Line Creek Operations
2022 Annual Water Report
Permit 5353

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Teck

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Executive Summary

The 2022 Annual Report was completed in accordance with Section 4.3 of Effluent Permit 5353, issued to Line Creek Operations under the provisions of the *Environmental Management Act*, most recently amended on July 22, 2021.

Maintenance activities of authorized works were conducted at Line Creek Operations in 2022, which included sediment/material cleanout of the Rail Loop Ponds (E210372/LC_EPOUT), the No Name Creek Pond (E221268) and Steam Bay Ponds (E288269). Additional maintenance activities include upgrades to the Sewage Treatment System and the Dry Creek flocculant station.

Throughout 2022 there were a total of 61 sets of duplicates samples collected, resulting in 122 parameters being evaluated for relative percent difference in accordance with Permit 5353. Of the 122 parameters evaluated, 4 did not meet acceptable relative percent difference assessment criteria. A total of 67 sets of field blank samples were collected in 2022, for a total of 134 parameters being evaluated in accordance with Permit 5353. Of the 134 parameters evaluated, there were no results above analytical method detection limits.

In 2022, Line Creek Operations had 18 quality assurance and quality control issues; 12 were related to hold-time exceedances and 6 were related to relative percent difference failures.

Line Creek Operations had 30 non-compliances in 2022. Twenty-four of these non-compliances were associated with unauthorized discharges of effluent from the coal preparation plant that were directed into a storm water ditch rather than the authorized location of the Rail Loop Ponds. Other non-compliances included two extractable petroleum hydrocarbons exceedances after Oil/Water Separators, two cases of freeboard exceedance at Rail Loop Ponds (E210372/LC_EPOUT), one case of unauthorized discharge at Horseshoe pit, and one TSS exceedance (>50mg/L) at Mine Service Area West Culvert. 2022 non-compliance's are further summarized in section 2.3. There were no missed samples for Permit 5353 in 2022. All permit limit requirements related to monitoring results are summarized in Table i. All unattainable data was due to frozen or dry streams. There was no discharge from the No Name Creek Pond (E221268/LC_LC9) in 2022, and the Contingency Treatment Pond (E219411/LC_LC8) was not used in 2022.

Monitoring for total suspended solids, turbidity, extractable petroleum hydrocarbons, and flow was conducted as per the Permit 5353 requirements. Discharge of stored pit water from Horseshoe Pit (E308146/LC_HSP) occurred from June 19, 2022 to December 31, 2022. Discharge from Horseshoe Pit was sampled in accordance with Line Creek Operation's *Horseshoe Ridge Pit Dewatering Plan* (2022). In 2022, Line Creek Operations initiated pumping from the Mine Service Area Extension Pit. This discharge was sampled in accordance with Line Creek Operation's *MSX Pit Pumping Plan* (2022). As the Contingency Treatment System (E219411/LC_LC8) was not used, and did not discharge in 2022, no samples were collected at these locations. All other parameters are monitored in accordance with Permit 107517 and are reported in the 107517 annual water report.

Table i. Exceedances of permit limits and Water Quality Guidelines for Protection of Aquatic Life (BCWQG) in site receiving waters in 2022.

EMS ID	Location Code	Parameter	Permit Limits	BCWQG	Frequency of Exceedance (%)
E102494	LC_LC11*	Flow-Daily	45 m^3/day	-	0/0 (0%)
E102494	LC_LC11*	Biochemical Oxygen Demand, Five Day	130 mg/L	-	0/0 (0%)
E102494	LC_LC11*	Total Suspended Solids, Lab	130 mg/L	-	0/0 (0%)
E288269	LC_SBPIN	EPH (C10-C32)	15 mg/L	-	1/15 (6.67%)
E288269	LC_SBPIN	Flow- Daily Average	150 m^3/day	-	0/110 (0%)
E216144	LC_LC7	Total Suspended Solids, Lab	50 mg/L	-	0/17 (0%)
E219411	LC_LC8*	Total Suspended Solids, Lab	50 mg/L	-	0/0 (0%)
E221268	LC_LC9*	Total Suspended Solids, Lab	50 mg/L	-	0/0 (0%)
E210372	LC_EPOUT	Freeboard	>1 m	-	36/365 (9.86%)
E295211	LC_SPDC	Total Suspended Solids, Lab	50 mg/L	-	0/156 (0%)
E295211	LC_SPDC	Flow- Continuous	1.8 m3/s	-	0/365 (0%)
E308146	LC_HSP	Total Suspended Solids, Lab	50 mg/L	-	0/23 (0%)
E308146	LC_HSP	Dissolved Oxygen - minimum	-	<5 mg/L	0/43 (0%)
E308146	LC_HSP	Dissolved Oxygen – 30-day average	-	<8 mg/L	0/23 (0%)
E308146	LC_HSP	Total Iron	-	1 ug/L	0/23 (0%)
E308146	LC_HSP	Mercury	-	0.00125 ug/L	0/23 (0%)
E308146	LC_HSP	Nitrite-Nitrogen as N	-	0.2 mg/L**	0/23 (0%)
E308146	LC_HSP	Total Selenium	-	2 ug/L	23/23 (100%)
E308146	LC_HSP	Temperature (field)	-	15 ºC	5/23 (21.74%)
E308147	LC_MSAWCULV	Total Suspended Solids, Lab	50 mg/L	-	1/20 (5%)
-	LC_LVWB	EPH (C10-C32)	15 mg/L	-	1/10 (10%)

*No discharge throughout the year.

**Guideline is variable and dependant on chloride. Value referenced is for low chloride water.

1 Description of Mine Operation and Discharges

1.1 Introduction

Teck Coal Limited (Teck) – Line Creek Operations (LCO) is located within the front ranges of the southern Canadian Rocky Mountains, approximately 18 kilometers northeast of Sparwood, British Columbia, and is comprised of 4,344 hectares of permitted land. Mining operations at LCO commenced in 1981, with the primary focus on producing steelmaking coal, although a lesser amount of thermal coal is also produced. In 2022, LCO produced 3,229,671 metric tonnes clean coal (MTCC) and 37.5 million bank cubic meters (MBCM) of waste rock. 1.2 MBCM of coarse coal refuse (CCR) was sent to the East Rejects Extension (ERX) CCR spoil.

As of December 31, 2022, total surface development at LCO was 2,771.1 ha with 596 ha reclaimed**.** Mine development at LCO in 2021 resulted in 97.7 ha of new disturbance. The majority of the new disturbance occurred in the Mount Michael pit, Burnt Ridge North pit, and Dry Creek waste rock spoil.

Current mining operations associated with Permit 5353 are impacting the Line Creek and Dry Creek drainages. Line Creek joins the Fording River which then flows into the Elk River. Five main tributaries feed Line Creek; (beginning at the headwaters and moving downstream) Tornado Creek, No Name Creek, West Line Creek, South Line Creek and Teepee Creek. Dry Creek is a tributary that drains to the north into the Fording River, which then flows into the Elk River.

1.2 Overview of Operations

In 2022, LCO operated in accordance with Permit 5353, most recently amended July 22, 2021, and issued to LCO under the provisions of the *Environmental Management Act*. This annual report reflects the requirements outlined in Section 4.3 of Permit 5353 and in the Annual Status Form (ASF) located in Appendix A.

Currently, 15 discharge and 20 receiving sites are identified in Permit 5353 as monitoring locations, as shown in Figure 1 and Table 1. Of those sites, two discharge sites and two receiving sites are not actively monitored under Permit 5353 as they are either not constructed or not in use (E295316/LC_SP3SW, and E295231/LC_SPFR), or do not have associated monitoring requirements (E295232/LC_FRUS, and E288271/LC_FRUSDC). The bypass to the Contingency Treatment System (219411/LC_LC8), which diverts Line Creek (downstream of 200337/LC_LC3) into the pond system to treat suspended solids, remained closed through 2022 and was not utilized for water treatment. Surface water runoff of the mining areas and roads at LCO are managed through the Mine Water Management Plan, and an updated version of this Plan was submitted to regulators June 30, 2022.

Mine development at Line Creek in 2022 resulted in 97.7 ha of new disturbance in the Mount Michael pit, Burnt Ridge North pit, and Dry Creek waste rock spoil. The coarse coal refuse development and Dry Creek Conveyance and Supplementation project also contributed to new disturbance, as did small amounts on Burnt Ridge North pit for exploration access construction. The Burnt Ridge Extension and Mine Services Area Extension pits in Line Creek Operations Phase I, and the Mount Michael pit and Burnt Ridge pit in Line Creek Operations Phase II, were active throughout 2022.

Access remained periodically limited to upstream areas of the Mine Service Area (MSA) North Settling Ponds (E216144/LC_LC7) system in 2022 due to geotechnical safety restrictions.

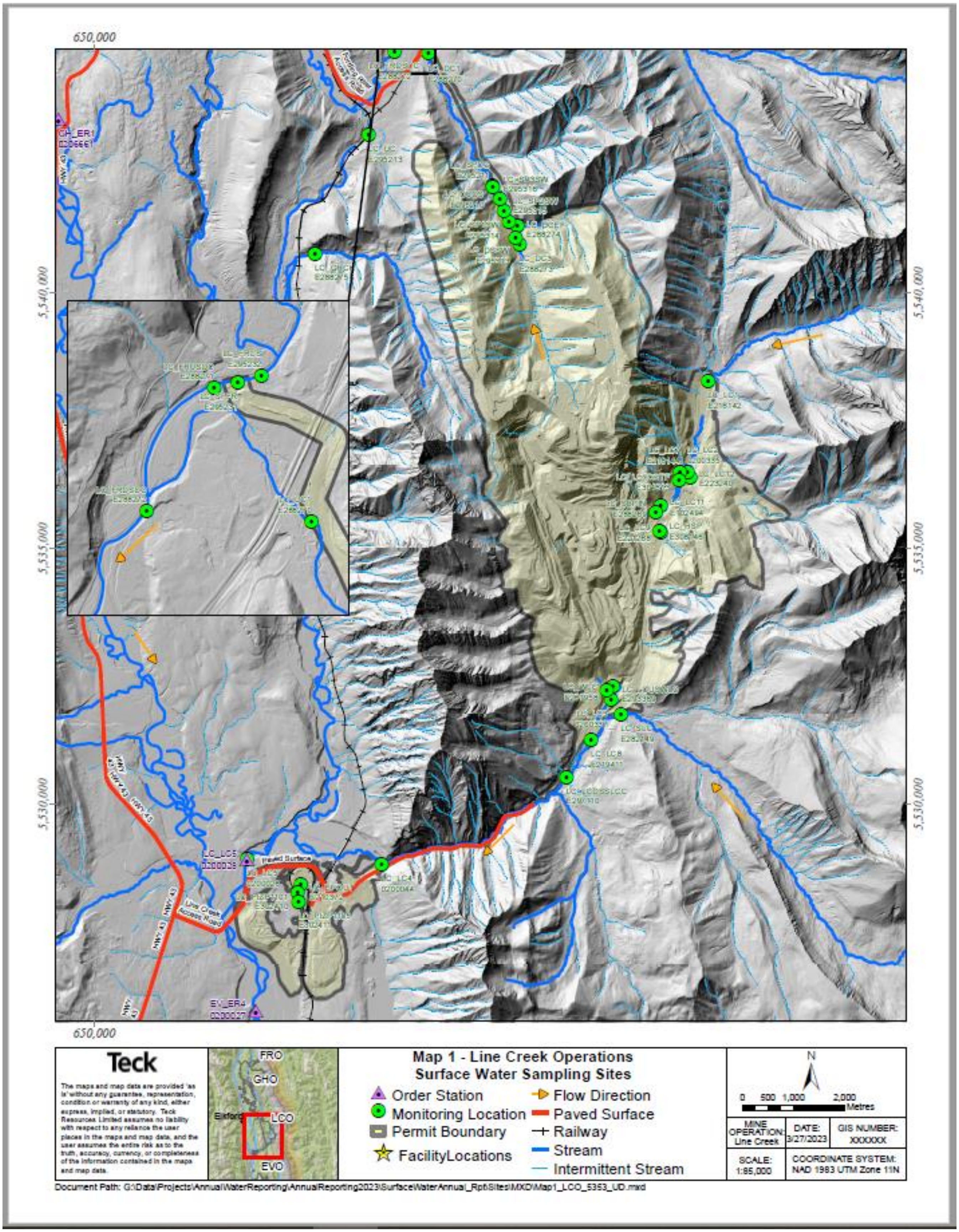

Figure 1. Line Creek Operations Surface Water Monitoring Locations.

Table 1. Summary of Permitted Sampling Sites

EMS ID	Site ID	UTM		Type	Description
		Northing	Easting		
E102494	LC_LC11	5535808	661072	Discharge	Mine Service Sewage Effluent to Ground
E216144	LC_LC7	5536472	661436	Discharge	MSA North Ponds Effluent to Line Creek
E219411	LC_LC8	5531255	659692	Discharge	Contingency Treatment System Effluent to Line Creek
E221268	LC_LC9	5535328	661033	Discharge	No Name creek Pond Effluent to Line Creek
E288269	LC_SBPIN	5535623	660991	Discharge	Wash Bay Effluent Discharge to Steam Bay Ponds to Ground
E302410	LC_PIZP1101	5528264	653956	Discharge	Rail Loop Ponds Effluent to Ground
E302411	LC_PIZP1105	5528075	653984	Discharge	Rail Loop Ponds Effluent to Ground
E308146	LC_HSP	5535319	661042	Discharge	Discharge of stored pit water from Horseshoe Pit
E295211	LC_SPDC	5542042	657821	Discharge	Dry Creek Sedimentation Pond effluent to Dry Creek
E295231	LC_SPFR	n/a	n/a	Discharge	Dry Creek Sediment Ponds effluent to Fording River
E253313	LC_DSSW	5541049	658225	Discharge	Diversion Structure Spillway
E295314	LC_SP1SW	5541366	658085	Discharge	Sedimentation Pond 1 Spillway
E295315	LC_SP2SW	5514710	655646	Discharge	Sedimentation Pond 2 Spillway
E295316	LC_SP3SW	n/a	n/a	Discharge	Sedimentation Pond 3 Spillway
E308147*	LC_MSAWCULV	5535205	660702	Discharge	Discharge of stored pit water from MSAW Pit (in accordance with MSX Pit Pumping Plan)
0200028	LC_LC5	5528919	652976	Receiving	Fording River downstream of Line Creek
0200044	LC_LC4	5528823	655604	Receiving	Line Creek upstream of Process Plant
0200337	LC_LC3	5532022	660090	Receiving	Line Creek downstream of West Line Creek
0200335	LC_LC2	5536473	661579	Receiving	Line Creek upstream of Rock Drain
E223240	LC_LC12	5536374	661629	Receiving	North Horseshoe Creek Near Mouth
E216142	LC_LC1	5538253	661978	Receiving	Line Creek upstream of MSA North Pit
E282149	LC_SLC	5531737	660271	Receiving	South Line Creek
E293369	LC_LCUSWLC	5532280	660124	Receiving	Lune Creek upstream of WLC Below Rock Drain
E261958	LC_WLC	5532208	660004	Receiving	West Line Creek
E297110	LC_LCDSSLCC	5530522	659218	Receiving	Line Creek Immediately downstream of south Line Creek Confluence
E288274	LC_DCEF	5541295	658260	Receiving	East Tributary of Dry Creek
E295210	LC_DCDS	5542073	657766	Receiving	Dry Creek Downstream of sedimentation ponds
E288270	LC_DC1	5544658	656520	Receiving	Dry Creek near mouth (at bridge)
E295213	LC_UC	5543086	655351	Receiving	Unnamed Creek
E288275	LC_GRCK	5540755	654303	Receiving	Grace Creek upstream of the CP rail tracks
E295232	LC_FRUS	5545243	656317	Receiving	Fording River 100m upstream of conveyance outfall
E288271	LC_FRUSDC	5545195	656126	Receiving	Fording River upstream of Dry Creek, 100m downstream of conveyance outfall
E288272	LC_FRDSDC	5544699	655856	Receiving	Fording River downstream of Dry Creek
E295214	RC_CH1	5552839	655796	Receiving	Chauncey Creek
E288273	LC_DC3	5540918	658294	Receiving	Dry Creek upstream of East Tributary Creek

Monitored in **accordance with MSX Pit Pumping Plan*

1.3 Maintenance of Works

This section provides a summary of maintenance activities of authorized works throughout 2022 (e.g., removal, culvert maintenance, etc.). Ongoing inspections of authorized works occurred throughout 2022 and were often the trigger for the maintenance of works described below, and are listed in Table 2.

In 2022, sediment was removed from the Rail Loop Settling Ponds (Rail Loop Pond B and Rail Loop Pond A), No Name Creek Diversion and Sediment Ponds, and the Steam Bay Ponds to maintain their design performance (Table 2). Sediment was disposed of in accordance with LCO's approved *Sediment Management Plan* (2015). Final reports for all sediment characterization tests are provided in Appendix B. In Q4, 2022 LCO submitted an updated version of the LCO *Sediment Management Plan* with input from Qualified Professionals. This version is undergoing review and comments from BC Ministry of Environment and Climate Change (ENV) and Ktunaxa Nation Council (KNC) and further development of it will continue in 2023.

No infrastructure changes were made to the authorized works for the MSA North Ponds (E216144/LC_LC7) or the Contingency Treatment System (E219411/LC_LC8).

In 2022, LCO continued work on upgrading the Sewage Treatment System (E102494/LC_LC11) to incorporate a membrane bioreactor (MBR) wastewater treatment unit to supplement the existing system. Work the MBR initiated with Qualified Professional discussions in May 2021, and following project design consultation, it was placed into position on December 17, 2021. Work progressed in Q1 and Q2 2022 with installation of electrical and mechanical/piping components of the project. Commissioning of the system was attempted during the first week of July 2022 but could not be completed because additional electrical components were identified that required upgrade to support the operation of the MBR. LCO is currently working with electrical engineering consultants and contractors to resolve challenges as work progresses in support of commissioning the system. Once these challenges are resolved, a commissioning date will be defined.

The Dry Creek flocculant addition station went through preliminary commissioning for system repairs (i.e., plumbing and logic control) and general upgrades for expected operation in 2023.

Table 2. Maintenance of Works Summary

Notification Date	EMS ID	Site ID	Location	Maintenance Complete
February 22, 2022	E210372	LC_RLPB	Rail Loop Pond B	June 2022 – sediment cleanout of Pond B (~11,000 m3)
February 22, 2022	E210372	LC_RLPA	Rail Loop Pond A	Rail Loop Pond A (~20,000 m3)
August 30, 2022	E288269	LC_SBPIN	Steam Bay Pond	Sediment Removal completed Q1, 2023
August 30, 2022	E221268	LC_LC9	No Name Creek Diversion and Sediment Pond Bypass	Sediment Removal completed in Q1, 2023
May 2021	E102494	LC_LC11	Sewage Treatment System	Installation of electrical and mechanical components along with additional upgrades and maintenance preformed inside MBR.
May - October 2022	E295211	LC_SPDC	Dry Creek Flocculant Addition Station	Conducted repairs in preparation for operation in 2023 including: replacement of pumps, plumbing repairs and general system upgrades.

2 Incidents and Compliance Summary

2.1 Incidents

Incidents resulting in the release of unauthorized effluent to the environment or resulting in non-compliance, including spills, discharges that bypassed authorized treatment works, and unscheduled and emergency release are tracked and reported, summarized below.

The *Spill Reporting Regulation* is followed for reporting spills occurring onsite. Emergency Management B.C. (EMBC) provides a reference number (Dangerous Goods Incident Report (DGIR number), which is included in any additional incident reporting to external agencies. A summary of all spills and incidents reported to EMBC can be found in Appendix C.

2.1.1 INCIDENTS RELATED TO WATER QUALITY

A summary of the reportable spills, precautionary spills, and/or incidents related to water quality at LCO in 2022 listed in Appendix C, details of these incidents are listed below.

2.1.1.1 LCO Pit Acute Toxicity Failures

Water quality monitoring in the LCO pits is driven by Permit 5353, the monitoring requirements outlined within, and the detailed monitoring requirements from the pits as outlined in specific pit pumping plans that specifies for the sampling location and frequency of monitoring. As outlined in the 2021 annual water report for effluent permit 5353, on December 2, 2021 acute toxicity samples were collected from MSX pit water being pumped for emergency purposes. Initial sample results indicated additional acute toxicity monitoring of MSX pit water was required due to samples not meeting the acute toxicity permit. These acute toxicity test failures are described in section 6.2 of *EMA* effluent permit 107517 as causing >50% mortality in the test organism (i.e., Rainbow trout or *Daphnia magna*). Rainbow trout and *Daphnia magna* acute toxicity testing follows standard procedures that are followed by the Qualified Professionals and third-party Laboratory: Nautilus Environmental.

Numerous reports were submitted to EMBC as precautionary spills in 2022. These precautionary spills have been referenced in previous quarterly water reports and are summarized below based on the occurrence location.

2.1.1.1.1 Mine Service Area Extension (MSX) Pit – Rainbow trout

Acute toxicity monitoring of MSX pit water was ongoing throughout 2022 following the initial acute toxicity test failure found in Rainbow trout in December 2021 (Initially reported in the Q1 2022 quarterly report). The spill was originally reported to EMBC on January 19, 2022 under DGIR number 214353. The cause of acutely toxic results to Rainbow trout from MSX pit water likely occurred from un-ionized ammonia which is developed from a changing pH in sample water resulting from aeration during the standardized laboratory test procedure. Further Toxicity Identification Evaluations (TIE) were completed for ongoing monitoring from the MSX pit (i.e., acute toxicity testing using pH stabilized methods). This information was reviewed and evaluated through the Environmental Impact Assessment, submitted as part of the End of Spill Report for DGIR number 221470 on October 15, 2022 by Golder Associates Ltd (2022).

As monitoring of the MSX pit continued throughout 2022, additional analysis was conducted using the pH stabilized method which continued to support the suspected cause of toxicity in the standard test. On September 7, 2022 failed results were observed in the pH stabilized acute toxicity test. These results indicated a potential change to the cause of the acutely toxic response of Rainbow trout observed in MSX pit water. Input from Qualified Professionals (QP) suggested the cause was likely related to elevated concentrations of nitrite. This was reported to EMBC under DGIR number 222285, and an End of Spill report was provided on October 6, 2022. Ongoing monitoring continued to occur and similar failed acute toxicity results were reported from the pH stabilized sample collected November 17, 2022 which led to further reporting to EMBC under DGIR number 223310 – this DGIR remains open and ongoing 30 day updates are being provided following the *Spill Reporting Regulation*.

Ongoing monitoring of the MSX pit in 2022 followed the LCO MSX Pit Pumping Plan. Review of the data from these sample requirements further support LCO's understanding of the potential risks in the downstream environment caused by discharge of water from the MSX pit. Water from the MSX pit flows either via ditches or controlled pumping into the Mine Service Area West (MSAW) backfilled pit. Water then naturally decants into the Line Creek Rock Drain which flows to the downstream receiving environment approximately 3 km away from the decant location: Line Creek upstream of West Line Creek (EMS E293369 / LC_LCUSWLC). Further studies are ongoing to evaluate monitoring locations within the MSAW backfilled pit that best represent discharge from the pit. Updates from this ongoing work will be provided through End of Spill reporting, and within the ongoing quarterly *Elk Valley Regional Water Quality Reports*.

2.1.1.1.2 Mine Service Area West (MSAW) Pit Acute Toxicity Failure – *Daphnia magna*

Monitoring of the MSAW backfilled pit water has been ongoing throughout 2022 following the initial observation of acutely toxic test results for effluent from the upstream MSX pit. On November 10, 2022, a water sample from the MSAW backfilled pit showed > 50% mortality in the *Daphnia magna* acute toxicity test from the shallowest MSAW pit well (LC_MSAW6). The result was observed in the pass/fail acute toxicity test (80% mortality of *Daphnia magna*). A second test (i.e., temperature controlled at 10°C) was recommended by QPs during the TIE to confirm the likely toxicant. Results from the 10°C temperature-controlled test showed 3% mortality from the same sample. This supported the QP's hypothesis that the likely cause of toxicity to *Daphnia magna* in the sample collected from the LC_MSAW6 pit well was caused by calcite (Golder Associates Ltd, 2022).

This incident was reported to EMBC on November 10, 2022 (DGIR number 223081). Following ongoing monitoring, and a lack of continuous acutely toxic results observed in *Daphnia magna,* an update report for DGIR number 223081 was provided on December 2, 2022. An End of Spill report was provided on December 21, 2022, as per *Spill Reporting Regulation*. Monitoring continues at this location, and reporting has discontinued due to ongoing passing acute toxicity test results.

2.1.1.1.3 Burnt Ridge Extension (BRX) Pit Acute Toxicity Failure – Rainbow Trout

Acute toxicity monitoring of BRX pit water began in April 2022 at end-of-pipe from a dewatering well in the BRX Pit. The sample result for April 25, 2022 showed 70% mortality to *Daphnia magna* at the 48-hour conclusion of testing.

Teck reported this incident to EMBC on April 29, 2022 (DGIR number 220400). The water samples were collected from end-of-pipe within an active mining area. Water from BRX Pit is pumped to a backfilled inactive North Line Creek Extension Pit (NLX Pit). Based on understanding, water was contained within NLX Pit in 2022 and was not discharging. This is supported through ongoing monitoring of the NLX pit water levels.

As a follow up to receiving the April 25, 2022 preliminary results, Teck LCO requested an evaluation of the potential cause of the acute toxicity test failure from the third-party laboratory, Nautilus Environmental Company Inc. The likely cause of the *Daphnia magna* mortalities was due to calcite precipitation on the *Daphnia magna*, as supported by review of water quality results. Additionally, TIE test was requested to determine cause of mortality from follow up sampling collected on April 29, 2022 and May 2, 2022 at the end-of-pipe discharge from the BRX Pit well.

The TIE for samples collected on April 29, 2022 and May 2, 2022 involved conducting parallel testing at the lab (i.e., standard method, and pH-controlled method). The toxicity results for *Daphnia magna* from these two samples were 0% and 20% mortalities respectively, indicating both samples passed the test. Standard Rainbow trout tests from these samples failed, with mortalities at 70% and 60% respectively. The laboratory indicated the toxicity in the lab observed while testing BRX Pit likely occurred from un-ionized ammonia which is developed from a changing pH in the water resulting from aeration during the standardized laboratory test procedure. To support this, a pH-controlled test was initiated to avoid the generation of un-ionized ammonia. Under these testing conditions, toxicity to Rainbow trout was no longer observed through the duration of the 96-hour test.

As monitoring of the BRX pit continued throughout 2022, acute toxicity failures continued to be observed at an irregular basis and were reported to EMBC as precautionary spills. Between Q2 and Q3 2022, there was a period when no acute toxicity test failures were observed in BRX pit water and therefore reporting was discontinued. On August 19, 2022, a water sample from the BRX pit showed > 50% mortality in the Rainbow trout acute toxicity test. Reporting resumed and the incident was reported to EMBC on August 22, 2022 (DGIR number 221915). A 30-day update report for DGIR number 221915 was provided on September 16, 2022. Additionally, a water sample collected from the BRX pit on September 7 that also showed >50% in the Rainbow trout acute toxicity test. This was reported to EMBC on September 15, 2022 (DGIR number 222284). Further monitoring of the BRX pit on October 19, 2022 provided similar results as described above (i.e., failure of acute toxicity testing to Rainbow trout in both standard and pH controlled testing) and was reported to EMBC on October 28, 2022 (DGIR number 222865). The Rainbow trout result was observed in both the standard pass/fail acute toxicity test and in a pH-stabilized test that was recommended by qualified professionals during the TIE. The observed mortality result in both analyses suggested the cause of toxicity was changes due to water chemistry.

Please note end of spill reports have been submitted for these precautionary spill reports. The end of spill reports summarize the details of the acute toxicity failures and monitoring results. Pumping of the BRX pit water into the backfilled NLX pit was not expected to reach the downstream receiving environment in 2022, as observed in the continued monitoring of the NLX pit water levels relative to the known decant elevations. However, as outlined in other pit pumping plans (i.e., MSX) LCO has continued to collect acute toxicity samples in the downstream receiving environment in Line Creek (Line Creek upstream of West Line Creek) since January 18, 2022, and has not observed a toxicity signal.

2.1.1.1.4 North Line Creek Extension (NLX) Pit Acute Toxicity Failure – *Daphnia magna*

On June 6, 2022 a precautionary spill report was submitted based on an acute toxicity result from a water sample collected on June 2, 2022. Teck reported this incident to EMBC on June 6, 2022 (DGIR number 220875). The water sample was collected from the source water used at the NLX water tree for dust suppression which pumps water from an inactive backfilled pit (NLX Pit). The source of the water was from the NLX backfilled pit that is pumped to the NLX water tree. Water from the NLX water tree is used for dust suppression on mine roads throughout LCO and was not directly discharged to the receiving environment.

Preliminary results from the acute toxicity assessment for *Daphnia Magna* for samples taken from the NLX water tree on June 2, 2022 were received on June 5, 2022 and showed 63% mortality to *Daphnia magna* at the 48-hour conclusion of testing which resulted in a failed sample However, after reviewing the final sample report received on July 22, 2022, it was determined the 63% mortality had been incorrectly reported. The final result of *Daphnia magna* mortalities from the June 2, 2022 sample was 37%, which indicates this sample was not acutely toxic to D*aphnia magna*.

Reporting was further supported by follow up sampling on June 8th, 2022 from the NLX water truck filling station for acute toxicity assessment which showed 30% mortality of *Daphnia magna* through testing at standard test conditions of 20°C.

Teck requested additional evaluation of the potential cause of the acute toxicity test failure from the laboratory. The laboratory stated the likely cause of the *Daphnia magna* mortalities was due to calcite precipitation on the *Daphnia magna*, as supported by review of water quality results. Additionally, a second test of the same June 8, 2022 water sample was performed with the addition of antiscalant and showed results of 0% mortality to daphnia at 48 hour conclusion of testing. Follow up sample results from June 22, 2022 showed 0% mortality to daphnia at 48hr conclusion of testing and 0% mortality to Rainbow trout at 96 hours.

Please note the end of spill reports have been submitted for these precautionary spill reports. The end of spill reports summarize the details of the acute toxicity failures and monitoring results. Water in the backfilled NLX pit is expected to be controlled, and therefore does not discharge to the downstream receiving environment, as observed in the continued monitoring of the NLX pit water levels monitored thought 2022. However, as outlined in other pit pumping plans (i.e., MSX) LCO has continued to collect acute toxicity samples in the downstream receiving environment in Line Creek (Line Creek upstream of West Line Creek) since January 18, 2022, and has not observed a toxicity signal.

2.1.1.2 East Rejects Extension Coarse Coal Rejects Spoil – June 14, 2022

Following heavy precipitation mid-June 2022, it is believed that water ponding on the active dump area at the south end of the East Ridge Extension (ERX) flowed through and down the coarse coal reject (CCR) spoil slope, causing the formation of erosion gullies and leading to deposition of CCR material (approximately 257 m^3) at the base of a drainage outside of LCO's *Mines Act* C-129 permit boundary.

Immediate actions included conducting water quality monitoring (June 16 – 29, 2022), repair of the gullies, and cleaning out, enhancing and re-establishing erosion and sediment control measures. Several third-party qualified professionals have been engaged to determine the potential on/offsite erosion and sediment control risks, conduct assessments on potential impacts to wildlife, vegetation, and archeological resources, and provide remediation recommendations. Future actions include removing saturated material from spoil toe, reviewing management plans and procedures to reduce water ponding potential, and development of mitigations to prevent fan development and fines transport. Additional corrective measures and clean-up actions will be developed based on the results of ongoing assessments and QP recommendations.

Teck reported this incident to EMBC on June 15, 2022 (DGIR number 221003). This incident was also reported as a noncompliance under *Mines Act* Permit C-129, with an update provided on June 24, 2022. The 30-day End of Spill Report was submitted July 17, 2022, which included results from the monitoring conducted.

2.1.1.3 Tributary (T5) of LCO Dry Creek Erosion Repair - June 17, 2022

On June 17, 2022, LCO staff discovered that high flows had eroded the left bank of a tributary (T5) of LCO Dry Creek. Based on current understanding, the high flows in this tributary were attributed to the rapid melting of snow that was deposited in the drainage during a heavy precipitation event earlier in the week.

Repair work was initiated under an emergency order from the Ministry of Forests (received June 17, 2022) to repair the erosion and reinforce/stabilize the channel and banks to prevent recurrence. The majority of the repair work was completed on June 17, 2022 and June 18, 2022. A post-completion report detailing emergency repairs conducted for the T5 tributary was written and signed by Kerr Wood Leidal (KWL), the qualified environmental professional who provided direction on the emergency repairs. As per the order, the post-completion report was submitted to Ministry of Forests on June 21, 2022. Following completion of repairs, field turbidity readings showed improvement and a return to background levels.

Teck reported this incident to EMBC on June 17, 2022 (DGIR number 221036). The 30-day End of Spill Report was submitted July 18, 2022, which included results from the monitoring conducted.

2.1.1.4 Dry Creek Turbidity Issues - August 27, 2022

At approximately 08:45 AM on August 27, 2022, a flash rain event caused an influx of water to flow from the drainage through a culvert at Dry Creek. At 10:00 AM, turbidity at the Dry Creek Bridge was 53.23 NTU.

The Erosion Sediment Control crew working with the LCO Dry Creek Conveyance & Supplementation project was deployed to the field to monitor and maintain check dams along the road. A culvert located close to Dry Creek was assessed as a potential source for sediment-laden water into Dry Creek and was immediately blocked off, diverting water around the culvert down towards a sediment containment sump.

Teck reported this incident to EMBC on August 30, 2022 (DGIR number 222065). The 30-day End of Spill Report was submitted September 29, 2022, which included results from the monitoring conducted.

2.1.2 ALL OTHER REPORTABLE SPILLS AND INCIDENTS

Reporting of spills is done in accordance with *Spill Reporting Regulation*. In 2022, a total of (156) spills and incidents occurred at LCO and were reported to EMBC. A summary of all spills and incidents reported to EMBC can be found in Appendix C.

2.2 Compliance Summary

All effluent monitoring is conducted in accordance with the monitoring schedule identified in Appendix A of Permit 5353, and summarized in Section 4.1, Table 8 of this report. All monitoring results are compared to applicable permit requirements and limits, summarized in Table 3 below.

Table 3. Summary of Site Permit Limits

EMS ID	Site ID	Parameter	Permit Limit Value
E102494	LC_LC11	Biochemical Oxygen Demand (Maximum)	130 mg/L
E102494	LC_LC11	Total Suspended Solids (Maximum)	130 mg/L
E102494	LC_LC11	Flow (Maximum)	45 m^3/day
E288269	LC_SBPIN	EPH (Maximum)	15 mg/L
E288269	LC_SBPIN	Flow (Average)	150 m^3/day
E216144	LC_LC7	Total Suspended Solids (Maximum)	50 mg/L
E216144	LC_LC7	Flow	0.84 m^3/sec
E219411	LC_LC8	Total Suspended Solids (Maximum)	50 mg/L
E219411	LC_LC8	Flow	3 m^3/sec
E221268	LC_LC9	Total Suspended Solids (Maximum)	50 mg/L
E221268	LC_LC9	Flow	2.3 m^3/sec
E210372	LC_EPOUT	Freeboard	>1 m
-	Miscellaneous Oil/Water Separators	EPH (Maximum)	15 mg/L
E308146	LC_HSP	Total Suspended Solids (Maximum)	50 mg/L*
E308146	LC_HSP	Water Quality Characteristics	As per dewatering plan*
E308147	LC_MSAWCULV	Total Suspended Solids (Maximum)	50 mg/L*
E295211	LC_SPDC	Total Suspended Solids	50 mg/L
E295211	LC_SPDC	Flow	1.8 m^3/sec
E295231	LC_SPFR	Total Suspended Solids	50 mg/L
E295231	LC_SPFR	Flow	1.8 m^3/sec

*Permit limit is in effect for E308146 and E308147 when pit pumping is occurring.

2.3 Non-Compliances

There were 30 non-compliances reported by LCO in 2022 (Table 4).

Table 4. Summary of Permit 5353 Non-compliances

#	EMS ID	Site ID	Date	Parameters	Description/Corrective Actions
1	E288269	LC_SBPIN	1/20/2022	EPH Exceedance	Condition 1.6.2 of Permit 5353 states that the characteristics of the discharge of effluent from the Heavy-Duty Steam Bay to the Steam Bay Ponds (LC_SBPIN; E288269) must not exceed 15 mg/L for extractable petroleum hydrocarbons (EPH). The routine water sample collected on January 20, 2022, at 08:45 had an EPH result of 19.6 mg/L. LCO ceased discharge from the Heavy-Duty Steam Bay (HDSB) on February 5, 2022. In addition, the discharge valves of the Heavy-Duty Steam Bay Recycle system were locked out (closed) to prevent discharge. Corrective actions that followed from these findings were to immediately restrict the use of the ineffective soaps within the HDSB (through supply controls via the LCO warehouse) and update the work procedures and ongoing inspections of the HDSB to ensure that the cartridge filter changes of the oil water separator are occurring on a weekly basis. The frequent change out of cartridge filters within the system will help ensure the effective removal of EPH.
2	--	LC_LVWB	3/10/2022	EPH Exceedance	Condition 1.7.1 of Permit 5353 states that the characteristics of the discharge of effluent from miscellaneous oil-water separators (OWS) must not exceed 15 mg/L for extractable petroleum hydrocarbons (EPH). A routine water sample collected at the Light Vehicle Wash Bay OWS on March 10, 2022, at 08:50 had an EPH result of 67.1 mg/L; this exceeded the discharge limit established for miscellaneous oil-water separators. Removal of material from the Light Vehicle Wash Bay sump occurred on March 10, 2022, along with a clean out of the OWS with fresh water after the sampling event. LCO has installed a sample port on the Light Duty Wash Bay OWS discharge pipe to ensure the sample is representative of water that is discharging from the LVWB OWS, rather than water at another location within the system (e.g., a sump located prior to the oil water separator or within the OWS prior to discharge) that does not accurately represent discharge concentrations.
3-4	E210372	LC_RLPC	3/22/2022 7/24/2022	Freeboard Exceedance	Condition 1.1.1 in Permit 5353 states that the freeboard in Rail Loop Settling Pond C must be greater than one metre. Condition 2.5 in Permit 5353 states that freeboard is defined as the difference in elevation between the top of the dyke and the level of the liquid impounded by the dyke. On March 22 and July 24, 2022, water level sensor data and field observations showed that the freeboard in Rail Loop Settling Pond C was less than 1 m. Following visual observations of water level in Rail Loop Pond C, the processing plant implemented processing water use restrictions. These restrictions remained in place until the freeboard returned within typical operational levels (i.e., Early April to Mid July, and then late July onwards for 2022 - details of the Rail Loop Pond water levels in 2022 can be seen in section 5.2.1.1). The LCO coal preparation plant will prioritize the use of recycled water returned from the Rail Loop Ponds until water levels in Rail Loop Pond C return to compliance. In addition, will proceed with planned routine removal of sediment from Rail Loop Pond A and Pond B to allow for more water storage which will reduce water levels in Rail Loop Pond C, and install staff gauges on all Rail Loop Ponds to improve visual observations.

#	EMS ID	Site ID	Date	Parameters	Description/Corrective Actions
5 -28	--	LC_PLTSPILL	3/29/2022 3/30/2022 4/4/2022 4/9/2022 4/20/2022 4/22/2022 4/29/2022 5/13/2022 5/28/2022 6/9/2022 6/10/2022 7/9/2022 7/22/2022 8/30/2022 10/7/2022 10/10/2022 10/21/2022 11/3/2022 11/8/2022 11/22/2022 11/28/2022 11/29/2022 12/7/2022 12/7/2022	Unauthorized Discharge	Condition 1.1 of Permit 5353 authorizes the discharge of effluent to ground from a coal preparation plant into four Rail Loop Ponds (E210372). Condition 2.1 of Permit 5353 (dated July 22, 2021) states that in the event of a condition or emergency that leads to unauthorized discharge, the permittee must (i) comply with all applicable statutory requirements, including the Spill Reporting Regulation; (ii) immediately contact the director, or an officer designated by the director, by email and telephone; and (iii) take appropriate remedial action for the prevention or mitigation of pollution. The non compliances in 2022 were the result of various operational malfunctions that led to water from the coal preparation plant overflowing through an access door and outside the building, resulting in spills ranging from 300L to 20,000L of clarified and/or process water. All of the spilled materials flowed to a nearby roadside ditch. As the coal preparation plant clarified and process water were not discharged into the four Rail Loop Ponds, these were all considered unauthorized discharges and reported as per Condition 2.1. At the time of the incident(s), vacuum trucks were mobilized to recover the spilled material present within the ditch. Internal investigations were completed and are ongoing to understand the root cause of these individual events. Corrective actions for each independent incident are further explained in Appendix D.
29	E308146	LC_HSP	8/25/2022	Unauthorized Discharge	Condition 2.13.5 in Permit 5353 states the Teck must notify the director, in writing, at least 24 hours in advance of starting of pit pumping and again within 24 hours of the completion of pit pumping. At 15:34 on August 23, 2022, LCO submitted a notification to the Ministry of Environment and Climate Change Strategy (ENV) under Condition 2.13.5 of Permit 5353 indicating that emergency pit pumping from Horseshoe Ridge Pit (HSP) had ceased. On August 25, 2022 at 14:50, during a field inspection of the HSP discharge point (LC_HSP; E308146) discovered water running into the Line Creek Rock Drain (LCRD). No notification was provided to ENV at least 24 hours in advance of this discharge. Corrective actions involved ceasing discharge on August 25, 2022 and reporting the noncompliance to the Ministry of Environment and Climate Change Strategy on August 26, 2022. As a result of the investigation about the incident, controls for activating the pumps in HSP were physically locked out to prevent further unplanned operation of the system.
30	E308147	LC_MSAWCULV	12/14/2022	TSS Exceedance	Section 1.8.2 in Permit 5353 states that discharge of stored pit water from MSAW Pit to Line Creek must not exceed a total suspended solids (TSS) of 50 mg/L (EMS E308147). Under LCO's MSX Pit Pumping Plan, this limit (and EMS number) is applied to the sample location LC_MSAWCULV during periods of active pumping from MSX. As part of the monitoring conducted as per the pit pumping plan, a routine water sample collected on December 14, 2022 at 2:30 PM from LC_MSAWCULV, Mine Services Area West backfilled pit decant, exceeded this limit with a TSS result of 56.5 mg/L. Following discovery of the exceedance, an investigation of the conditions was conducted and confirmed that it was limited to a single sample and not indicative of an on-going event. LCO is conducting further investigation into this incident to identify the root cause(s) and inform the development of corrective actions.

2.4 Missing and Unattainable Data

All monitoring is conducted in accordance with Permit 5353. When data is not obtained it is categorized as either missed data or unattainable data (Table 5). Potential causes of missed samples are human error or issues with the Sample Planning Module (SPM) of Teck's Environmental Quality Information System (EQuIS) database. Data categorized as unattainable occurs when circumstances prevent the collection of water samples from authorized discharges and/or receiving environment sampling sites throughout the calendar year. Such circumstances are generally out of Teck's control and include, but are not necessarily limited to, unsafe sampling conditions for personnel, no flow due to freezing conditions, or cessation of discharge activities.

MISSING DATA SUMMARY

There was no missed data in 2022.

UNATTAINABLE DATA SUMMARY

Table 5. Summary of Unattainable Data

EMS ID	Site ID	Date	Parameters	Reason
E216142	LC_LC1	Q1 2022	All parameters	No flow (frozen)
		December 2022	All parameters	No flow (Frozen
E219411	LC_LC8	Q1 2022	All parameters	No flow (not discharging)
		Q2 2022	All parameters	No flow (not discharging)
		Q3 2022	All parameters	No flow (not discharging)
		Q4 2022	All parameters	No flow (not discharging)
E221268	LC_LC9	Q1 2022	All parameters	No flow (not discharging)
		Q2 2022	All parameters	No flow (not discharging)
		Q3 2022	All parameters	No flow (not discharging)
		Q4 2022	All parameters	No flow (not discharging)
E102494	LC_LC11	Q1 2022	All parameters	No flow (not discharging). On going system upgrades
		Q2 2022	All parameters	No flow (not discharging). On going system upgrades
		Q3 2022	All parameters	No flow (not discharging). On going system upgrades
		Q4 2022	All parameters	No flow (not discharging). On going system upgrades
E223240	LC_LC12	Q1 2022	All parameters	No flow (not discharging)
		April 2022	All Parameters	No flow (not discharging)
		August 2022	All parameters	No flow (not discharging)
		September 2022	All parameters	No flow (not discharging)
		Q4 2022	All parameters	No flow (not discharging)
E288275	LC_GRCK	Q1 2022	Flow	Unattainable flow (partially frozen)
E295214	RG_CH1	January 2022	Flow	Unattainable flow (partially frozen)
		February 2022	Flow	Unattainable flow (partially frozen)
		December 2022	Flow	Unattainable flow (partially frozen)
E308147	LC_MSAWCULV	Q1 2022	All parameters	Unattainable Sample (well obstruction)

Note that any site where flow was absent (no flow, not discharging), a result was uploaded to EMS as a zero flow and the water quality parameters were therefore not attainable.

3 Data Quality Assurance and Quality Control (QA/QC)

3.1 QA/QC Program

In accordance with Section 3.1.3.3 of Permit 5353, LCO has implemented a Quality Assurance and Quality Control (QA/QC) Program in accordance with the *Environmental Data Quality Assurance Regulation* and guidance provided in the *British Columbia Field Sampling Manual for continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples* and the *British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air*. A summary of LCO's QA/QC program is provided below.

3.1.1 PERSONNEL TRAINING

LCO personnel are trained using Teck Standard Practices & Procedures (SP&P), hands-on training, and mentoring from more senior or experienced personnel. Training covers environmental monitoring (including sampling procedures, shipping methods, and equipment calibration procedures), data management, and reporting activities. Teck Coal Limited's operations employ a dedicated Training Department and utilize a Training History system for scheduling reviews of SP&Ps at set frequencies and tracking records of training.

3.1.2 EQUIPMENT CALIBRATION

Equipment used for measuring real time field parameters include a flow meter, turbidity meter and three multi-parameter meters that are used to measure pH, temperature, conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity. All meters are calibrated with the methodology and frequency recommended in the manufacturers' manuals. All in-house calibrations are conducted using certified calibration solutions per manufacturers' recommendations. Records of calibration and any required remedial actions are recorded in the equipment logbook. The calibration requirements for these instruments were met for 2022 (Table 6).

Table 6. Equipment Calibration Summary.

Equipment	Model	Calibration Frequency	Last Calibration	Due Date
Field Parameter Meter	YSI Exo 3	Daily/Weekly	Mar 15, 2022	Prior to scheduled sampling event
Field Parameter Meter	Pro DSS	Daily/Weekly	Dec 28, 2022	Prior to scheduled sampling event
Field Parameter Meter	Pro DSS	Daily/Weekly	Dec 28, 2022	Prior to scheduled sampling event
Field Parameter Meter	YSI Pro Plus	Daily/ Weekly when in use	Mar 15, 2022	Prior to scheduled sampling event
Hach Company, Flow Meter	Hach Model FH950.1	As required* (Completed by Manufacturer upon purchase in October 2020)	Oct 2020	As required*
KROHNE; Electromagnetic Flowmeter	Tidalflux X300F	As required by manufacturer	Nov 29, 2022	As required
Turbidity Meter	YSI Photometer 9500	Prior to each use	Dec 7, 2022	Prior to scheduled sampling event

*There is no manufacturer specification on calibration frequency; instrument is calibrated as needed.

3.1.3 RECORD KEEPING

Data quality is maintained by storing all sampling data in a controlled database. The data management application at LCO is EQuIS. User defined rules are applied to the uploading of data to ensure quality is maintained. Additionally, all data is compared to applicable limits or guidelines (e.g., *British Columbia Water Quality Guidelines*). If a value entered exceeds a limit or guideline, the user is advised in an automated report generated by the database. This enables users to determine if the value is entered incorrectly, if there is a possible laboratory error, or if values have truly exceeded the applicable standards.

3.1.4 SAMPLE ANALYSIS

In 2022, third-party analysis was conducted by:

- ALS Laboratory Group
  8081 Loughheed HWY
  Suite 100
  Burnaby, B.C. V5A 1W9

- ALS Laboratory Group
  2559 29 Street Northeast
  Calgary, AB T1Y 7B5

- ALS Laboratory Group
  9450 – 17 Avenue
  Edmonton, AB T6N 1M9

- Nautilus Environmental Company Inc.
  8664 Commerce Court
  Burnaby, B.C. V5A 4N7

- Nautilus Environmental Company Inc.
  10823 27 Street SE
  Calgary, AB. T2Z 3V9

Analyses were carried out in accordance with procedures described in the most recent edition of the *British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air*, or by suitable alternative procedures as authorized by the Director.

3.1.5 FIELD DUPLICATES

To measure the overall precision of sampling and analysis and to confirm environmental homogeneity, Teck collects duplicate samples in the field and calculates relative percent difference (RPD) as defined in the *British Columbia Field Sampling Manual*. RPD is the arithmetic difference between two samples, divided by the mean of those samples, then multiplied by one hundred to express the result as a percentage:

$$RPD = \left(\frac{(a - b)}{(a + b) / 2} \right) \times 100\%$$

Field Duplicate sample precision was evaluated using RPD where four criteria were used to evaluate each set of duplicate samples:

- RPD of < 20% = Pass
- RPD of >20% with results < 5 times the detection limit = Pass-1
- RPD of > 20% and <50% with results > 5 times the detection limit = Pass-2
- RPD of >50% with results > 5 times the detection limit = Fail

Throughout 2022 there were a total of 61 sets of duplicate samples collected, resulting in 122 parameters being evaluated for RPD. Of the 122 parameters evaluated, 4 (3.28%) did not meet acceptable RPD assessment criteria. Refer to Appendix E for results.

3.1.6 BLANK SAMPLES

Control blank sampling (trip blanks and field blanks) was conducted throughout the year in accordance with procedures established in *British Columbia Field Sampling Manual for Continuous Monitoring* as well as *The Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples*.

A total of 89 sets of trip blank samples were collected in 2022. A total of 178 parameters were analyzed with no results above the analytical method detection limit (100% non-detect). Refer to Appendix F for results.

Throughout 2022, a total of 67 sets of field blank samples were collected. A total of 134 parameters were analyzed with no results above the analytical method detection limit (100% non-detect). Refer to Appendix F for results.

3.2 QA/QC Issues

Teck monitors QA/QC results to identify any potential issues with laboratory precision or sample contamination. In accordance with the QA/QC Program concerns identified in the field and/or laboratories are tracked.Table 7 summarizes all QA/QC concerns for 2022 under Permit 5353. Teck continues to address the causes of hold-time exceedances by working with the laboratories to improve the timely reporting of issues such as equipment malfunctions, sample volumes, shipping delays, and laboratory resources. Timely reporting of these issues to Teck often provides field samplers enough time to resample to meet permit requirements.

Table 7. Summary of QA/QC Issues

Date	EMD ID	Location Code	Parameter	Reason
1/02/2022	0200337	LC_LC3	Turbidity, Lab	EHT
1/02/2022	0200028	LC_LC5	Turbidity, Lab	EHT
1/02/2022	E282149	LC_SLC	Turbidity, Lab	EHT
1/02/2022	E297110	LC_LCDSSLCC	Turbidity, Lab	EHT
3/22/2022	0200028	LC_LC5	Turbidity, Lab	RPD Failure
4/05/2022	0200028	LC_LC5	Total Suspended Solids, Lab	RPD Failure
5/02/2022	E216142	LC_LC1	Turbidity, Lab	RPD Failure
5/19/2022	E295211	LC_SPDC	Turbidity, Lab	EHTR
6/13/2022	E216142	LC_LC1	Turbidity, Lab	EHTL
6/13/2022	E223240	LC_LC12	Turbidity, Lab	EHTL
6/13/2022	0200335	LC_LC2	Turbidity, Lab	EHTL
6/13/2022	0200044	LC_LC4	Turbidity, Lab	EHTL
6/13/2022	E261958	LC_WLC	Turbidity, Lab	EHTL
6/24/2022	0200044	LC_LC4	Turbidity, Lab	EHTR
7/05/2022	E216142	LC_LC1	Turbidity, Lab	RPD Failure
8/08/2022	0200337	LC_LC3	Turbidity, Lab	RPD Failure
9/27/2022	E295211	LC_SPDC	Turbidity, Lab	EHT
12/12/2022	0200337	LC_LC3	Turbidity, Lab	RPD Failure

EHTR Exceeded ALS recommended hold-time prior to sample receipt.
EHTL Exceeded ALS recommended hold-time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT Exceeded recommended hold-time prior to analysis.
HTD Hold-time exceeded for re-analysis, but initial testing was conducted within hold-time.
RPD Relative Percent Difference

4 Water Monitoring Program Description

4.1 Water Quality and Quantity Monitoring Requirements

In 2022, monitoring was conducted in accordance with the sampling sites, frequencies and parameters defined in Permit 5353 (July 22, 2021) and is summarized below (Table 8). A complete list of required parameters can be found in *Table 5 of Appendix A in Permit 5353*.

Additional sampling was conducted in 2022 in accordance with LCO's *Horseshoe Pit Dewatering Plan* (2022) and *MSX Pit Pumping Plan* (2022); both are presented in

Table 9. A complete list of required parameters can be found in Section 2.3.3 of the *Horseshoe Pit Dewatering Plan* and Section 3.1 of the *MSX Pit Pumping Plan*.

Table 8. Permit 5353 Monitoring Requirements

EMS ID	Site ID	Permitted location since	Parameters								
			Permit Limit Flow	Permit Limit EPH	Permit Limit TSS & Turbidity	Permit Limit BOD	Field Parameters*	Conventional Parameters*	Major Ions*	Nutrients*	Metals Scan*
E102494	LC_LC11	1981	Q	-	Q	Q	-	-	-	-	-
E288269	LC_SBPIN	2012	M	M	-	-	M	M	M	M	M
E216144	LC_LC7	1991	W/M	Q	-	-	-	-	-	-	-
E219411	LC_LC8	1994	W/M	-	-	-	-	-	-	-	-
E221268	LC_LC9	1994	W/M	Q	-	-	-	-	-	-	-
E302410	LC_PIZP1101	2015	-	Q	-	-	Q	Q	Q	-	Q
E302411	LC_PIZP1105	2015	-	Q	-	-	Q	Q	Q	-	Q
E292521	LC_SPDC	2021	C	-	BP-W/M	-	-	-	-	-	-
E295231	LC_SPFR	2021	C	-	W/M	-	-	-	-	-	-
E293113	LC_DSSW	2021	D*/W	-	D*/W	-	-	-	-	-	-
E295314	LC_SP1SW	2021	D*/W	-	D*/W	-	-	-	-	-	-
E295315	LC_SP2SW	2021	D*/W	-	D*/W	-	-	-	-	-	-
E295316	LC_SP3SW	2021	D*/W	-	D*/W	-	-	-	-	-	-
0200028	LC_LC5	1981	-	-	W/M	-	-	-	-	-	-
0200044	LC_LC4	1981	-	-	W/M	-	-	-	-	-	-
0200337	LC_LC3	1981	-	-	W/M	-	-	-	-	-	-
0200335	LC_LC2	1981	-	Q	W/M	-	-	-	-	-	-
E293369	LC_LCUSWLC	2014	-	-	M	-	-	-	-	-	-
E216142	LC_LC1	1991	-	-	W/M	-	-	-	-	-	-
E282149	SLC	2012	-	-	M	-	-	-	-	-	-
E297110	LC_LCDSSLCC	2014	-	-	M	-	-	-	-	-	-
E261958	LC_WLC	2012	-	Q	M	-	-	-	-	-	-

EMS ID	Site ID	Permitted location since	Parameters								
			Permit Limit	Permit Limit	Permit Limit	Permit Limit	Field Parameters*	Conventional Parameters*	Major Ions*	Nutrients*	Metals Scan*
			Flow	EPH	TSS & Turbidity	BOD					
E223240	LC_LC12	1996	-	-	W/M	-	-	-	-	-	-
E288274	LC_DCEF	2021	Gauged Flows (hourly)	-	-	-	-	-	-	-	-
E288273	LC_DC3	2021	C	-	-	-	-	-	-	-	-
E295210	LC_DCDS	2021	BP-W/M	-	-	-	-	-	-	-	-
E288270	LC_DC1	2021	C	-	-	-	-	-	-	-	-
E295213	LC_UC	2021	M	-	-	-	-	-	-	-	-
E288275	LC_GRCK	2021	M	-	-	-	-	-	-	-	-
E295232	LC_FRUS	2021	-	-	-	-	-	-	-	-	-
E288272	LC_FRDSDC	2021	-	-	-	-	-	-	-	-	-
E295214	RG_CH1	2021	M	-	-	-	-	-	-	-	-

**A complete list of parameters can be found in Appendix A of Permit 5353*
M – Monthly Frequency
Q – Quarterly frequency
W – Weekly frequency
W/M – Weekly frequency for March 15 – July 15, monthly during the rest of the year
C – Continuous
BP-W/M -- Weekly frequency March 15 to at least August 31 during bypass of DCWMS, monthly during the rest of depending on unexpected monitoring results that indicate potential ortho-P uptake or the generation of organic selenium species
D/W One sample within the first 24 hours when actively discharging at spillway, then weekly*

Table 9. 2022 HSP Dewatering Plan and MSX Pit Pumping Plan Monitoring Requirements

EMS ID	Site ID	Parameters								
		Flow	Turbidity	Field Parameters*	Conventional Parameters*	Major Ions*	Nutrients*	Metals Scan*	Acute Toxicity*	Selenium Speciation*
E308146	LC_HSP*	W (Total volume)	W	W	W	W	W	W	M	M
n/a	LC_MSXS*	W	W	W	W	W	W	W	M	M
n/a	LC_MSAW6**	-	M	M	M	M	M	M	M***	M
E3081479	LC_MSAWCULV**	-	M	M	M	M	M	M	M	M
E293369	LC_LCUSWLC	-	M	M	M	M	M	M	M	M

**A complete list of parameters can be found in Section 2.3 of the HSP Dewatering Plan and Section 3.1 of the LCO MSX Pit Pumping Plan. **Monitoring required only during period when MSX pit pumping is occurring ***Monitoring only required if sample from MSAW cannot be obtained, or if specified by TARP*
M – Monthly Frequency, Q – Quarterly frequency, W – Weekly frequency

Please note that the above table (i.e., Table 9) refers to the sampling frequencies specified in the relevant 2022 pit pumping plans. For a portion of the year, pumping activities from MSX and HSP were both dictated by their respective 2021 pit pumping plans. For HSP there were no changes, but there were some minor updates from the 2021 to 2022 MSX plans. The 2022 MSX plan reduced the selenium speciation sampling frequency to monthly (from weekly) at LC_MSXS and added monthly acute toxicity sampling at LC_MSXS. Additionally, acute toxicity sampling frequency at LC_MSAWCULV was increased to monthly (from quarterly). Lastly, sampling at LC_MSAW6 was added.

4.2 Sampling Methodology

All samples are collected in accordance with procedures in *British Columbia Field Sampling Manual – For Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment and Biological Samples* (2013) published by the Water, Air and Climate Change Branch, Ministry of Water, Land and Air Protection, Province of British Columbia. A summary of detection limits is provided in Appendix G

5 Monitoring Results

5.1 Water Quality Results

5.1.1 INTRODUCTION

Parameters monitored (as per Table 8) are compared to applicable permit limits (Table 3). Exceedances of permit water quality limits are trended for further assessment. All 2022 water quality data required under Permit 5353 can be found in Appendix H.

5.1.2 PERMIT LIMITS

5.1.2.1 Authorized Discharges

5.1.2.1.1 Mine Service Area (MSA) Sewage Effluent to Ground (E102494/LC_LC11)

The sewage treatment system did not discharge in 2022 due to ongoing upgrades and therefore no water quantity data is compared to applicable permit limits. As no discharge occurred in 2022, no samples were collected from this location. LCO implemented actions to cease discharge from the sewage treatment system in Q4 2021. This involved engaging a contractor (a vacuum truck service) to remove wastewater from the septic tank and transport it offsite for disposal. The contractor was on a recurring schedule throughout 2022 to remove loads of wastewater from the septic tank as required until the upgraded system has been fully commissioned. Further information on the sewage treatment system corresponding is outlined in Table 4.

5.1.2.1.2 Heavy Duty Wash Bay Effluent Discharge to Steam Bay Ponds to Ground (E288269/LC_SBPIN)

Discharge to the Steam Bay Ponds from the Heavy-Duty Wash Bay occurred throughout 2022. Sample results can be found in Figure 2. In Q1 2022, a sample result (19.6 mg/L) from the LC_SBPIN was observed to exceed the EPH limits of 15 mg/L. All remaining samples in 2022 were below the EPH permit limit for effluent discharged to the receiving environment.

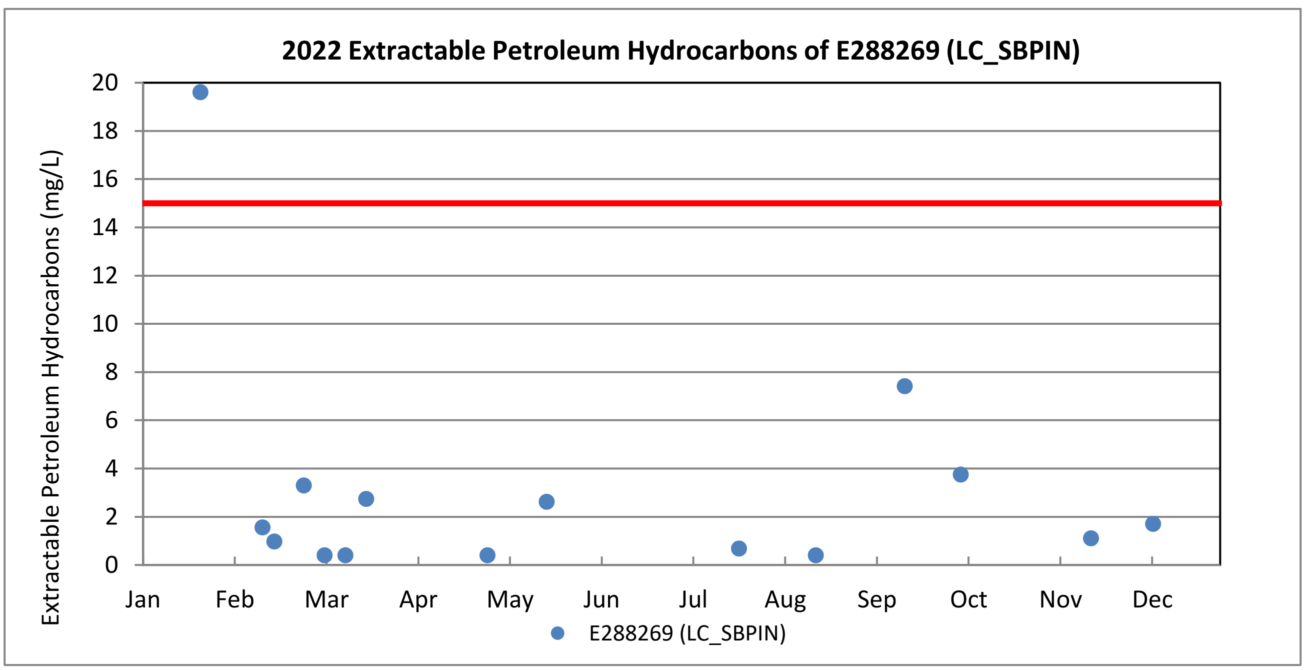

Figure 2. 2022 Extractable Petroleum Hydrocarbons of E288269 (LC_SBPIN)

5.1.2.1.3 Miscellaneous Oil water separators (LC_LVWB)

Samples were collected from the Light Vehicle Wash Bay (LC_LVWB) throughout 2022, which discharges to ground via the Steam Bay Ponds. All samples in 2022 were below the EPH permit limit (15 mg/L) with the exception of March 10, 2022, having an EPH result of 67.1 mg/L (Figure 3). Details of the exceedance is discussed in section 2.3.

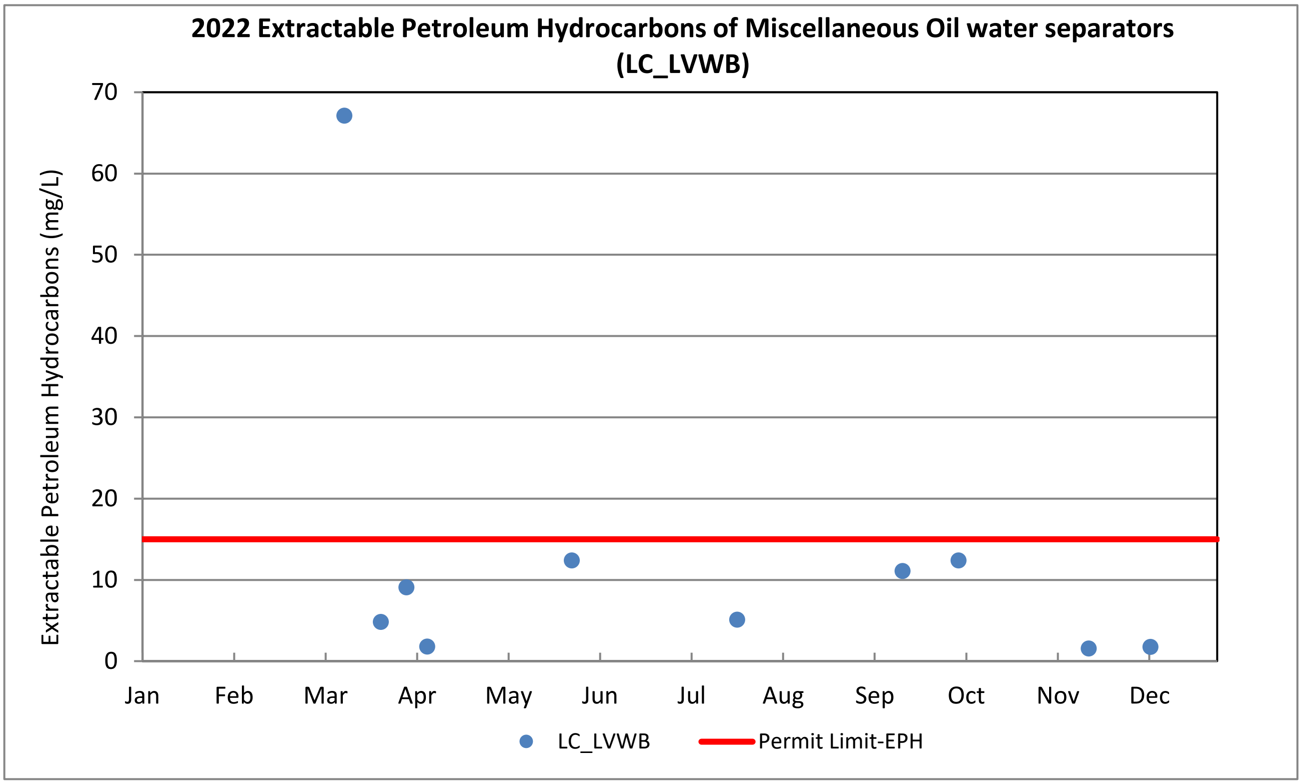

Figure 3. 2022 Extractable Petroleum Hydrocarbons at the Light Vehicle Wash Bay Effluent

5.1.2.1.4 MSA North Ponds Effluent to Line Creek (E216144/LC_LC7)

The MSA North Ponds were in compliance for the TSS permit limit (50 mg/L) for all of 2022 (Figure 4).

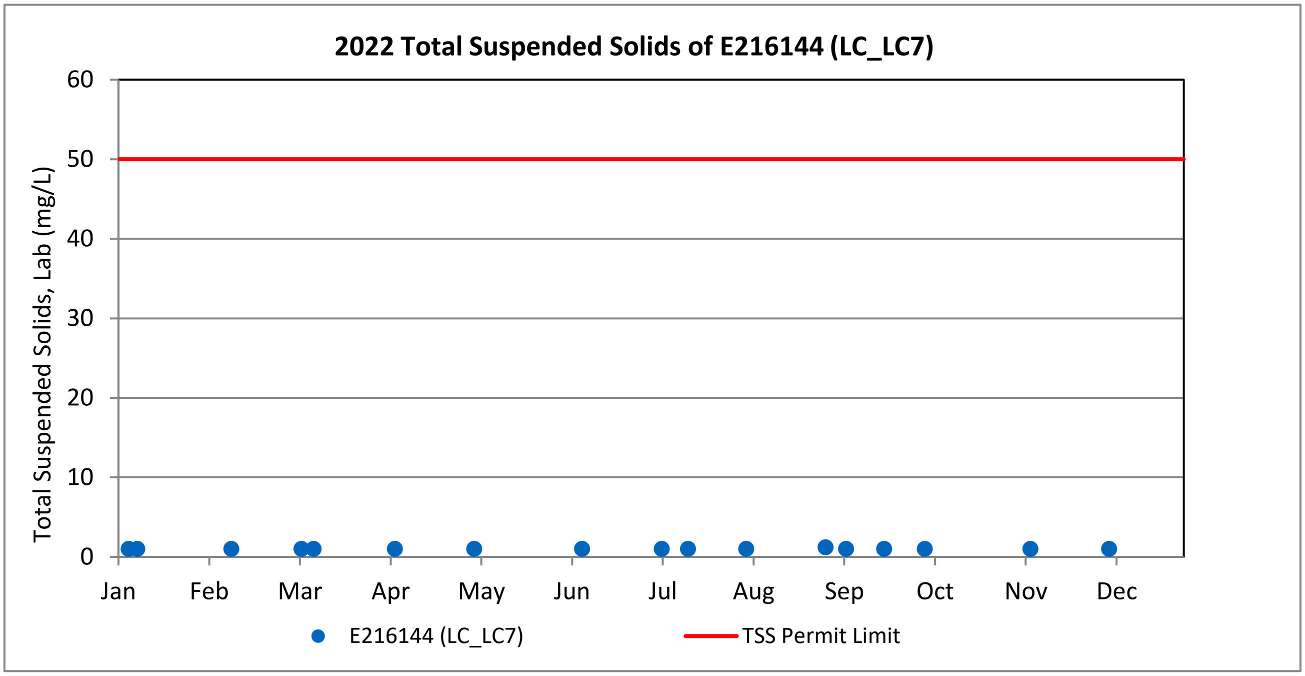

Figure 4. 2022 Total Suspended Solids at the MSA North Ponds Effluent (E216144/LC_LC7)

5.1.2.1.5 Contingency Treatment System Effluent to Line Creek (E219411/LC_LC8)

The Contingency Treatment System was not utilized in 2022 for treating water quality (i.e., TSS) in Line Creek. The pond system did not discharge and therefore no water quality data is available to be compared to applicable permit limits or trended.

5.1.2.1.6 No Name Creek Pond Effluent to Line Creek (E221268/LC_LC9)

In Q4 2022, sediment removal was initiated for the No Name Creek Ponds to re-establish retention time and increase pond capacity to improve sediment removal. The No Name Creek Pond did not discharge in 2022 and therefore no water quality data is available to be compared to applicable permit limits or trended.

5.1.2.1.7 Rail Loop Ponds Effluent to Ground (E302410/LC_PIZP1101 and E302411/LC_PIZP1105)

The Rail Loop Ponds effluent to ground (E302410/LC_PIZP1101 and E302411/LC_PIZP1105) were sampled in all quarters of 2022. All parameters, with the exception of extractable petroleum hydrocarbons (EPH), are discussed in the groundwater monitoring report submitted under separate cover (titled "*2022 Annual Report: Elk Valley Regional and Site Specific Groundwater Monitoring Programs*"). EPH at these two locations were found to be below the method detection limits for EPH (0.4 mg/L) except for LC_PIZP1105 in Q1, 2022 with a result of 1.25 mg/L (Figure 5).

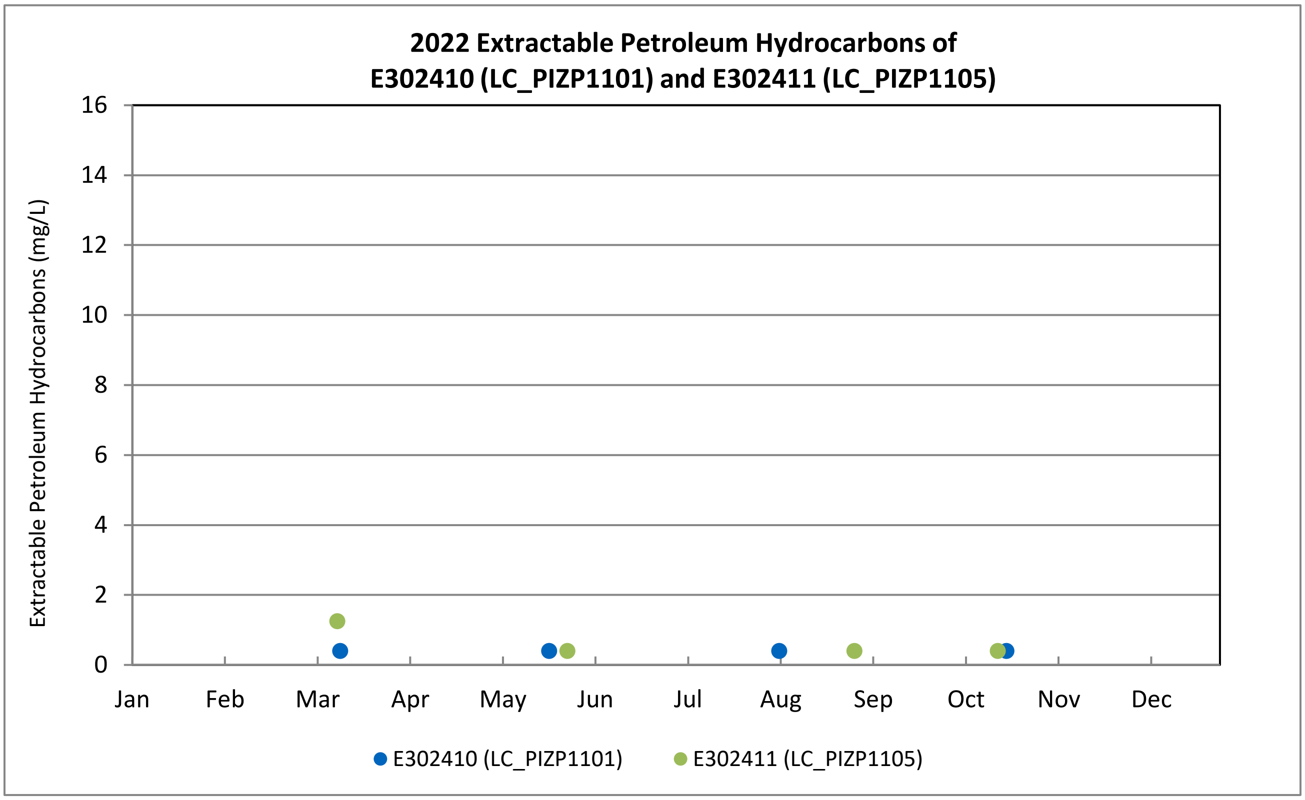

Figure 5. 2022 EPH from Rail Loop Ponds Effluent to Ground (302410/LC_PIZP1101 and E302411/LC_PIZP1105)

5.1.2.1.8 Horseshoe Pit Discharge to Line Creek (E308146/LC_HSP)

As further detailed in Section 6.3, discharge of stored pit water from Horseshoe Pit (E308146/LC_HSP) occurred in 2022, and this discharge was sampled in accordance with LCO's *Horseshoe Pit Dewatering Plans* (2021 and 2022). Acute toxicity tests for *Daphnia magna* and Rainbow trout taken from the discharge from Horseshoe Pit all remained at 0% mortality except for one result of 20% *Daphnia magna* mortality (Figure 6).

Total suspended solids (TSS) at the discharge from Horseshoe Pit remained below the limit of 50 mg/L for 2022 (Figure 7). In addition to the permit limit for TSS specified in Section 1.8 of Permit 5353 (July 22, 2021), the *Horseshoe Pit Dewatering Plan* (2022) identified the following parameters as constituents of potential concern (COPC): ammonia, cobalt (total), copper (dissolved), dissolved oxygen, nickel (total), nitrite, and phosphorus. Selenium speciation was also assessed but was not considered as a COPC. Results from samples collected of water discharged from Horseshoe Pit during the 2022 dewatering program were below BCWQG with the exception of total selenium (Figure 8) and field temperature (Figure 9). However, total selenium was below the permit limit (58 mg/L) set for the LCO Compliance Point (E297110/LC_LCDSSLCC) under Permit 107517, and therefore did not cause an exceedance of the thresholds established. A discussion on the water quality monitoring pumping triggers from Horseshoe Pit dewatering is provided in Section 6.3.2. Likewise, field temperature at E293369 (LC_LCUSWLC) remained below the BCWQG throughout the duration of pumping from HSP.

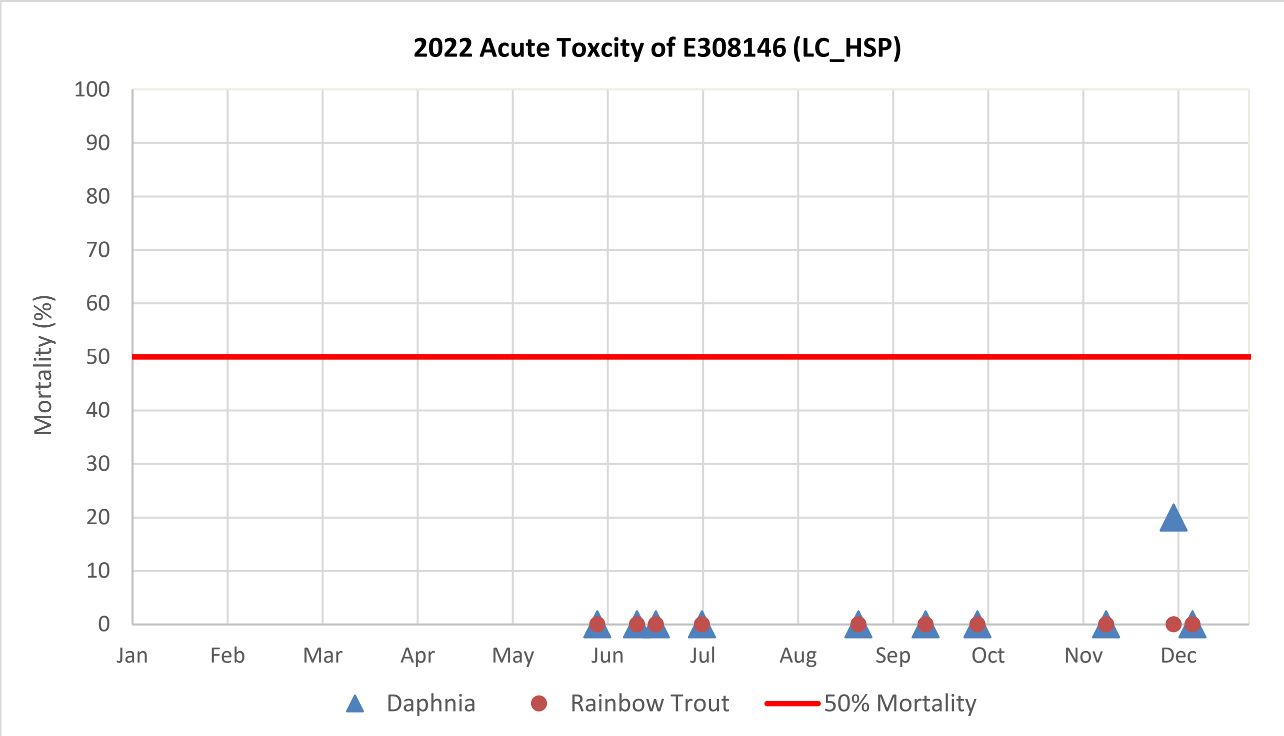

Figure 6. 2022 Acute Toxicity from Horseshoe Pit Discharge to Line Creek (E308146/LC_HSP)

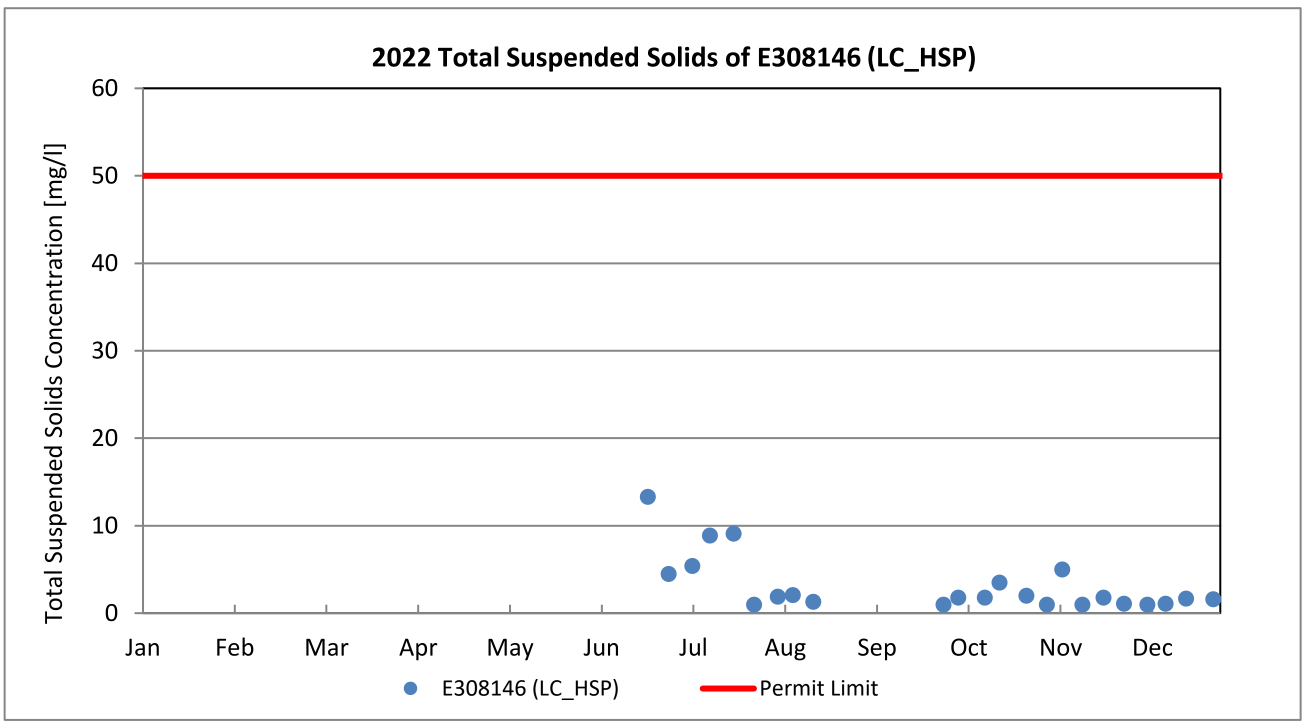

Figure 7. 2022 Total Suspended Solids (Lab) from Horseshoe Pit Discharge to Line Creek (E308146/LC_HSP)

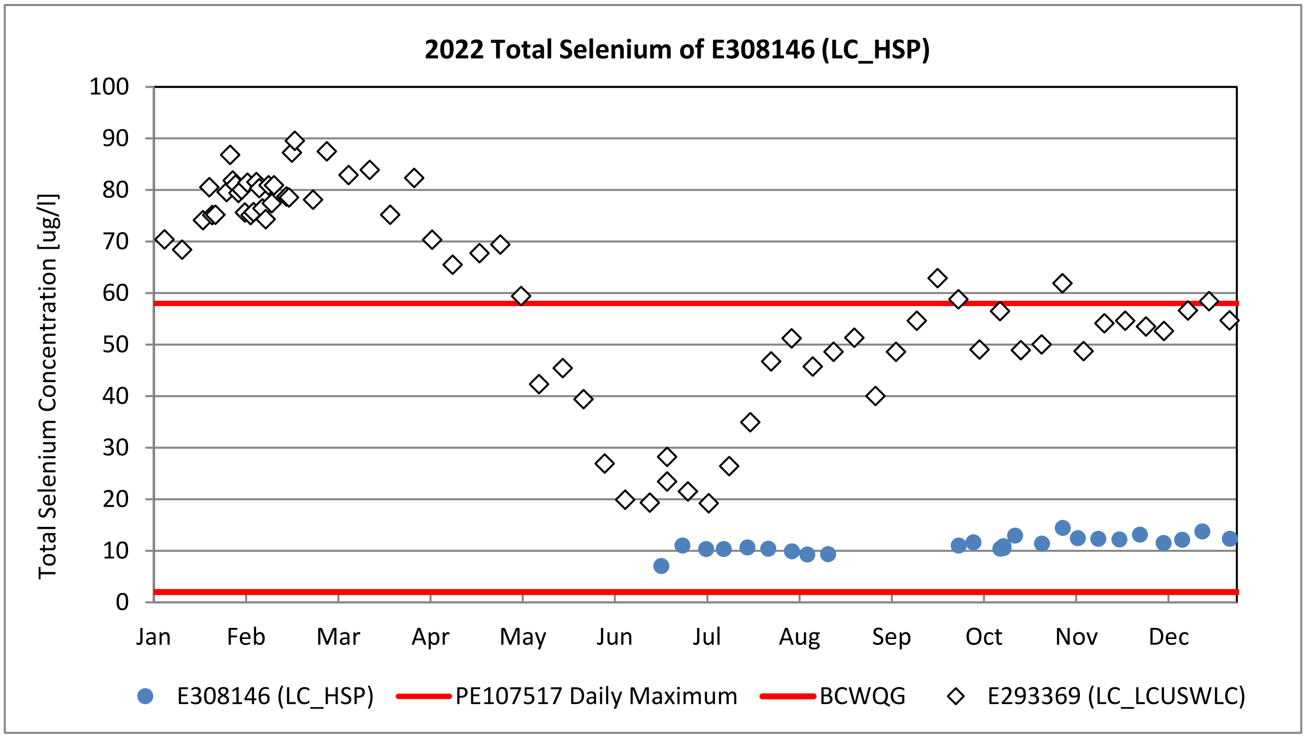

Figure 8. 2022 Total Selenium from Horseshoe Pit Discharge to Line Creek (E308146/LC_HSP)

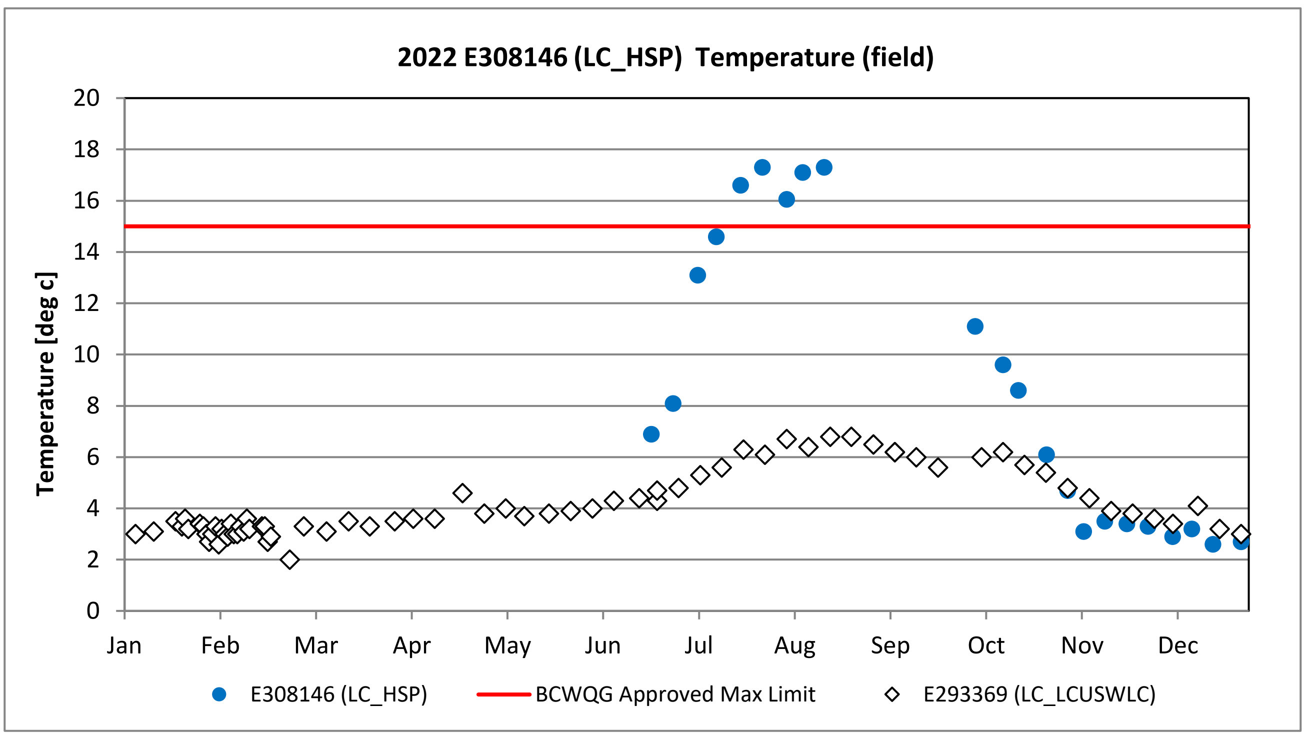

Figure 9. 2022 Field Temperature from Horseshoe Pit Discharge to Line Creek (E308146/LC_HSP)

5.1.2.1.9 MSAW Pit discharge to Line Creek (E308147/LC_MSAWCULV)

The discharge of MSAW pit water to Line Creek is influenced by two factors: natural upstream flows of the No Name Creek Rock Drain and management of water from the upstream MSX pit. Further details of the management of water from the MSX pit can be found in Section 6.3.

In 2022 the discharge of the MSAW Pit was sampled in accordance with LCO's *MSX Pit Pumping Plan* (2020 and 2021). Total suspended solids (TSS) at the discharge from MSAW Pit while pumping was ongoing at MSX Pit in 2022 remained below the limit of 50 mg/L except for Dec 14, 2022 with a result of 56.5 mg/L (Figure 10). The exceedance is discussed in section 2.3.

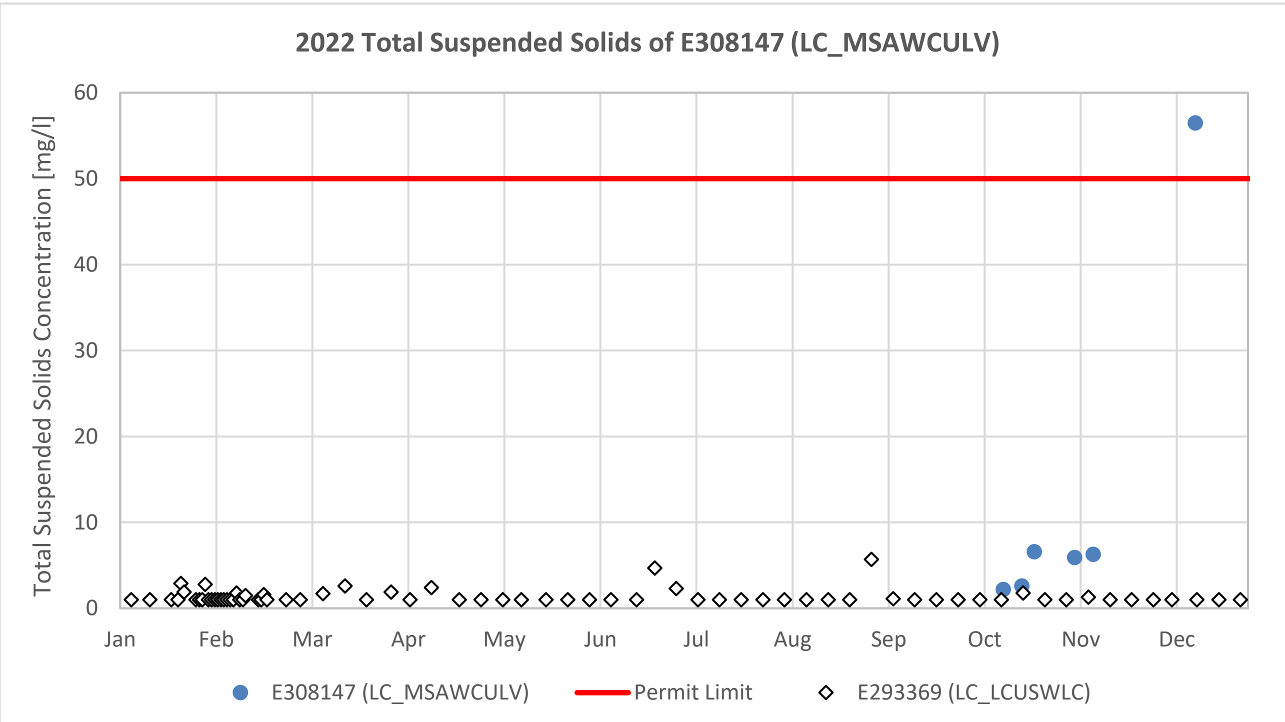

Figure 10. 2022 Total Suspended Solids from MSAW Pit Discharge to Line Creek (E308147/LC_MSAWCULV) sampled while pumping was ongoing at MSX Pit in 2022

5.1.2.2 Receiving Environment

Receiving environment locations are monitored for TSS, turbidity and EPH (Table 8) under Permit 5353. Below is the summary of the 2022 results at each receiving environment location for TSS and turbidity. All 2022 water quality data required under Permit 5353 is included for review in Appendix H.

5.1.2.2.1 Line Creek Upstream MSA North Pit (E216142/LC_LC1)

Monitoring conducted in 2022 at Line Creek upstream of the MSA North Pit (E216142/LC_LC1) shows TSS remained below 8 mg/L (Figure 11) and turbidity below 2 NTU (Figure 12) for most of 2022.

5.1.2.2.2 Line Creek Upstream of Rock Drain (0200335/LC_LC2)

Monitoring conducted in 2022 from Line Creek Upstream of the Rock Drain (0200335/LC_LC2) indicates TSS remained below 8.5 mg/L (Figure 10) with two exceptions on June 27, 2022 (31.1 mg/L) and June 20, 2022 (54 mg/L). Note the Contingency Treatment System (CTS) was not initiated because downstream TSS monitoring results, particularly those directly above the intake for CTS (i.e. LC_LC3, LC_WLC and LC_LCUSWLC) did not have TSS concentrations above 50 mg/L as outlined in section 1.5.2 of Permit 5353.

Additionally, the observed turbidity readings remained low (Figure 11) throughout 2022. All EPH results remained below detection limit (0.4 mg/L) in 2022 (Figure 12).

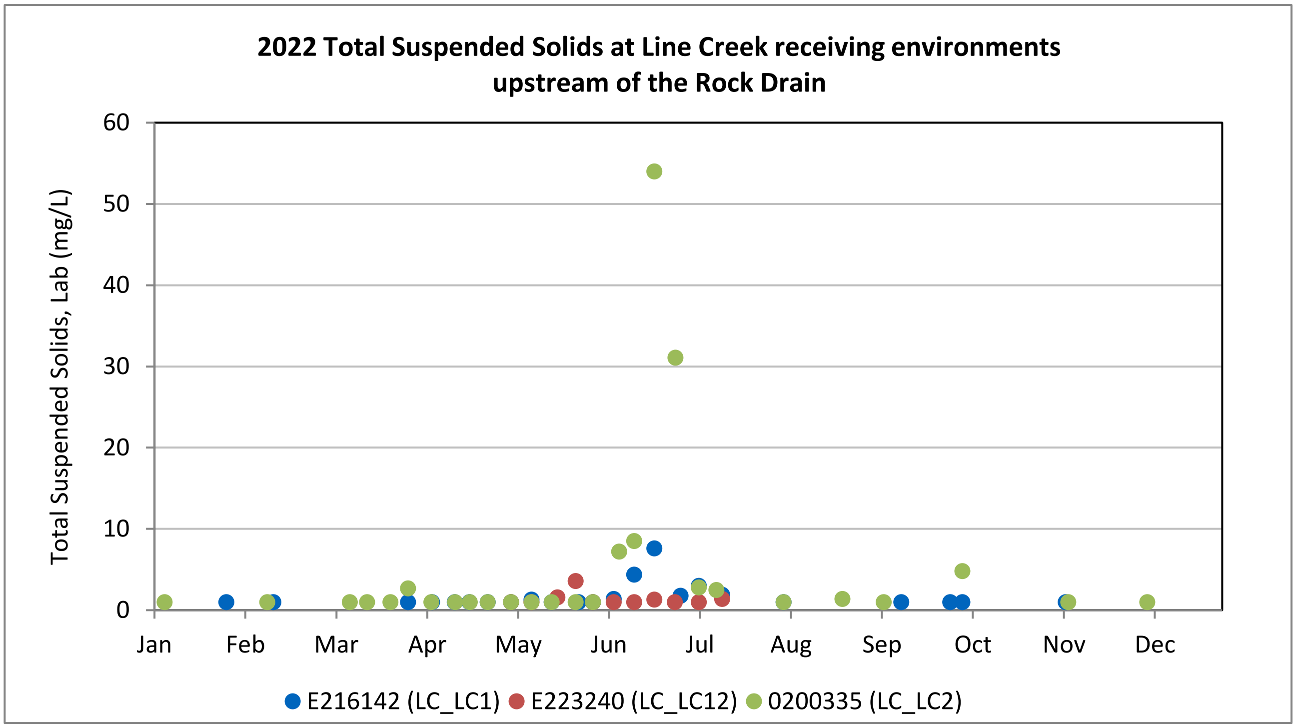

Figure 11. 2022 Total Suspended Solids at Line Creek receiving environments upstream of the Rock Drain.

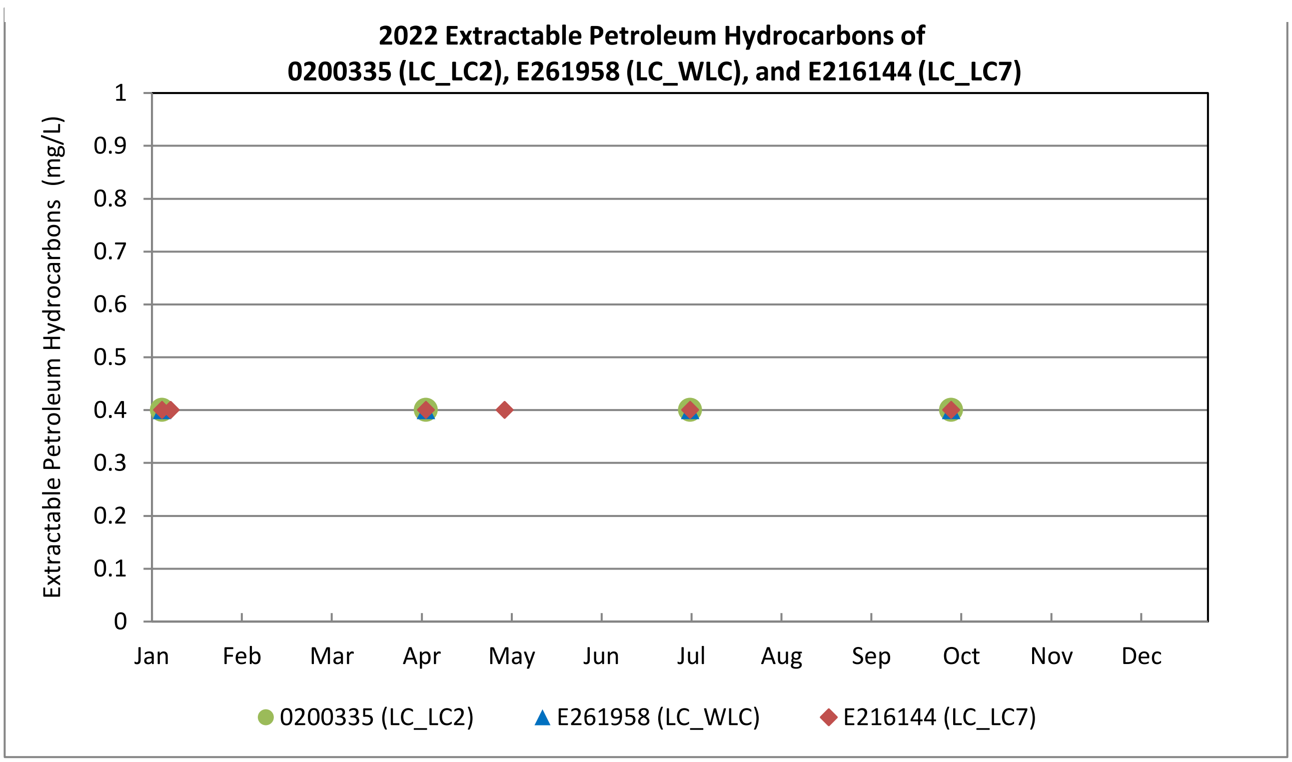

Figure 12. 2022 EPH at Line Creek upstream of Rock Drain and West Line Creek receiving environments.

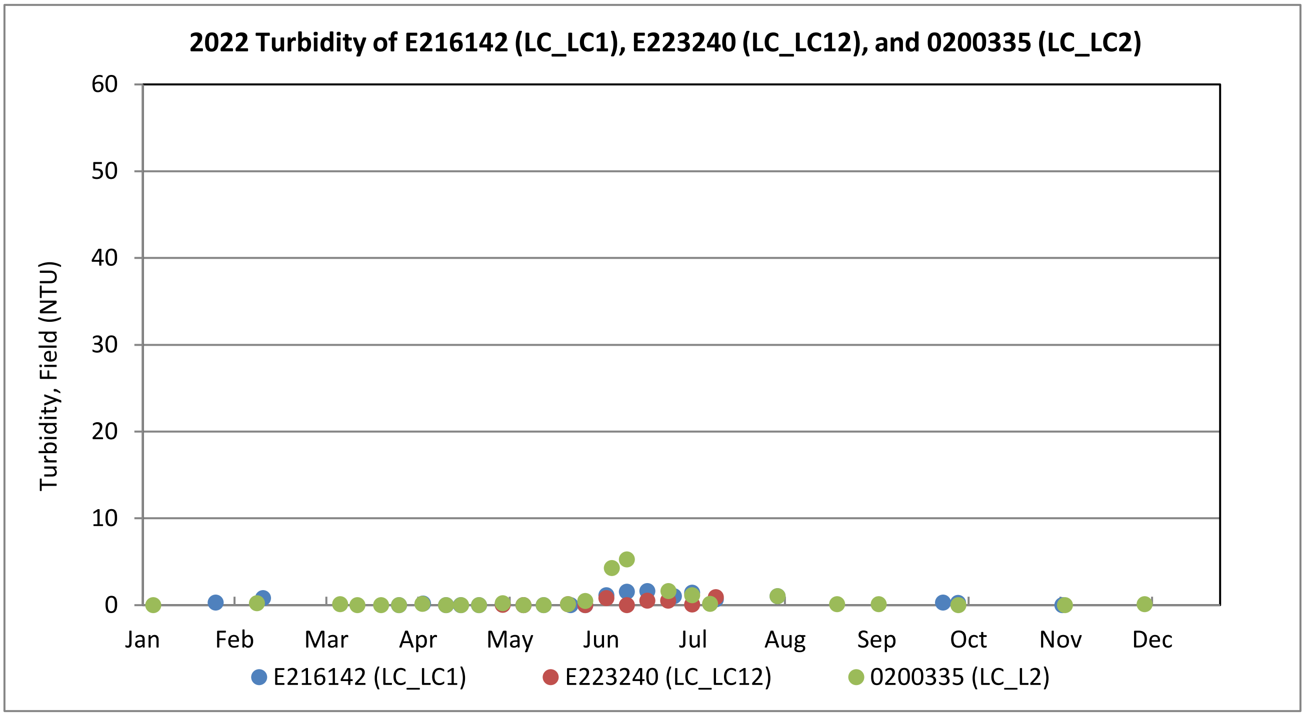

Figure 13. 2022 Turbidity at Line Creek receiving environments upstream of the Rock Drain.

5.1.2.2.3 North Horseshoe Creek Near Mouth (E223240/LC_LC12)

Monitoring conducted in 2022 at North Horseshoe Creek near the Mouth (E223240/LC_LC12) shows TSS remained below 4 mg/L (Figure 11) and turbidity below 1 NTU (Figure 13). Although this location is mine-affected, there was no active mining in the area in 2022. The sample site was observed to be dry (zero flow) for most of the year (Table 5).

5.1.2.2.4 Line Creek upstream of West Line Creek below Rock Drain (E293369/LC_LCUSWLC)

Line Creek upstream of West Line Creek below the Rock Drain (E293369/LC_LCUSWLC) remained below 6 mg/L for TSS (Figure 14) and 3 NTU for turbidity (Figure 15) for all of 2022.

5.1.2.2.5 West Line Creek (E261958/LC_WLC)

West Line Creek (E261958/LC_WLC) remained below 5 mg/L for TSS (Figure 14) and 5 NTU for turbidity (Figure 15) for all of 2022. Although West Line Creek is a mine-affected area, the only mining activities that occurred in 2022 in the West Line Creek drainage was reclamation of spoil surfaces. All EPH results remained below detection limit (0.4 mg/L) in 2022 (Figure 12).

5.1.2.2.6 Line Creek downstream of West Line Creek (0200337/LC_LC3)

Line Creek downstream of West Line Creek (0200337/LC_LC3) did not exceed 11 mg/L for TSS (Figure 14) and 4 NTU for turbidity (Figure 15) in 2022.

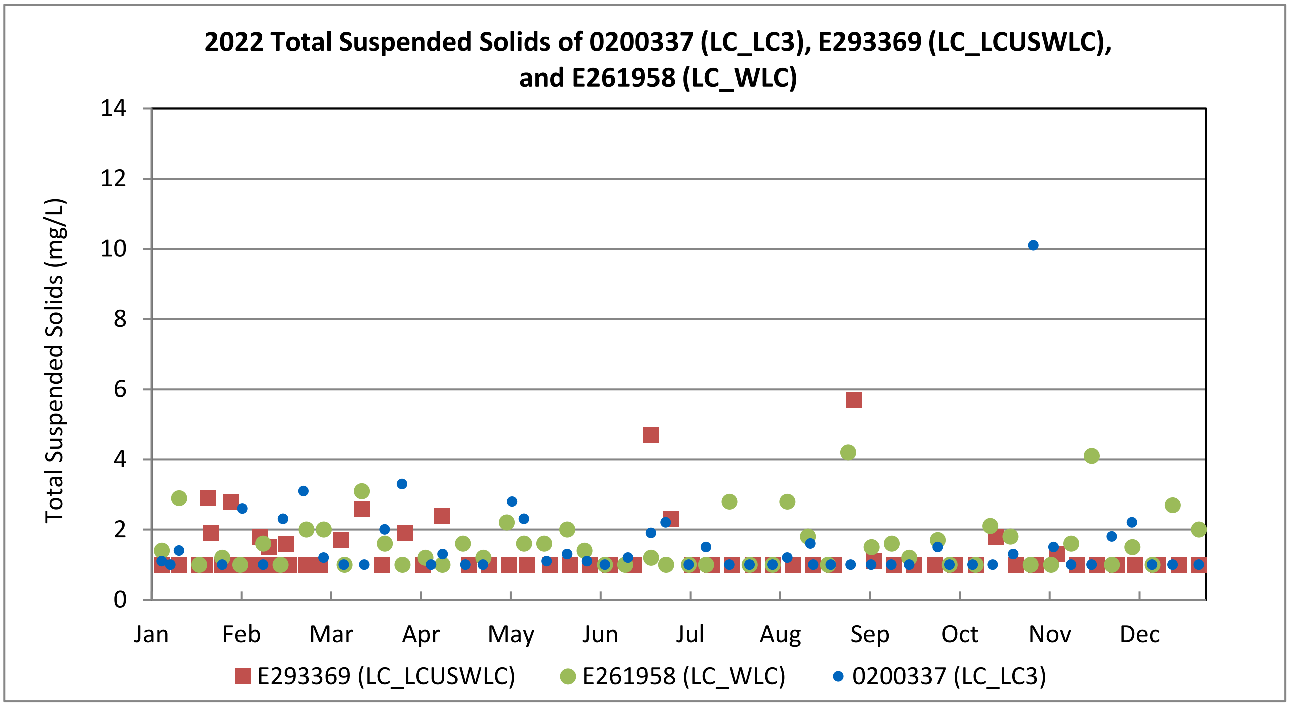

Figure 14. 2022 TSS of Line Creek and West Line Creek receiving environments below the Rock Drains

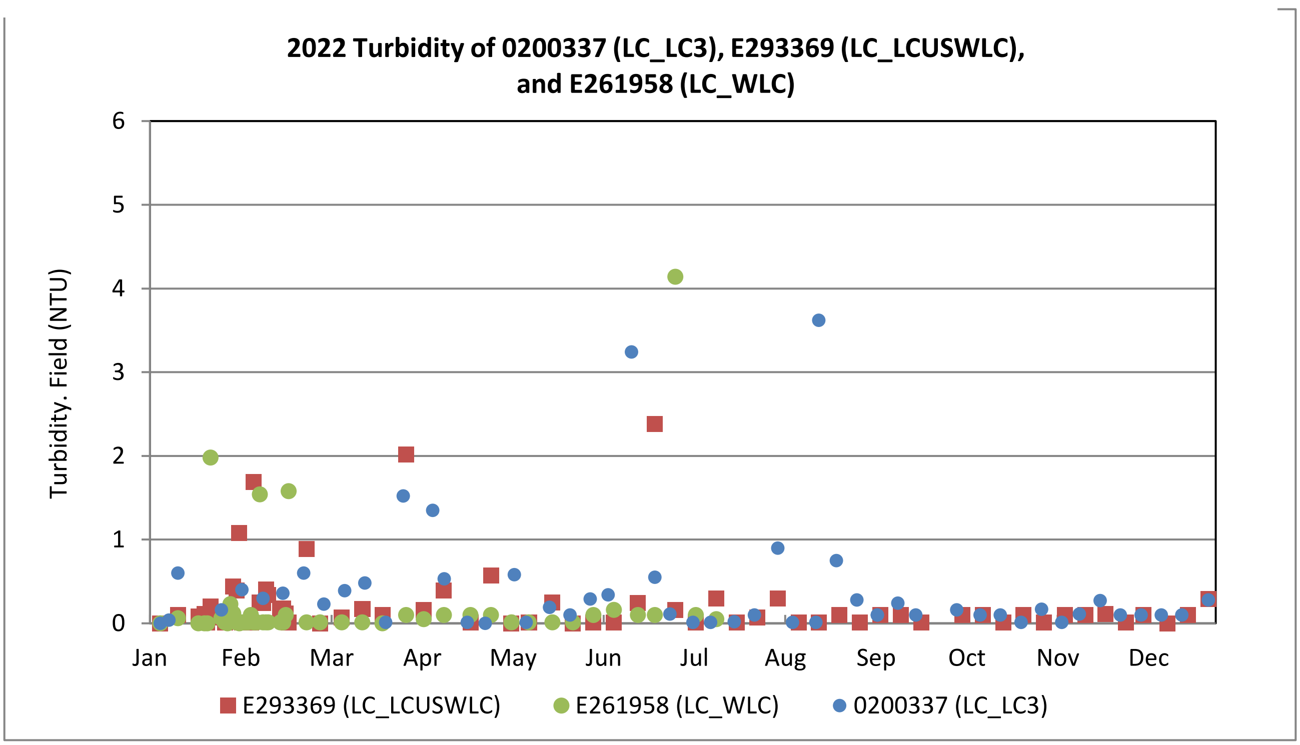

Figure 15. 2022 Turbidity of Line Creek and West Line Creek receiving environments below the Rock Drains

5.1.2.2.7 Dry Creek Sedimentation Ponds Effluent to Dry Creek via the Return Channel (E295211/LC_SPDC)

For all of 2022, Dry Creek Sedimentation Pond Effluent to Dry Creek via the Return Channel (E295211/LC_SPDC) did not exceed 20 mg/L for TSS (Figure 16). Turbidity remained below 20 NTU for all of 2022 except for December 29, 2022 with a result of 100.0 NTU (Figure 17). The TSS on December 29, 2022 had a result of 1.4 mg/L. This low TSS value paired with high turbidity reading supports suspicion of a potential turbidity sensor error on December 28, 2022.

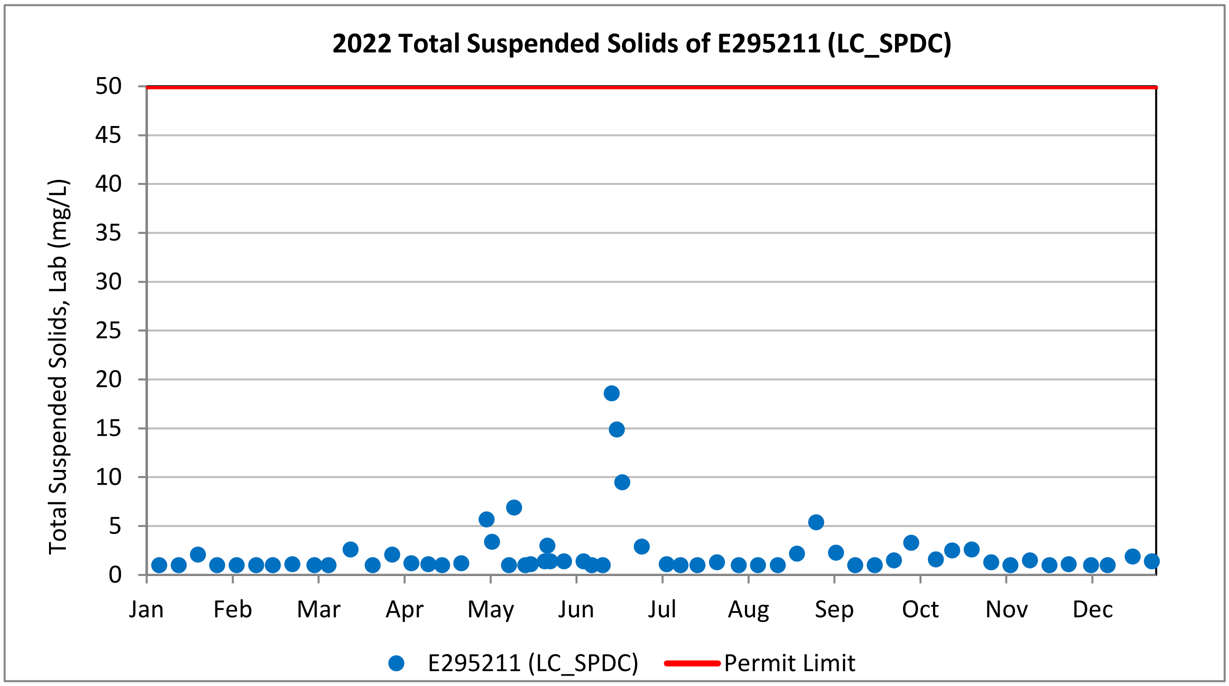

Figure 16. 2022 TSS of Dry Creek Sedimentation Pond Effluent to Dry Creek via the Return Channel (E295211/LC_SPDC)

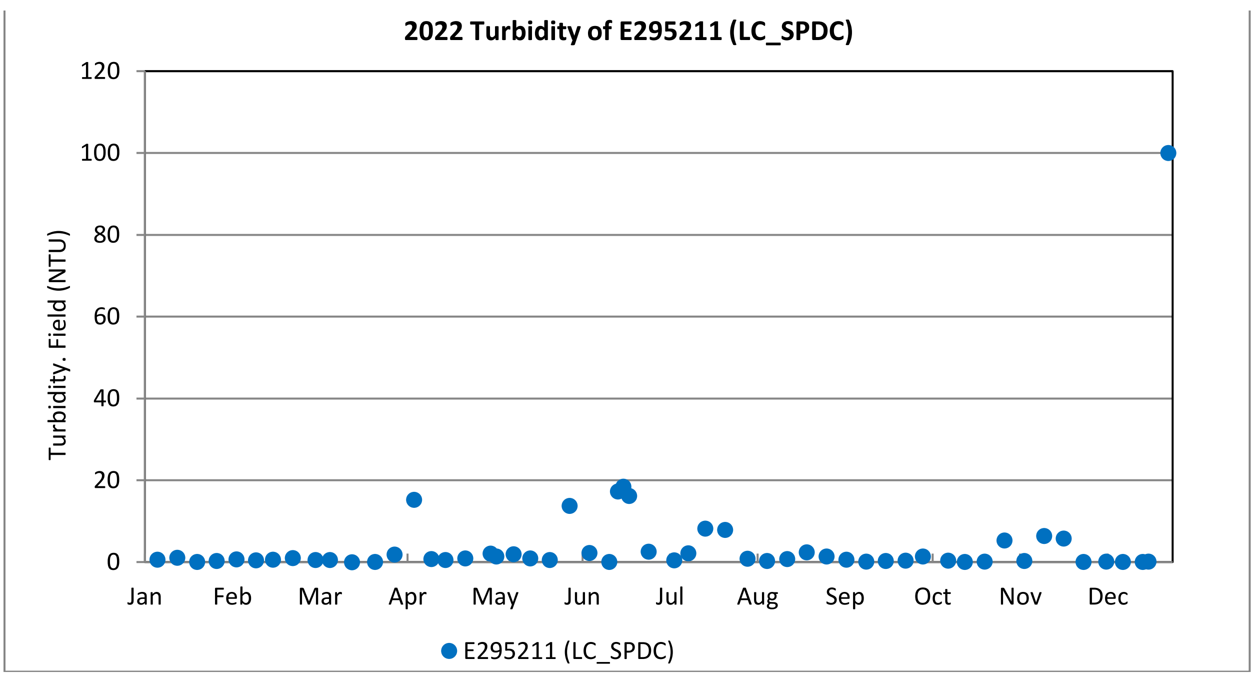

Figure 17. 2022 Turbidity of Dry Creek Sedimentation Pond Effluent to Dry Creek via the Return Channel (E295211/LC_SPDC)

5.1.2.2.8 South Line Creek (E282149/LC_SLC)

South Line Creek (E282149/LC_SLC) data indicated that TSS did not exceed 7 mg/L (Figure 18), and turbidity remained below 6 NTU (Figure 19) in 2022. South Line Creek is non-mine affected and believed to be representative of natural conditions.

5.1.2.2.9 Line Creek Immediately downstream of South Line Creek Confluence (E297110/LC_LCDSSLCC)

Line Creek immediately downstream of South Line Creek Confluence (E297110/LC_LCDSSLCC) typically remained below 16 mg/L for TSS (Figure 18) with a turbidity below 4 NTU (Figure 19) throughout 2022.

5.1.2.2.10 Line Creek upstream of Process Plant (0200044/LC_LC4)

Line Creek upstream of the Process Plant (0200044/LC_LC4) typically remained below 35 mg/L for TSS (Figure 18) with turbidity below 6 NTU (Figure 19). Elevated TSS concentrations (133 mg/L) were sampled from this location on June 18, 2022. Note the Contingency Treatment System (CTS) was not initiated because monitoring locations (i.e. LC3, LCUSWLC, and WLC) upstream of the CTS did not exceed the Line Creek permit limit in section 1.5.2 of Permit 5353 (50 mg/L). It was determined the elevated TSS concentrations at LC4 on June 18, 2022 were from a source downstream of the CTS, and therefore use of the designated treatment was not necessary.

5.1.2.2.11 Fording River downstream of Line Creek (0200028/LC_LC5)

Fording River downstream of Line Creek (0200028/LC_LC5) remained below 39 mg/L for TSS (Figure 18) and turbidity below 26 NTU (Figure 19). This location is influenced by discharges from Fording River and Greenhills Operations, in addition to Line Creek Operations.

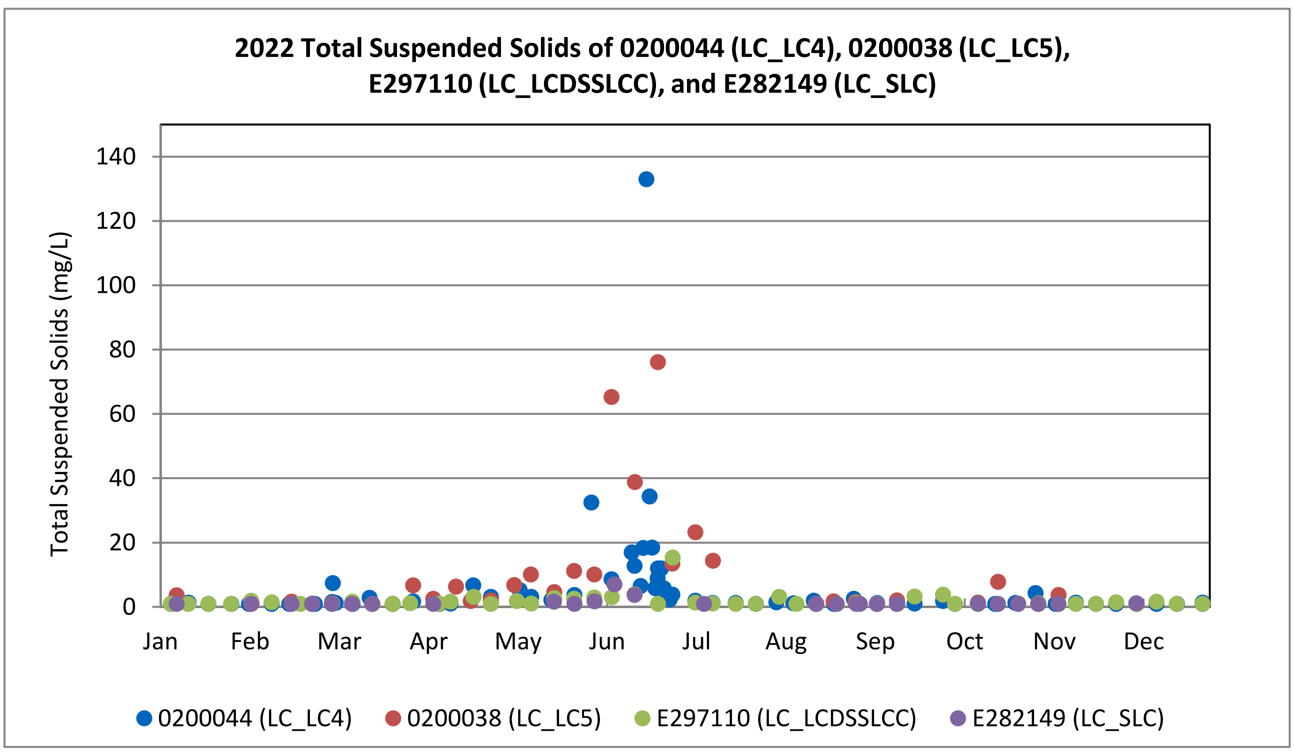

Figure 18. 2022 TSS of South Line Creek, Line Creek downstream of confluence with South Line Creek, Line Creek upstream of Process Plant and Fording River downstream of Line Creek

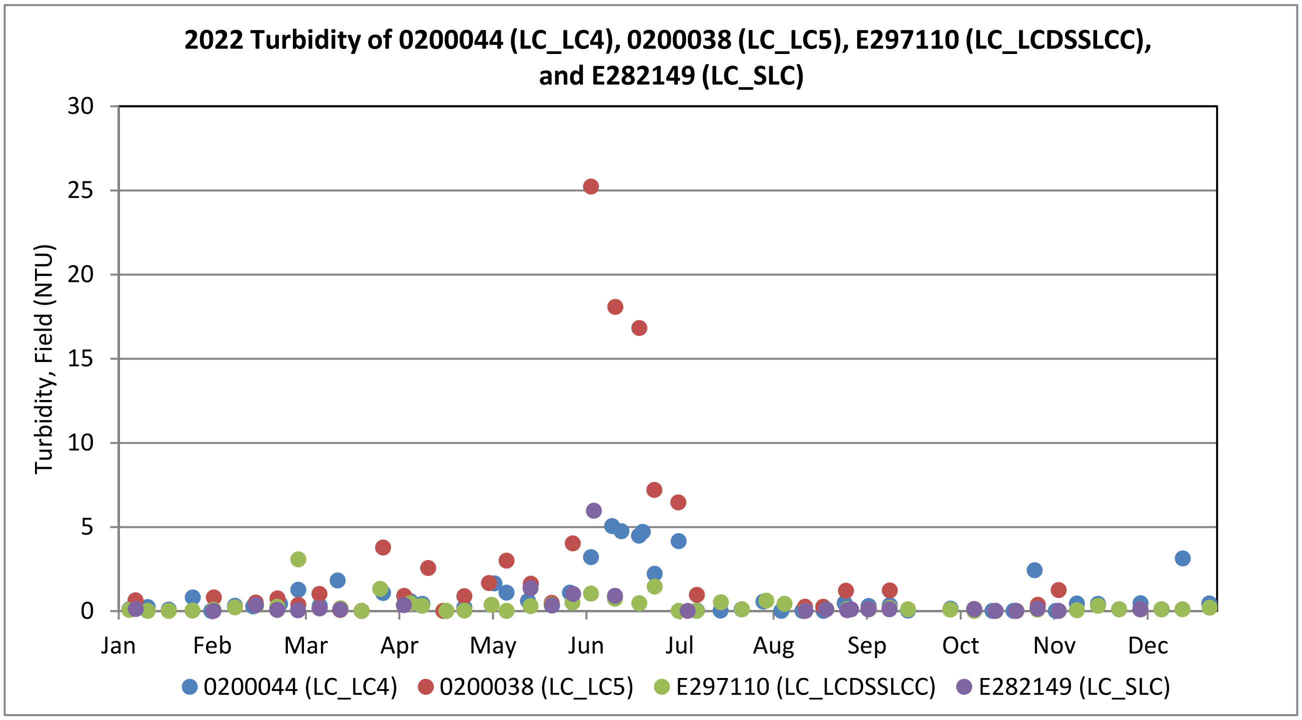

Figure 19. 2022 Turbidity of South Line Creek, Line Creek downstream of confluence with South Line Creek, Line Creek upstream of Process Plant and Fording River downstream of Line Creek.

5.2 Water Quantity Results

5.2.1 INTRODUCTION

Flow measurement monitoring is conducted as per the Permit 5353 requirements as shown in Table 8. Flow is monitored at each authorized discharge and evaluated against applicable permit limits (Table 3). These results are also used to develop Stage-Discharge Relationships (SDR) at specific locations validated by a third-party Qualified Professional (QP). These details can be found in the *Kerr Wood Leidal Hydrometric Monitoring Report* (2022) (Appendix I). Flow results collected by LCO can also be found in Appendix H.

5.2.1.1 Rail Loop Settling Ponds E210372 / LC_EPOUT)

The freeboard in Rail Loop Settling Pond C must be greater than 1 m at all times (Condition 1.1.1). Freeboard exceeded limits a total of 36 days throughout 2022 as mentioned in section 2.3 (Figure 20). The exceeded limits only occurred in the periods of March and July, 2022. Note that the Freeboard measurements from early January, 2022 that can be seen in Figure 20 as exceeding the limit are believed to have occurred due to instrumentation error this was explained in detail through the update to the potential non-compliance report that was submitted to ENV, EMLI and KNC February 2, 2022.

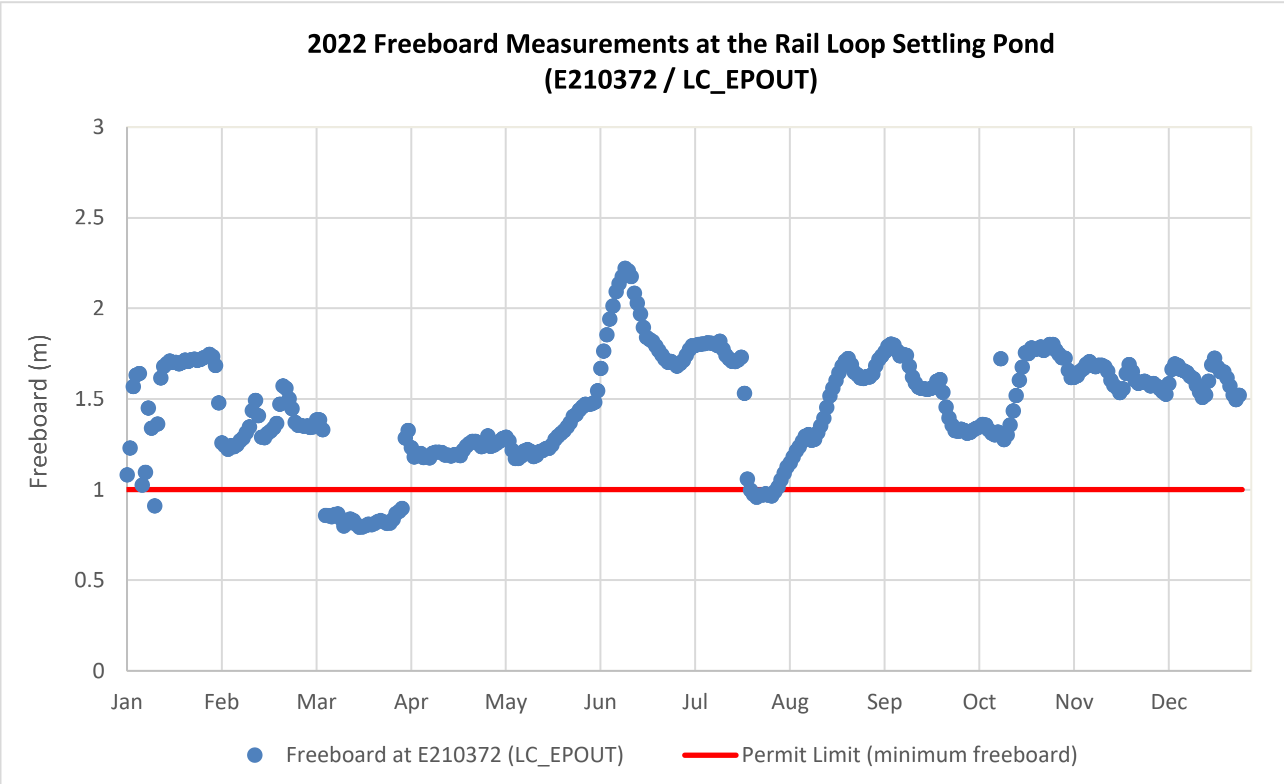

Figure 20. 2022 Freeboard measurements at the Rail Loop Settling Ponds (E210372/LC_EPOUT)

5.2.1.2 Mine Service Area (MSA) Sewage Effluent to Ground (E102494/LC_LC11)

The MSA Sewage Effluent has a maximum daily flow limit of 45 m^3/day (condition 1.2.1). The system did not discharge throughout 2022 due to ongoing upgrades. As mentioned in section 5.1.2.1.1, all MSA Sewage Effluent was taken off-site via third party contractors with a vac truck.

5.2.1.3 Heavy Duty Wash Bay Effluent Discharge to Steam Bay Ponds to Ground (E288269/LC_SBPIN)

The Heavy-Duty Wash Bay Effluent was below the daily maximum flow limit of 150 m^3/day for all of 2022 (Figure 21). There was no discharge in June 2022, due to upgrades. All material was taken off-site by third-party contractors.

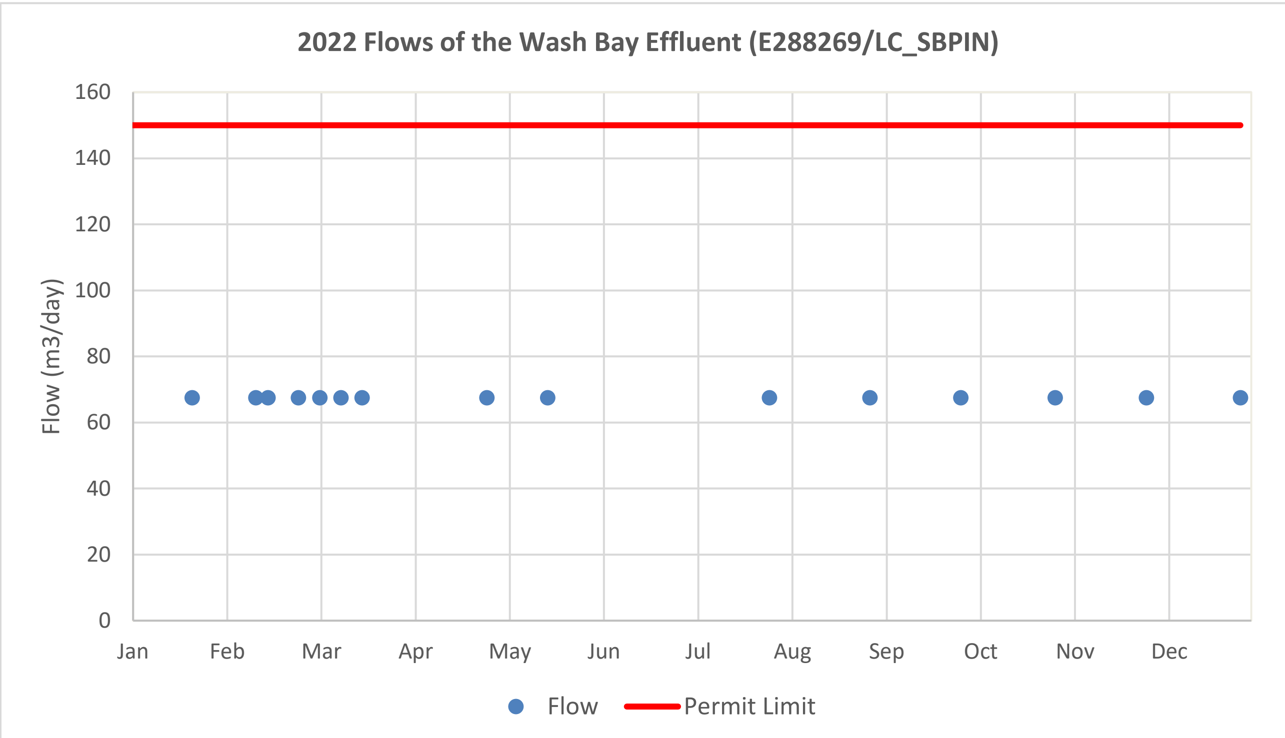

Figure 21. 2022 Flows at the Wash Bay Effluent (E288269/LC_SBPIN)

5.2.1.4 MSA North Ponds Effluent to Line Creek (E216144/LC_LC7)

The MSA North Ponds were below the Q10 flow (0.84 m^3/s) throughout 2022 (Figure 22). Freeboard remained greater than 0.5 m throughout 2022. There was no bypass of the MSA North Pond in 2022.

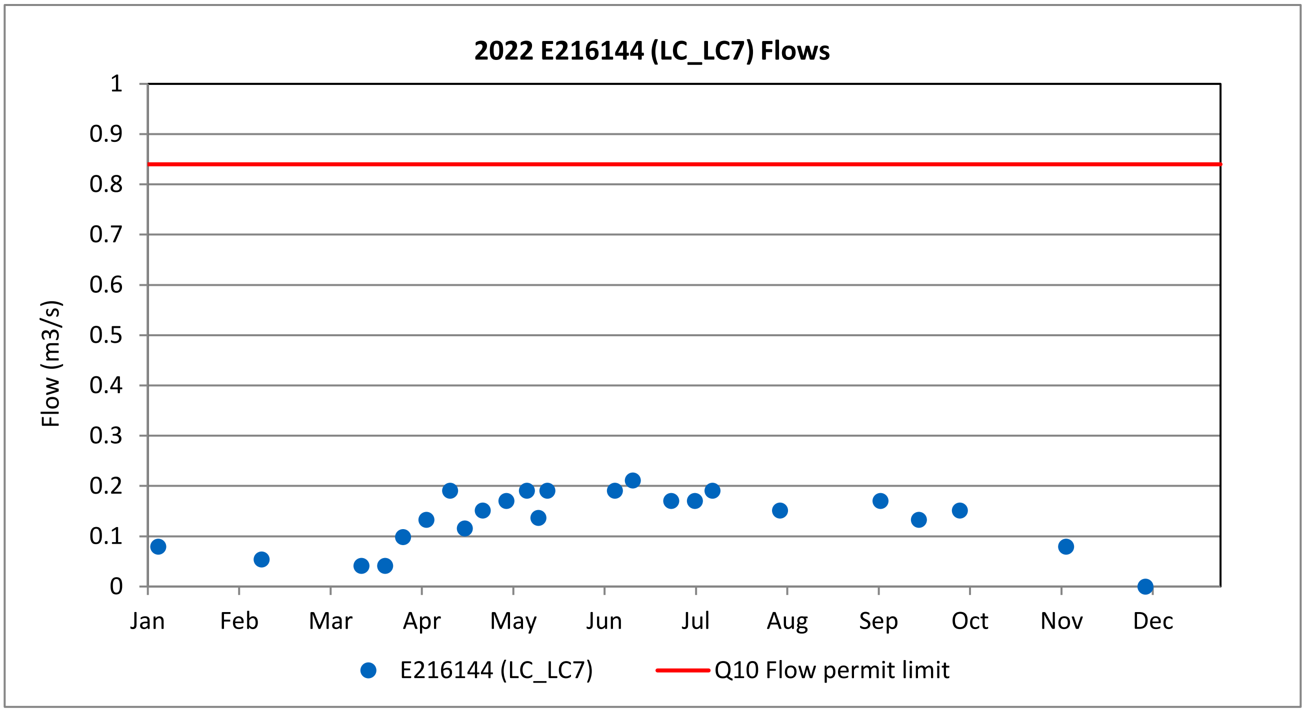

Figure 22. 2022 Flows at the MSA North Ponds Effluent (E216144/LC_LC7)

5.2.1.5 Dry Creek Sedimentation Pond Effluent to Dry Creek via the Return Channel (E295211/LC_SPDC)

Dry Creek Sedimentation Pond Effluent to Dry Creek via the Return Channel (E295211/LC_SPDC) was below the Q10 flow (1.8 m^3/s) throughout 2022 (Figure 23).

5.2.1.5.1 **Dry Creek Sedimentation Ponds Record of Bypass**:
Seasonal bypass of the Dry Creek Sedimentation Ponds was first initiated in July 2020. This practice has continued through 2021 and 2022. Notification of refilling and upcoming discharge of water from the sedimentation ponds was provided via email on May 2, 2022. The refill of Dry Creek Sedimentation Pond 1 was initiated May 2, 2022 and was completed May 12, 2022 at which point the bypass of the Dry Creek Sedimentation Ponds ceased.

Starting on July 14, 2022 the bypass of the LCO Dry Creek Sedimentation Ponds began and remained ongoing for the rest of the 2022 calendar year. Notification of commencement of the bypass was provided via email July 14, 2022. Dewatering of Dry Creek Sedimentation Pond 1 began on July 14, 2022 and was completed by July 26, 2022.

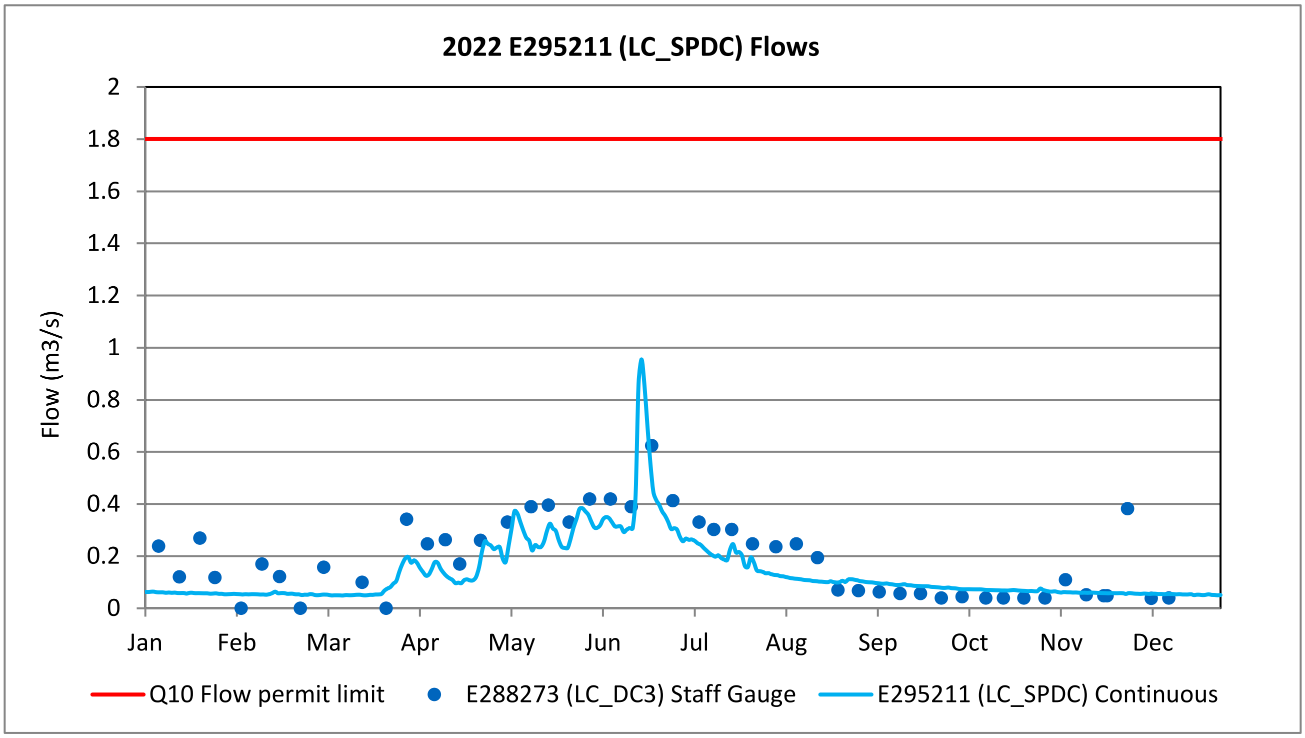

Figure 23. 2022 Flows at the Dry Creek Sedimentation Pond Effluent to Dry Creek via the Return Channel (E295211/LC_SPDC)

5.2.1.6 Contingency Treatment System Effluent to Line Creek (E219411/LC_LC8)

Total suspended solids measured in Line Creek immediately upstream of the Contingency Treatment System (i.e., LC_LC3 and LC_WLC) remained below 50 mg/L in 2022 (Section 5.1.2.1.5); as a result, the Contingency Treatment System was not utilized in 2022 for treating water quality and therefore no water quantity data is compared to applicable permit limits or trends. As water elevations did not reach the discharge point elevation, it is reasonable to state that the minimum freeboard limits of 0.5 m was maintained throughout 2022.

5.2.1.7 No Name Creek Pond Effluent to Line Creek (E221268/LC_LC9)

The No Name Creek Ponds were not bypassed and did not discharge in 2022; therefore, flows remained below the Q10 flow (2.3 m^3/s) in 2022. Additionally, as water elevations did not reach the discharge point elevation, it is reasonable to state that the minimum freeboard limits of 0.5 m was maintained throughout 2022.

5.2.1.8 Horseshoe Pit Discharge to Line Creek (E308146/LC_HSP)

Discharge of stored pit water from Horseshoe Pit (E308146/LC_HSP) occurred between June 19, 2022 to December 31, 2022. Discharge flow rates from June 20, 2022 through to July 4, 2022 from HSP were above the prescribed maximum daily discharge rate of 25,000 m^3/day stated in the HSP pit dewatering plan (Figure 24). The increased dewatering rates were required at that time to manage excessively high flood waters which threatened critical infrastructure such as the infiltration gallery which supplies potable water for the Mine Service Building at LCO.

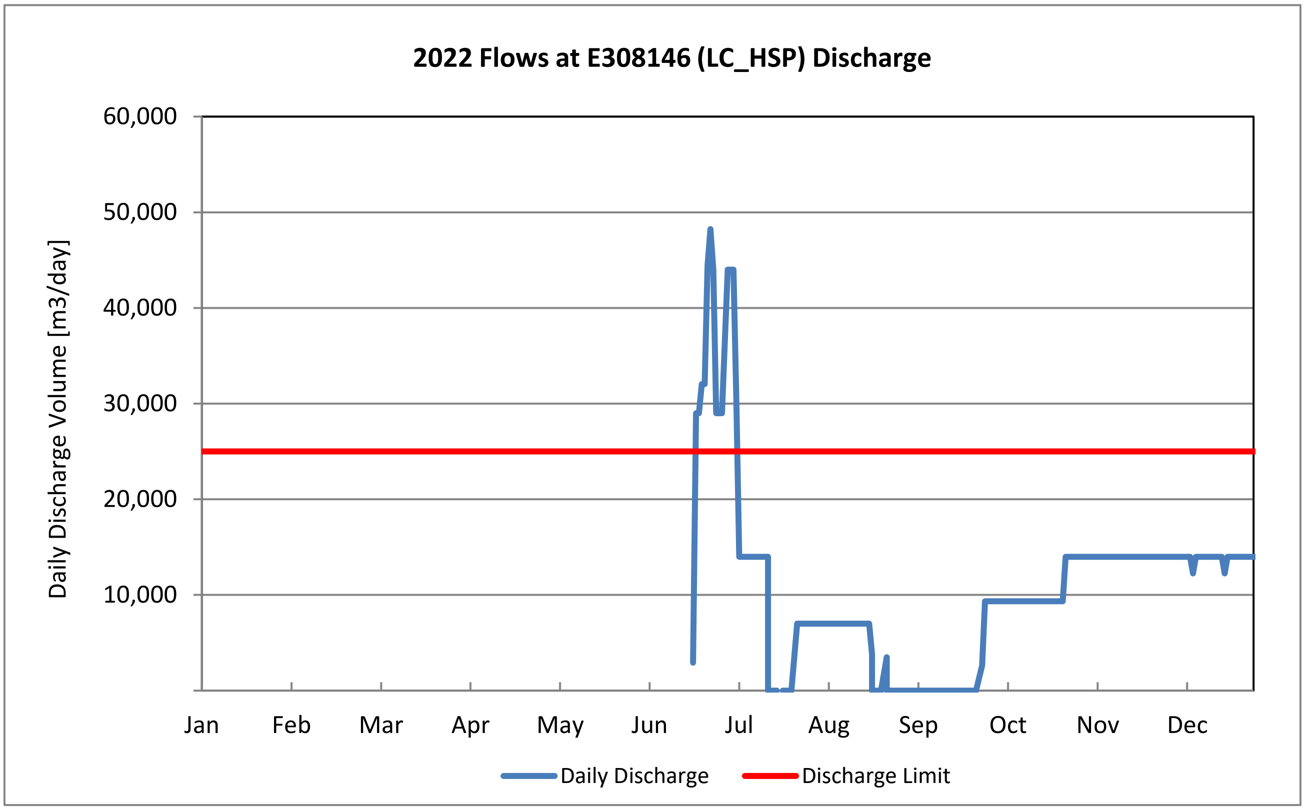

Figure 24. 2022 Flows at the HSP Discharge (E308146/LC_HSP)

5.3 Temporary Paired Sampling at the MSA North Ponds

On December 17, 2015, an amendment to Permit 5353 was issued to temporarily allow use of E304613 (LC_LC7DSTF) as the LC7 alternate location for the collection of water samples when access to E216144 (LC_LC7) was restricted. This restriction is due to safety concerns with the progression of the MSX Short Dump and the position of MSA North (MSAN) Ponds below the potential runout zone of the dump.

As per Section 3.1.2.2 of the current (July 22, 2021) Permit 5353, paired sampling was conducted two times in 2022 for E304613 (LC_LC7DSTF) and E216144 (LC_LC7). The 2022 results have been incorporated into the sample dataset (2013-2022) and compared using the method of statistical evaluation (T-Test) previously provided in the Teck Memorandum on October 27, 2015 (Appendix J). As the LC_LC7DSTF alternate monitoring site is located ~400 m downstream (in a safe sampling zone) of the original sampling location (MSAN Pond, LC_LC7), a comparison of the water quality was required to ensure there is not a significant difference between the two sampling sites. In all cases, the P-values were less than the corresponding critical P-value, which verifies acceptance of the null hypothesis that no significant difference exists between the two datasets. A summary of that evaluation is provided in Appendix J.

5.4 Subsurface Drainage Originating from the ERX/Coarse Coal Rejects

Subsurface drainage originating from the ERX/CCR dump daylights down gradient of the dump where it infiltrates to ground. Monitoring of this water is conducted a minimum of one time per year in accordance with Section 3.1.1.4 in Permit 5353. Results of the water quality analysis conducted from two samples collected in 2022 were compared against the BCWQG for the protection of wildlife. All parameters measured in 2022 are below the applicable guidelines, except for total selenium. Total selenium exceeded the wildlife guideline of 2 µg/L on June 16, 2022 (3.64 µg/L). These results are presented in (Figure 25) along with results from previous years for comparison. All 2022 water quality data from LC_ERX is included in Appendix K. Further interpretation of water quality, including selenium, for this location is provided in the groundwater monitoring report submitted under a separate cover (titled "*2022 Annual Report: Elk Valley Regional and Site Specific Groundwater Monitoring Programs"*).

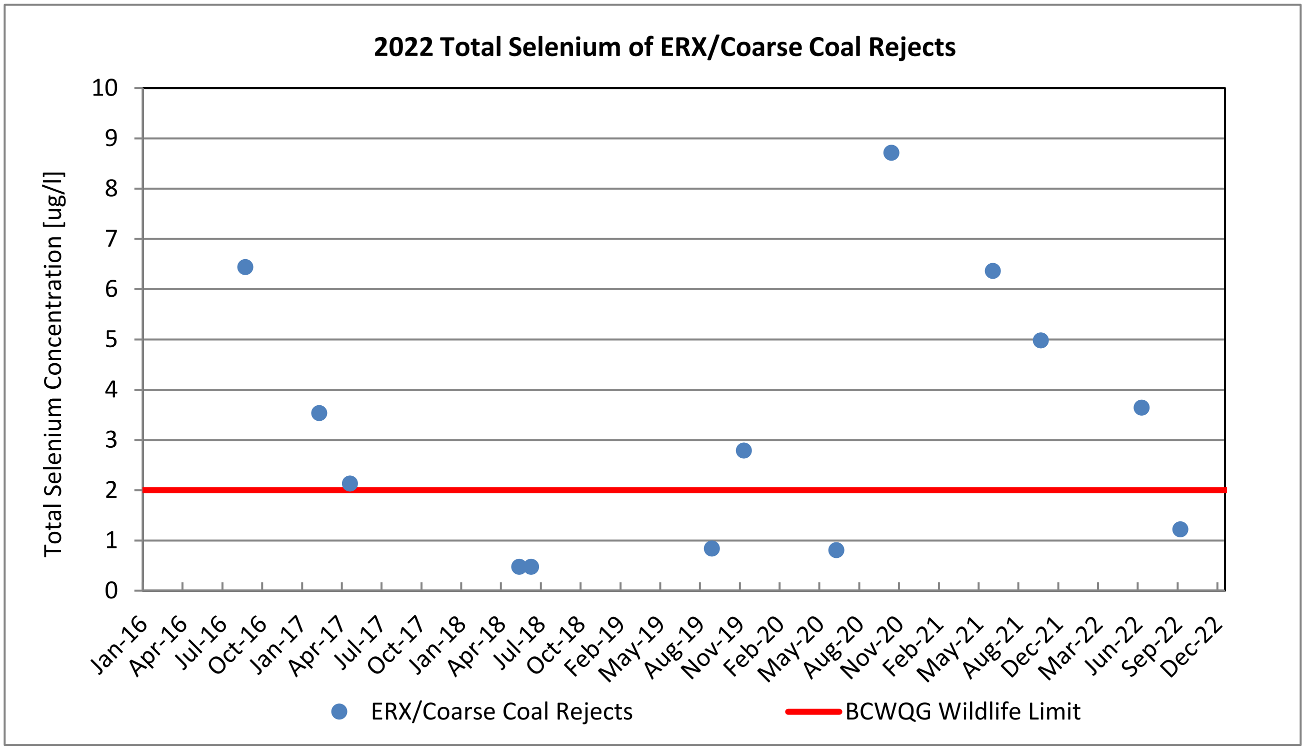

Figure 25. 2022 Total Selenium from Drainage of ERX (LC_ERX)

5.5 Capture of Mine Affected Water in the DCWMS

The DCWMS is designed to reduce seepage loss from the mine-affected water collection system. On February 20, 2015, ENV approved Teck's submission of a *Dry Creek Water Management Plan*. This approval, previously with EMA effluent Permit 106970 has since been amended and incorporated into Section 4.3 of Permit 5353 to include:

> *An estimate of the proportion of mine-affected water (surface and subsurface) that is not captured by the Dry Creek Water Management System.*

To address the above condition, in 2016 Golder updated a three-dimensional FEFLOW model to assess potential seepage pathways from the spoil pile in the upper Dry Creek basin in a report titled, *Groundwater Flow Modeling to Evaluate Potential Seepage Bypass.* The model showed that all groundwater seepage through the waste rock daylights at the toe of the pile due to upward gradients in the underlying bedrock and valley fill sediments. Consequently, all seepage from the spoil pile is predicted to report to the diversion structure head pond. An estimate of the proportion of mine-affected water (surface and subsurface) that was not captured by the system can be assessed by comparing the average flows from the underdrains to the average flows measured upstream of the head pond. Each pond in the DCWMS has a dedicated underdrain system whose purpose is to direct water in a manner which protects the liner system of each pond. In 2022 average flow rates measured from the Head Pond underdrain and upstream of the Head Pond (LC_LC3) were 0.00267 m^3/s and 0.188 m^3/s, respectively. This indicates 98.58% of mine-affected water (surface and sub-surface) is captured by the water management system.

6 Management Plan Summary

6.1 Flocculant Management Plan

In accordance with Section 2.7.1 of Permit 5353, flocculants may be used to maintain the level of TSS equal to or less than permit limits in settling pond discharges in line with the *Flocculant Management Plan* (FMP) approved by the Director on May 28, 2015.

No liquid flocculants were dispensed in 2022 at any of the settling pond discharges authorized under Permit 5353. In accordance with LCO's FMP, Water Lynx Blocks 360 (WL360) were deployed at E288273 (LC_DC3). A table of quantity and locations are provided in below in Table 10.

Table 10. Summary of Flocculant Use

Date	Product Name	Location	Number of blocks placed	Mass placed* (kg)	Dosage* (mg/L)	Frequency / Duration
5/05/2022	Water Lynx Blocks 360	Dry Creek (E288273, LC_DC3) – before the head pond	6	12	0.02	21 days**
5/25/2022	Water Lynx Blocks 360	Dry Creek (E288273, LC_DC3) – before the head pond	6	12	0.02	21 days**

* Mass of each Water Lynx Block 360 is 2 kg; Dosage varies based on flow rate
** Manufacturer expected dissolution time

6.2 TSS Determination

TSS/turbidity regressions were revised at the end of the 2017 field season and provided to the ENV on April 30, 2018 in an updated report (appended to the *Q1 2018 Elk Valley Regional Water Quality Report)*. Additional data was collected in 2022 and the revised TSS Determination report is provided in Appendix L.

6.3 Pit Pumping and Dewatering Plans

6.3.1 BACKGROUND

LCO has submitted two plans with respect to dewatering and/or operational pit pumping:

- The *Horseshoe Ridge Pit Dewatering Plan* was submitted on March 11, 2021 and an updated plan was submitted on September 13, 2022.
- The *MSX Pit Pumping Plan* was originally submitted on February 28, 2020 and updated on July 15, 2021. The latest update to the MSX Pit Pumping Plan was submitted December 21, 2022.

Both plans include a water quality evaluation to characterize the quality of the water to be discharged, an estimate of dewatering/pumping rates, monitoring plan, and discharge management triggers.

In 2022, emergency pumping from Horseshoe Ridge Pit (E308146/LC_HSP) was initiated on June 19, last day of discharge was August 20, and pumping activities were completed on August 23, 2022. Pumping during this period were conducted in accordance with the *Horseshoe Ridge Pit Dewatering Plan* (2021). Notification of the emergency pumping was provided on June 18, 2022 and notification within 24 hours for cessation of emergency pumping was provided on August 23, 2022. Following cessation of emergency pumping, a notification was submitted on September 13, 2023 to provide 14-days advance notice (as per Section 2.13.1 of EMA Permit 5353) that LCO planned to initiate pumping from Horseshoe Ridge Pit; this notification included the updated *2022 Horseshoe Ridge Pit Dewatering Plan*. Notification 24-hours in advance of commencing pumping from Horseshoe Ridge Pit was submitted on September 26, 2022 and pumping occurred from September 27 to December 31, 2022 and continued into 2023.

On December 2, 2021, LCO initiated pumping from the MSX Pit. Notification of this pumping was submitted on December 1, 2021; pumping remained on standby under this notification in-order to respond to spring melt and precipitation events. Pumping under this notification occurred on January 4, 2022, and intermittently between October 2 to December 31, 2022. Pumping under the December 21, 2022 *MSX Pit Pumping Plan* submission did not begin until January 2023.

6.3.2 HORSESHOE PIT WATER QUALITY PUMPING TRIGGERS

Discharge of stored pit water from Horseshoe Pit (E308146/LC_HSP) occurred between June 19, 2022 to December 31, 2022. Pumping triggers, constituents of potential concern, and volumes are discussed in Appendix M.

6.3.3 MSX PIT WATER QUALITY MONITORING RESULTS

In 2022, LCO initiated pumping from the MSX Pit. Water from the MSX Pit sump (LC_MSXS) discharges to the MSAW Pit. Mining in MSAW Pit was completed in 2010 and has since been backfilled with waste rock. MSAW Pit decants into the Line Creek Rock Drain. The outlet of the Line Creek Rock Drain is located approximately 3 km downstream of MSAW Pit at the receiving environment monitoring location Line Creek upstream of West Line Creek (E293369/LC_LCUSWLC). The *MSX Pit Pumping Plan* provides recommended maximum pump rates that can be used to set pump discharge. The plan also allows adjusting the pump rate maximum by using the excel mass balance tool updated with relevant water quality results and downstream flow rates. Pumping triggers, constituents of potential concern, and volumes are discussed in Appendix M.

6.3.4 WATER QUALITY PREDICTIONS

A comparison of predicted water quality against actual monitoring results is provided in Appendix M for Horseshoe Pit Dewatering and MSX Pit Pumping. These evaluations also include potential opportunities for improvements to the dewatering tools.

7 Summary and Conclusions

This annual report reflects the requirements of effluent Permit 5353 issued to Line Creek Operations under the provisions of the *Environmental Management Act*, most recently amended on July 22, 2021. This amendment has brought Line Creek Operations Phase II development (previously regulated under Order In Council Permit 106970) into Permit 5353.

All monitoring events occurred in accordance with the schedule shown in Appendix A of Permit 5353 for all parameters listed. Results of the Rail Loop Ponds effluent to ground (E302410/LC_PIZP1101 and E302411/LC_PIZP1105) is discussed in the *2022 Annual Report: Elk Valley Regional and Site Specific Groundwater Monitoring Programs*. In 2022, dewatering occurred in Horseshoe Pit and monitoring of the water discharged was done in accordance with LCO's *Horseshoe Pit Dewatering Plan*. LCO also pumped water in MSX Pit to the MSAW backfilled pit once in January and intermittently from October until the end of 2022. Monitoring of this discharge was conducted in accordance with LCO's *MSX Pit Pumping Plan*.

Line Creek Operations had 30 non-compliances in 2022. Twenty-four of these non-compliances were associated with the unauthorized discharge of effluent to ground from a coal preparation plant instead of the permitted four Rail Loop Ponds. Other non-compliances in 2022 are summarized in table 2.3. There were no missed samples for Permit 5353 in 2022. All other locations met permit limit requirements (Table i). All unattainable data was due to frozen or dry streams. The No Name Creek Pond (E221268/LC_LC9) did not discharge, and the Contingency Treatment Pond (E219411/LC_LC8) was not used in 2022.

In 2023, LCO will continue all efforts to collect samples in accordance with the Permit 5353 monitoring schedule, and where requirements cannot be met, the alternative locations will be used in accordance with conditions identified in the aforementioned ENV approval.

8 References

British Columbia Field Sampling Manual, 2020

British Columbia Environmental Laboratory Manual, 2020

British Columbia Water Quality Guidelines,

Golder Associates Ltd. 2022. Environmental Impact Assessment; Toxicity Event at Mine Services Area Extension Pit.

Teck. 2022. LCO Sediment Management Plan

Teck. 2022. Horseshoe Pit Dewatering Plan

Teck. 2022. MSX Pit Pumping Plan

Teck. 2022. Annual Report: Permit 107517 Surface Water Quality Monitoring 2021 Report

Teck. 2022. Annual Report: Elk Valley Regional and Site Specific Groundwater Monitoring Programs.

9 Appendices

9.1 Appendix A – Annual Status Form

Annual Compliance Status Form

AUTHORIZATION NUMBER:	5353
AUTHORIZATION TYPE:	Permit
LEGAL AUTHORIZATION HOLDER NAME:	Teck Coal Limited
PERIOD OF COMPLIANCE STATUS ASSESSMENT:	2022/01/01 to 2022/12/31
AUTHORIZED PERSON NAME:	Joda Hamilton
AUTHORIZED PERSON SIGNATURE:	J Hamilton
SIGNATURE DATE:	March 31, 2023

I understand that it is an offense to mislead a government official, and I declare that all of the information presented is accurate and true.
I have been given the authority by the authorization holder to sign this form.

AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
1.1.1	The freeboard in Rail Loop Settling Pond C must be greater than 1 m at all times, unless a reduced freeboard is authorized in writing by the director.	No	Freeboard measurements of Rail Loop Pond C exceeded 1m for various periods of times throughout 2022.	Refer to Section 5.2.1.1
1.2.1	The discharge of effluent from the Sewage Treatment System serving the Mine Service Building to the ground, must not exceed the maximum authorized rate of 45m3/day.	Yes	The LCO Mine Service Building Sewage Treatment System did not discharge throughout 2022 due to ongoing upgrades.	Refer to Section 5.1.2.1.1 and 5.2.1.2
1.2.2	The characteristics of the effluent from Sewage Treatment System serving the Mine Service Building to the ground, must not exceed Total Suspended Solids (TSS) of 130mg/l or Biological Oxygen Demand of 130mg/l.	Yes	As mentioned under clause 1.2.1 The LCO MSB Sewage Treatment System did not dischage throughout 2022. Work is underway to incorporate a membrane bioreactor (MBR) wastewater treatment system to supplement the existing system. All discharge from the Sewage treatmetn system serving the MSB was discharged at an external facility through ongoing use of vac trucks to take the sewage offsite for suitable treatment.	Refer to Sections 1.3, and 5.1.2.1.1.
1.3.1	The characteristics of the effluent from No Name Creek Diversion and Sediment Pond to the Line Creek Rock Drain, must not exceed TSS of 50 mg/l for discharge rates up to the Q10 flow of 2.3m3/second.	Yes	The No Name Creek Ponds did not discharge in 2022.	Refer to Section 5.2.1.6.

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1.4.1	The characteristics of the effluent from MSA North Ponds to Line Creek, must not exceed TSS of 50 mg/l for discharge rates up to the Q10 flow of 0.84m3/second	Yes	Samples collected from the MSA North Ponds effluent location illustrate TSS remains below 50mg/L limit. Additionally, flows measured at the MSA North Ponds discharge through the stage discharge relationship show discharge rates were below the Q10 flows.	Refer to Sections 5.1.2.1.4 and 5.2.1.4
1.5.1	The characteristics of the effluent from Contingency Treatment System to the Line Creek, must not exceed TSS of 50 mg/l for discharge rates up to 3m3/second.	Yes	The Contingency Treatment System to the Line Creek did not discharge in 2022.	Refer to Section 5.2.1.5.
1.5.2	The designated treatment works must be used when Line Creek exhibits total suspended solids above 50 mg/L	No	While there were two Line Creek samples in June 2022 from different locations (i.e. LC2 and LC4) that showed Total Suspended Solids concentrations greater than 50 mg/L, the Contingency Treatment System(CTS) was not implemented because of the monitoring location's distant proximity to the CTS. LC2 is upstream of the Line Creek Rock Drain and greater than 4 KM upstream of the Contingency Treatment System. At the time of the elevated TSS concentrations LC2, water quality samples were also collected immediately upstream of the CTS (i.e. WLC, LC3, LCUSWLC) and results were below 50 mg/L at the time of the LC2 exceedance. Additionally, the downstream compliance point monitoring location on Line Creek also had TSS below 50mg/L. These results provide evidence the use of the Contingency Treatment System would not have been necessary in 2022.	Refer to Section 5.1.2.2
1.6.1	The effluent from the Heavy Duty Wash Bays to the Steam Bay Ponds must not exceed the average authorized rate of discharge of 150m3/day.	Yes	The Heavy Duty Wash Bay Effluent was below the daily maximum flow limit of 150 m3/day for all of 2022.	Refer to Section 5.2.1.3
1.6.2	The characteristics of the discharge from the Heavy Duty Wash Bays to the Steam Bay Ponds must not exceed Extractable Petroleum Hydrocarbons (EPH) of 15mg/l.	No	There was one discharge from the Heavy Duty Wash Bay into the Steam Bay Ponds that had an EPH exceedance. This occurred January 20, 2022.	Refer to Sections 2.3 and 5.1.2.1.2
1.7.1	The characteristics of discharge of contaminants from Miscellaneous Oil/Water Separators (OWS) at LCO to ground must not exceed EPH of 15mg/l prior to discharge to ground.	No	A routine water sample collected at the Light Vehicle Wash Bay OWS on March 10, 2022, at 08:50 had an EPH result of 67.1 mg/L; this exceeded the discharge limit established for miscellaneous oil-water separators.	Refer to Section 5.1.2.1.3

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1.8.1	The discharge of stored pit water from Horseshoe Pit and MSAW Pit to Line Creek must not exceed the authorized daily rate specified in the applicable pumping plan.	Yes	The discharge flow rates from June 20, 2022 through to July 4, 2022 from HSP were above the prescribed maximum daily discharge rate of 25,000 m3/day stated in the HSP pit dewatering plan. The increased dewatering rates were required at that time to manage excessively high flood waters which threatened critical infrastructure such as the infiltration gallery which supplies potable water for the Mine Service Building at LCO.	Refer to Section 5.2.1.8
1.8.2	The characteristics of the effluent from Horseshoe Pit and MSAW Pit to Line Creek, must not exceed TSS of 50 mg/l and water quality prescribed in the applicable pumping plan.	No	Total suspended solids (TSS) at the discharge from MSAW Pit in 2022 remained below the limit of 50 mg/L except for Dec 14, 2022 with a result of 56.5 mg/L.	Refer to Section 2.3 and Section 5.1.2.1.9
1.10.1	The maximum authorized rate of discharge of effluent from a return channel from the Dry Creek Sedimentation Ponds to Dry Creek is the QIO flow of 1.8 cubic meters per second.	Yes	Discharge measurements from the outflow of the Dry Creek Sedimentation ponds were below the Q10 flow for 2022.	Refer to Section 5.2.1.5
1.10.2	Characteristics of discharge must not exceed Total Suspended Solids (TSS) of 50 mg/L	Yes	For all of 2022, TSS measures from the Dry Creek Sedimentation Pond Effluent to Dry Creek via the Return Channel (E295211/LC_SPDC) did not exceed 20 mg/L, which is less than the permit limit of 50mg/L.	Refer to Section 5.1.2.2.7
1.11.1	The maximum authorized rate of discharge of effluent from a diffuser and conveyance pipeline from the Dry Creek Sedimentation Ponds to the Fording River is the Q10 flow of 1.8 cubic meters per second.	ND	Diffuser and conveyence pipeline from Dry Creek Sedimentation Ponds to the Fording River are not yet constructed.	N/A
1.11.2	Characteristics of discharge must not exceed Total Suspended Solids (TSS) of 50 mg/L	ND	Diffuser and conveyence pipeline from Dry Creek Sedimentation Ponds to the Fording River are not yet constructed.	N/A
2.1	The permittee must inspect the authorized works regularly and maintain them in good working order. In the event of a condition or emergency comply with all applicable statuatory requirements including Spill Reporting Regulation, immediately contact the Director or designated officer by email or telephone and take appropriate remedial action for the prevention or mitigation of pollution.	Yes	Ongoing inspections of authorized works occurred throughout 2022, and were often the trigger for any maintenance requirements.	Refer to section 1.3
2.2.1	Bypass of the authorized works (with the exception of Contingency Treatment System and MSA North Ponds and Dry Creek Sedimentation Ponds seasonally during non-freshet flows) is prohibited unless the prior approval of the Director is obtained and confirmed in writing.	Yes	N/A	N/A
2.2.2	Pursuant to 2.2.1, characteristics of the effluent bypassing No Name Creek Diversion and Sedimentation Pond and MSA North Ponds are <50mg/l TSS and measured once per day during the bypass.	Yes	in 2022 there was no bypass of No Name Creek Diversion and Sedimentation Ponds or the MSA Noth Ponds.	Refer to Sections 5.2.1.4 and 5.2.1.7.

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2.2.3	Pursuant to subsection 2.2.1, bypass of the authorized works in section 1.10, the Dry Creek Sedimentation Ponds, via the bypass works is authorized on a seasonal basis, during non-freshet flows to reduce or avoid the generation of bioavailable selenium, in accordance with the updated DCWMS operations manual required by section 2.9.4. The permittee must notify the director within 48 hours of commencement of the bypass and of commencement of refilling the sedimentation ponds. The permittee must notify the director 48 hours prior to discharge of water accumulated in the sedimentation ponds during operation of the bypass. A record of bypass of the Dry Creek Sedimentation Ponds must be maintained for inspection and presented in the quarterly and annual reports.	Yes	Bypass of the Dry Creek sedimentation ponds occurred in 2022 details are outlined in Section 5.2.1.5.1.	Refer to section 5.2.1.5.1
2.3	The permittee must develop and validate, at minimum on an annual basis a tool for field analysis of TSS value and procedures for additional TSS sampling for discharges referenced in Section 1 of this permit and any effluent discharge to surface water from the mine property. The TSS determination method must be approved by the Director.	Yes	TSS/turbidity regressions were revised at the end of the 2017 field season and provided to the ENV on April 30, 2018 in an updated report (appended to the Q1 2018 Elk Valley Regional Water Quality Report). Additional data was collected in 2022 and the revised TSS Determination report.	Refer to section 6.2 and Appendix I
2.4	The permittee must notify the director in writing, prior to implementing changes to any process that may adversely affect the quality and/or quantity of the discharge. Notwithstanding notification under this section, permitted levels must not be exceeded.	Yes	N/A	N/A
2.5	A minimum 0.5m of freeboard must be maintained in the sedimentation ponds. Settled solids which have accumulated in all settling ponds must be removed as required to maintain their design performance. The Director must be notified prior to removing solids.	Yes	Notification was provided to ENV for maintenance of works, identified in Section 1.3, Table 2.	Refer to Sections 5.2.1.4, 5.2.1.6 and 5.2.1.7.
2.6	Sediment characterization, removal and disposal must be managed in accordance with the mine Sediment Management Plan covering the authorized works in sections 1.1 (Rail Loop Ponds), 1.3 (No Name Ponds), 1.4 (MSAN Ponds), and 1.6 (Steam Bay Ponds). The plan may be modified as required by the Director. The Sediment Management Plan must be prepared and signed off by a qualified professional. Updates to the Sediment Management Plan must be submitted to the director within 30 days of adoption.	Yes	Sediment characterization and removal/disposal from the Rail Loop, Steam Bay and No Name Creek Ponds in 2022 followed the guidance from the approved LCO Sediment Management Plan (2015). Note that an updated Sediment Management Plan was submitted to ENV for review on December 23, 2022. The review and approval process with Teck and regulators is ongoing in 2023.	Refer to section 1.3
2.7.1	The permittee may use flocculants to maintain the level of total suspended solids equal to or less than the permit limits in the discharges from settling ponds and other structures identified in the plan. These flocculants must be used in accordance with the “Flocculant Management Plan” provided by Teck Line Creek Operations, approved by the Director on May 28, 2015, as updated from time to time. Any updates to the plan must be developed by a qualified professional, and submitted to the director within 30 days of adoption. The Director may impose additional requirements for the use of flocculants for the protection of the environment.	Yes	Flocculant blocks were used in the LCO Dry Creek in 2022 following the LCO Flocculant Management Plan.	Refer to Section 6.1 and Table 11

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Date:________________

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2.7.2	The permittee shall maintain a record of the use of all flocculant(s) for sediment control on site. The permittee shall record daily, when flocculants are used, the type(s) of flocculant used, the weight applied and application rate (mg/L/day) and type of application system used. The permittee shall maintain records on site for inspection for a period of five years.	Yes	Full records of Flocculant used for sediment control can be found in Table 11 of Section 6.1	Refer to Section 6.1 and Table 11
2.8.1	Surface water runoff from process areas and roads must be managed through a Mine Water Management Plan. The plan must be modified as required by the director.	Yes	Line Creek operated under the Mine Water Management Plan versions from 2021 and the latest updated in July 2022.	Section 1.2
2.9.1	The Permittee shall develop and implement a Water Management and Erosion Control Plan. This plan must be submitted to the Director, Environmental Protection prior to the initiation of construction of works.	Yes	The Mine Water Management Plan provides an outline of the Erosion Control Plan, and the latest vesrion was submitted in July 2022.	Section 1.2
2.9.2	Additional Sedimentation Pond	Yes	The contingency option of a third sedimentation pond within the DCWMS has not yet been pursued. There remains existing land to develop this contingency if required to increase effectiveness of the DCWMS.	N/A
2.9.3	The Permittee must ensure the operating plan for the DCWMS addresses the design and operation of the sedimentation ponds such that normal operation level of the pond(s) will leave buffering capacity in the pond to dissipate instantaneous peak flow and maintain permit requirements.	Yes	N/A	N/A
2.9.4	An operational manual for the authorized works must be submitted to the director four months prior to waste rock placement in the Dry Creek watershed. The operations manual shall include but not necessarily be limited to: i Procedures for operation, monitoring, inspection and maintenance for the authorized works in section l of this permit; ii Measures to ensure that the authorized works are operated at all times within specifications and in a manner to ensure compliance with this permit and applicable legislation; iii Records management procedures; iv Communications and reporting procedures pursuant to requirements in section 4 of this permit; v Emergency Response and Contingency Plan; and vi Procedures for operation and monitoring during seasonal bypass of the sedimentation ponds, water quality objectives and targets used to make operational decisions, management of accumulating water, sediment removal, timing of initiation of bypass, refilling of the ponds, and contingency measures. The plan must also include procedures to ensure that natural downstream flow is maintained, and ramping criteria are met downstream of the DCWMS during initiation of bypass, draining of the ponds and filling of the ponds.	Yes	The Dry Creek Water Management System (DCWMS) Operation, Maintenance and Surveillance (OMS) Manual has undergone various updates throughout the operation of the DCWMS, the latest version was provided to ENV and KNC in April, 2021. While minor internal updates continue, the procedures of operation of the DCWMS have not changed. Details of pond refilling can be found in Section 5.2.1.5.1.	Refer to section 5.2.1.5.1
2.9.5	The final design for the Dry Creek Water Management System must include calcite controls to prevent calcification in the works. Characterization of the final effluent quality, with an assessment of risks to the receiving environment from the calcite treatment process, must be submitted to the Director, Environmental Protection by June 30, 2014.	Yes	The LCO Dry Creek Calcite Antiscalant Addition has been in full operation since summer 2021.	N/A

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AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
2.10.1	Authorized works must be complete and in operation while discharging or as required seasonally to maintain water quality and/or water management needs (flocculant addition, pumping equipment).	Yes	N/A	N/A
2.11	The ten-year return flood flow or Q10 referenced in section 1 is defined as the average calculated flood flow in cubic meters per second (m3/s) over a 24-hour period that can be expected to occur once in a ten-year return period for a specified drainage basin.	Yes	All discharges were below the Q10 flow in 2022.	Refer to section 5.2 and Appendix F
2.12	All documents submitted to the Director by a Qualified Professional must be signed by the author(s).	Yes	Updated documents that were submitted to the director that were written by a Qualified Professional in 2022 include: Sediment Management Plan (under update and review) Mine Water Management Plan Horseshoe Ridge Pit Dewatering Plan MSX Pit Pumping Plan *Note at the time of this submission some QP report signatures are missing. Updated reports with signatures will be submitted in 2023.	Refer to sections 1.2, 1.3, and 6.3.1
2.13.1	The permittee must notify the director, in writing, 14 days prior to discharge of effluent commencing from the pits listed in section 1.8. The notification must include a pumping plan that outlines the quality of the pit water, the total volume to be pumped to Line Creek, general time frame and conditions under which the prescribed pumping plan is valid, sampling and monitoring schedule, discharge location, any prescribed water treatment, the pumping duration and rates, and the predicted water quality at downstream permitted monitoring locations and the nearest PE107517 compliance point.	Yes	No pit pumping occurred from the MSAW pit in 2022. The MSX pit pumping to MSAW pit occurred following notification provided on December 1, 2021 and followed the MSX Pit Pumping Plan (submitted July 2021) throughout 2022. Discharge of Horseshoe Pit water initated June 19 in response to elevated water levels, and the need for emergency pumping, and followed the updated Horseshoe Ridge Pit dewatering plan that was updated July 15, 2021. Refer to Section 6.3 for detail on written notifications provided.	see condition 2.13.5 of Permit 5353 and Refer to Section 6.3 in the Annual Report for further detail.
2.13.2	Water quality predictions must be made using a water quality model specific to the Line Creek mine site. The director may require additional assessments, monitoring, and/or treatment following notification of pit pumping.	Yes	A comparison of predicted water quality against actual monitoring results was completed for the Horseshoe Pit dewatering and MSX pit pumping.	See section 6.3.4
2.13.3	Notification under section 1.13.1 is required 30 days prior to commencing when the pit pumping plan prescribes pre-discharge water treatment works other than the works specified in section 1.8.3 and/or flocculants identified in the approved Flocculant Management Plan.	Yes	Refer to Section 6.3.4 for detail on written notifications provided.	see section 6.3.1
2.13.4	The permittee must submit an updated mine water management plan by April 30, 2020. The director may require modifications to the plan to accommodate pit pumping and the protection of the receiving environment.	Yes	An updated version of the Mine Water Management Plan was submited June 30, 2022	see section 1.2

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2.13.5	The permittee must notify the director, in writing, at least 24 hours in advance of the starting of pit pumping and again within 24 hours of the completion of pit pumping.	No	On August 25, 2022 at 14:50, during a field inspection of the HSP discharge point (LC_HSP; E308146) running water was discovered into the Line Creek Rock Drain (LCRD). No notification was provided to ENV at least 24 hours in advance of this discharge.	See section 2.3
2.13.6	If monitoring results indicate a limit in permit 107517 is reasonably expected to be exceeded at Compliance Point E297110 or Order Station 0200028 and that pumping may need to be suspended, the director must be notified immediately via email: ENVSECOAL@gov.bc.ca.	Yes	No pit pumping occurred from the MSAW pit in 2022. The HSP pit pumping to the Line Creek Rock Drain initiated under emergency conditions; see condition 2.13.1 of Permit 5353 and Refer to Section 6.3 in the Annual Report for further detail. For MSX pit pumping refer to section 6.3.	See section 6.3
3.1.2	The permittee is required to conduct the monitoring program identified in Appendix 2A, Tables 2 and 3. Details of sampling schedule are included in Appendix 2A.	Yes	N/A	N/A
3.1.2.1	At least twice per year during the duration of the MSX Short Dump Project, paired samples shall be taken from site E304613 and E216144 when safe access is available to E216144. The results shall be compared in the Annual Report.	Yes	Paired sampling was conducted two times in 2022 for E304613 (LC_LC7DSTF) and E216144 (LC_LC7). The 2022 results have been incorporated into the sample dataset (2013-2022) and compared using the method of statistical evaluation (T-Test) previously provided in section 5.3.	Refer to section 5.3
3.1.3.1	Sampling is to be carried out in accordance with the procedures described in the most recent edition of the "British Columbia Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples," or by suitable alternative procedures as authorized by the Director.	Yes	Refer to Section 4.2	Refer to section 4.2
3.1.3.1	Analyses are to be carried out in accordance with procedures described in the most recent edition of the "British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air," or by suitable alternative procedures as authorized by the director.	Yes	Refer to section 3.1.4	Refer to section 3.1.4
3.1.3.3	The permittee must implement a Quality Assurance and Quality Control plan in accordance with the Environmental Data Quality Assurance Regulation and guidance provided in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air- Emissions, Water, Wastewater, Soil, Sediment, and biological Samples", and "British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air."	Yes	Refer to section 3.	Refer to section 3.
3.1.3.1	Analyses are to be carried out in accordance with procedures described in the most recent edition of the "British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air," or by suitable alternative procedures as authorized by the director.	Yes	Refer to section 3.1.4	Refer to section 3.1.4

Authorized Person Initial:____________________

Date:________________

AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
	The permittee must implement a Quality Assurance and Quality Control plan in accordance with the Environmental Data Quality Assurance Regulation and guidance provided in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air- Emissions, Water, Wastewater, Soil, Sediment, and biological Samples", and "British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air."	Yes	Refer to section 3.	Refer to section 3.
3.1.3.4	Flow calculation methods for receiving streams or creeks must be based on a regional hydrological evaluation, and recommendations made and implemented by a qualified professional. Appropriate current and historical stream gauging data should be utilized. Methods must be updated at a frequency and in a manner recommended by a qualified professional. Flow gauging stations required by permit for discharge stations must be evaluated and documented to illustrate gauging method, consistency and relative accuracy and must be operated according to recommendations from a qualified professional. Reports on methods, evaluations and recommendations must be made available to the director on request.	Yes	Refer to Appendix F, 2022 Line Creek Operations Hydrometric Program Final Report	Refer to section 5.2.1 and Appendix F
4.3	The permittee must prepare on an annual basis a report or series of reports summarizing activities, incidents, and discharge/receiving environment monitoring results. The report(s) must include but is not limited to: i. A map of monitoring locations with EMS and Teck descriptors; ii. A summary of non-compliances with the permit conditions for the previous calendar year. This shall include interpretation of significance, and the status of corrective actions and/or ongoing investigations; iii. A summary of environmental incidents reported during the previous calendar year, including corrective status; iv. A summary of measured parameters, including appropriate graphs and comparison of results to permit limits, Approved and Working Water Quality Guidelines, Site Performance Objectives, or other criteria and benchmarks as specified by the director; v. A summary of flocculants used at each pond location, in accordance with the approved Flocculent Management Plan, including types and trade names, concentrations and volumes of each type dosed, and frequency and duration of dosing; vi. A summary of any QA/QC problems during the year; and, vii. A summary of annual pit pumping results including comparisons of predicted water quality and actual monitoring results as well as any changes needed to improve water quality predictions for pit pumping in the upcoming year. viii. An estimate of the proportion of mine-affected water (surface and subsurface) that is not captured by the Dry Creek Water Management System. The Annual Report must be submitted to the director on March 31st of each year following the data collection calendar year.	Yes	Acknowledged. Refer to Line Creek Operations 2022 Annual Water Report for Permit 5353, submitted March 31, 2021	N/A

Authorized Person Initial:____________________ Date:________________

9.2 Appendix B – 2022 Sediment Characterization

CERTIFICATE OF ANALYSIS

Work Order	: **CG2200934**	Page	: 1 of 16
Client	: **Teck Coal Limited**	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 27-Jan-2022 08:40
PO	: VPO00809190	Date Analysis Commenced	: 28-Jan-2022
C-O-C number	: RLPB 20220126	Issue Date	: 08-Feb-2022 21:19
Sampler	: SF		
Site	: ----		
Quote number	: Q68208		
No. of samples received	: 6		
No. of samples analysed	: 6		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Aulora Alexander	Lab Assistant	Inorganics, Calgary, Alberta
Brian Wong	Laboratory Assistant	Organics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Metals, Calgary, Alberta
Jeanie Mark	Laboratory Analyst	Organics, Calgary, Alberta
Joshua Stessun	Laboratory Analyst	Organics, Calgary, Alberta
Kevin Baxter		Metals, Calgary, Alberta
Maqsood Ul Hassan	Laboratory Analyst	Organics, Calgary, Alberta
Oscar Ruiz	Lab Assistant	Metals, Calgary, Alberta
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Sara Niroomand		Metals, Calgary, Alberta
Sorina Motea	Laboratory Analyst	Organics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µg/L	micrograms per litre
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
DLCI	*Detection Limit Raised: Chromatographic interference due to co-elution.*
SMI	*Surrogate recovery could not be measured due to sample matrix interference.*
VOCJ	*Soil jar was submitted as VOC sample container. VOC results may be biased low, and do not meet federal (CCME) or provincial requirements (for BC, AB-Tier1, MB, ON, SK).*

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	LC_RLPB_SO_2022-01-26_NP 1	LC_RLPB_SO_2022-01-26_NP 2	LC_RLPB_SO_2022-01-26_NP 3	LC_RLPB_SO_2022-01-26_NP 4	LC_RLPB_SO_2022-01-26_NP 5
				Client sampling date / time	26-Jan-2022 13:50	26-Jan-2022 14:10	26-Jan-2022 14:30	26-Jan-2022 14:50	26-Jan-2022 15:10
Analyte	CAS Number	Method	LOR	Unit	CG2200934-001	CG2200934-002	CG2200934-003	CG2200934-004	CG2200934-005
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	41.6	38.5	47.2	44.5	39.3
pH (1:2 soil:water)	----	E108	0.10	pH units	7.41	7.73	7.51	7.09	7.65
Metals									
aluminum	7429-90-5	E440	50	mg/kg	2180	1860	1900	2200	1910
antimony	7440-36-0	E440	0.10	mg/kg	0.53	0.40	0.43	0.53	0.42
arsenic	7440-38-2	E440	0.10	mg/kg	1.43	1.31	1.60	1.80	1.42
barium	7440-39-3	E440	0.50	mg/kg	245	216	239	297	155
beryllium	7440-41-7	E440	0.10	mg/kg	0.42	0.43	0.45	0.50	0.47
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	0.21
boron	7440-42-8	E440	5.0	mg/kg	8.2	7.2	7.6	9.3	6.5
cadmium	7440-43-9	E440	0.020	mg/kg	0.450	0.461	0.496	0.520	0.477
calcium	7440-70-2	E440	50	mg/kg	2790	2260	2450	2190	2000
chromium	7440-47-3	E440	0.50	mg/kg	3.64	2.86	3.34	3.75	3.20
cobalt	7440-48-4	E440	0.10	mg/kg	2.19	2.00	2.27	2.41	2.44
copper	7440-50-8	E440	0.50	mg/kg	15.4	15.9	15.4	15.3	15.5
iron	7439-89-6	E440	50	mg/kg	2200	2530	2540	3020	6820
lead	7439-92-1	E440	0.50	mg/kg	5.63	5.49	5.95	5.88	5.32
lithium	7439-93-2	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
magnesium	7439-95-4	E440	20	mg/kg	529	392	423	358	450
manganese	7439-96-5	E440	1.0	mg/kg	20.7	20.4	19.8	21.1	53.2
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
molybdenum	7439-98-7	E440	0.10	mg/kg	1.81	1.69	2.06	2.46	1.68
nickel	7440-02-0	E440	0.50	mg/kg	6.72	6.42	7.87	9.02	7.38
phosphorus	7723-14-0	E440	50	mg/kg	579	474	571	661	507
potassium	7440-09-7	E440	100	mg/kg	380	360	340	400	350
selenium	7782-49-2	E440	0.20	mg/kg	1.84	2.10	2.28	2.24	1.54
silver	7440-22-4	E440	0.10	mg/kg	0.10	0.11	0.12	0.14	0.11
sodium	7440-23-5	E440	50	mg/kg	52	<50	<50	<50	<50
strontium	7440-24-6	E440	0.50	mg/kg	97.0	85.6	101	126	90.3

Analytical Results

Sub-Matrix: Soil

(Matrix: Soil/Solid)

				Client sample ID	LC_RLPB_SO_2022-01-26_NP 1	LC_RLPB_SO_2022-01-26_NP 2	LC_RLPB_SO_2022-01-26_NP 3	LC_RLPB_SO_2022-01-26_NP 4	LC_RLPB_SO_2022-01-26_NP 5
				Client sampling date / time	26-Jan-2022 13:50	26-Jan-2022 14:10	26-Jan-2022 14:30	26-Jan-2022 14:50	26-Jan-2022 15:10
Analyte	CAS Number	Method	LOR	Unit	CG2200934-001	CG2200934-002	CG2200934-003	CG2200934-004	CG2200934-005
					Result	Result	Result	Result	Result
Metals									
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	1300	1200
thallium	7440-28-0	E440	0.050	mg/kg	0.054	<0.050	<0.050	<0.050	<0.050
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	mg/kg	20.4	18.9	23.6	26.9	21.7
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	mg/kg	0.713	0.583	0.654	0.753	0.598
vanadium	7440-62-2	E440	0.20	mg/kg	24.4	23.7	27.5	31.0	31.7
zinc	7440-66-6	E440	2.0	mg/kg	25.7	27.0	27.7	30.6	31.9
zirconium	7440-67-7	E440	1.0	mg/kg	3.1	2.8	3.3	3.8	2.8
TCLP Anions & Nutrients									
fluoride, TCLP	16984-48-8	E240.F	10	mg/L	<10	<10	<10	<10	<10
TCLP Extractables									
acenaphthene, TCLP	83-32-9	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acenaphthylene, TCLP	208-96-8	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acridine, TCLP	260-94-6	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
anthracene, TCLP	120-12-7	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
benz(a)anthracene, TCLP	56-55-3	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
benzo(a)pyrene, TCLP	50-32-8	E644	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
benzo(b+j)fluoranthene, TCLP	----	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
benzo(g,h,i)perylene, TCLP	191-24-2	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
benzo(k)fluoranthene, TCLP	207-08-9	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
chrysene, TCLP	218-01-9	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
dibenz(a,h)anthracene, TCLP	53-70-3	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene, TCLP	206-44-0	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluorene, TCLP	86-73-7	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
indeno(1,2,3-c,d)pyrene, TCLP	193-39-5	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
methylphenol, 2-, TCLP	95-48-7	E665A	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
methylphenol, 3+4-, TCLP	----	E665A	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
methylphenols, total, TCLP	----	E665A	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
naphthalene, TCLP	91-20-3	E644	0.0050	mg/L	0.0058	<0.0050	<0.0050	<0.0050	<0.0050

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	LC_RLPB_SO_2022-01-26_NP1	LC_RLPB_SO_2022-01-26_NP2	LC_RLPB_SO_2022-01-26_NP3	LC_RLPB_SO_2022-01-26_NP4	LC_RLPB_SO_2022-01-26_NP5
				Client sampling date / time	26-Jan-2022 13:50	26-Jan-2022 14:10	26-Jan-2022 14:30	26-Jan-2022 14:50	26-Jan-2022 15:10
Analyte	CAS Number	Method	LOR	Unit	CG2200934-001	CG2200934-002	CG2200934-003	CG2200934-004	CG2200934-005
					Result	Result	Result	Result	Result
TCLP Extractables									
nitrobenzene, TCLP	98-95-3	E665A	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
phenanthrene, TCLP	85-01-8	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
pyrene, TCLP	129-00-0	E644	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
TCLP Extractables Surrogates									
acenaphthene-d10, TCLP	15067-26-2	E644	5.0	%	97.9	102	97.6	106	98.7
chrysene-d12, TCLP	1719-03-5	E644	5.0	%	58.7	97.9	94.4	101	94.0
naphthalene-d8, TCLP	1146-65-2	E644	5.0	%	83.0	102	101	106	97.9
phenanthrene-d10, TCLP	1517-22-2	E644	5.0	%	74.6	104	98.9	107	99.9
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	8.44	6.89	6.59	6.72	6.86
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	1.46	1.47	1.47	1.46	1.49
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	4.91	4.91	4.91	4.91	4.91
pH, TCLP final	----	EPP444	0.010	pH units	4.98	5.04	5.01	5.02	5.03
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
boron, TCLP	7440-42-8	E444	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
calcium, TCLP	7440-70-2	E444	10	mg/L	34	50	35	40	47
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
copper, TCLP	7440-50-8	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	7.8	8.9	6.9	8.0	9.3
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	----	<0.0010	<0.0010	<0.0010	<0.0010
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	----	----	----	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid)**

				Client sample ID	LC_RLPB_SO_2022-01-26_NP1	LC_RLPB_SO_2022-01-26_NP2	LC_RLPB_SO_2022-01-26_NP3	LC_RLPB_SO_2022-01-26_NP4	LC_RLPB_SO_2022-01-26_NP5
				Client sampling date / time	26-Jan-2022 13:50	26-Jan-2022 14:10	26-Jan-2022 14:30	26-Jan-2022 14:50	26-Jan-2022 15:10
Analyte	CAS Number	Method	LOR	Unit	CG2200934-001	CG2200934-002	CG2200934-003	CG2200934-004	CG2200934-005
					Result	Result	Result	Result	Result
TCLP Metals									
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10
TCLP VOCs									
benzene, TCLP	71-43-2	E615A	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
benzene, TCLP	71-43-2	E615B	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
bromodichloromethane, TCLP	75-27-4	E615B	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
bromoform, TCLP	75-25-2	E615B	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
carbon tetrachloride, TCLP	56-23-5	E615B	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
chlorobenzene, TCLP	108-90-7	E615B	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
chloroform, TCLP	67-66-3	E615B	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
dibromochloromethane, TCLP	124-48-1	E615B	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
dichlorobenzene, 1,2-, TCLP	95-50-1	E615B	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
dichlorobenzene, 1,4-, TCLP	106-46-7	E615B	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
dichloroethane, 1,2-, TCLP	107-06-2	E615B	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
dichloroethylene, 1,1-, TCLP	75-35-4	E615B	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
dichloromethane, TCLP	75-09-2	E615B	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
ethylbenzene, TCLP	100-41-4	E615A	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
ethylbenzene, TCLP	100-41-4	E615B	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
methyl ethyl ketone [MEK], TCLP	78-93-3	E615B	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
tetrachloroethylene, TCLP	127-18-4	E615B	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
toluene, TCLP	108-88-3	E615A	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
toluene, TCLP	108-88-3	E615B	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
trichloroethylene, TCLP	79-01-6	E615B	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
vinyl chloride, TCLP	75-01-4	E615B	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, m+p-, TCLP	179601-23-1	E615A	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
xylene, m+p-, TCLP	179601-23-1	E615B	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Analytical Results

Sub-Matrix: Soil
(Matrix: Soil/Solid)

				Client sample ID	LC_RLPB_SO_2022-01-26_NP1	LC_RLPB_SO_2022-01-26_NP2	LC_RLPB_SO_2022-01-26_NP3	LC_RLPB_SO_2022-01-26_NP4	LC_RLPB_SO_2022-01-26_NP5
				Client sampling date / time	26-Jan-2022 13:50	26-Jan-2022 14:10	26-Jan-2022 14:30	26-Jan-2022 14:50	26-Jan-2022 15:10
Analyte	CAS Number	Method	LOR	Unit	CG2200934-001	CG2200934-002	CG2200934-003	CG2200934-004	CG2200934-005
					Result	Result	Result	Result	Result
TCLP VOCs									
xylene, o-, TCLP	95-47-6	E615A	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
xylene, o-, TCLP	95-47-6	E615B	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
xylenes, total, TCLP	1330-20-7	E615A	0.0075	mg/L	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075
xylenes, total, TCLP	1330-20-7	E615B	0.0075	mg/L	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075
trihalomethanes [THMs], total, TCLP	----	E615B	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20
TCLP VOCs Surrogates									
bromofluorobenzene, 4-, TCLP	460-00-4	E615A	1.0	%	86.8	89.2	89.5	87.5	84.2
bromofluorobenzene, 4-, TCLP	460-00-4	E615B	1.0	%	101	102	103	103	104
difluorobenzene, 1,4-, TCLP	540-36-3	E615A	1.0	%	99.4	96.2	95.5	100	97.2
difluorobenzene, 1,4-, TCLP	540-36-3	E615B	1.0	%	99.7	98.1	98.3	99.0	100
Aggregate Organics									
waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	<1000	<1000	<1000	<1000
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611A	0.0050	mg/kg	1.63 VOCJ	2.83	0.430	1.63	1.82
ethylbenzene	100-41-4	E611A	0.015	mg/kg	1.13 VOCJ	1.13	0.526	0.927	1.11
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200 VOCJ	<0.200	<0.200	<0.200	<0.200
styrene	100-42-5	E611A	0.050	mg/kg	<0.050 VOCJ	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611A	0.050	mg/kg	8.70 VOCJ	12.5	2.36	7.30	8.79
xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	12.4 VOCJ	13.6	3.87	9.63	12.7
xylene, o-	95-47-6	E611A	0.050	mg/kg	2.79 VOCJ	3.07	1.41	2.61	3.02
xylenes, total	1330-20-7	E611A	0.075	mg/kg	15.2 VOCJ	16.7	5.28	12.2	15.7
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.10	%	77.2	73.3	76.0	77.2	87.2
difluorobenzene, 1,4-	540-36-3	E611A	0.10	%	72.9	73.9	73.4	71.6	76.5
Hydrocarbons									
EPH (C10-C19)	----	E601A	200	mg/kg	1560	1580	1580	1580	1380
EPH (C19-C32)	----	E601A	200	mg/kg	970	1090	990	1000	1040
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	97 VOCJ	93	66	100	112
HEPHs	----	EC600A	200	mg/kg	960	1080	980	1000	1040
LEPHs	----	EC600A	200	mg/kg	1530	1540	1550	1550	1350

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid)**

Analyte	CAS Number	Method	LOR	Unit	LC_RLPB_SO_2022-01-26_NP1	LC_RLPB_SO_2022-01-26_NP2	LC_RLPB_SO_2022-01-26_NP3	LC_RLPB_SO_2022-01-26_NP4	LC_RLPB_SO_2022-01-26_NP5
				Client sampling date / time	26-Jan-2022 13:50	26-Jan-2022 14:10	26-Jan-2022 14:30	26-Jan-2022 14:50	26-Jan-2022 15:10
					CG2200934-001	CG2200934-002	CG2200934-003	CG2200934-004	CG2200934-005
					Result	Result	Result	Result	Result
Hydrocarbons									
VPHs	----	EC580A	10	mg/kg	70	60	57	78	85
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	Not Determined SMI	71.0	Not Determined SMI	Not Determined SMI	Not Determined SMI
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	76.2	74.2	79.2	70.2	86.0
Polycyclic Aromatic Hydrocarbons									
benzo(e)pyrene	192-97-2	E641A-L	0.010	mg/kg	1.45	1.73	1.39	1.35	1.31
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	1.52	1.56	1.32	1.35	1.47
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	0.326	0.425	0.372	0.399	0.372
acridine	260-94-6	E641A-L	0.010	mg/kg	3.16	3.76	3.07	2.98	2.93
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.420 DLCI	<0.520 DLCI	<0.440 DLCI	<0.400 DLCI	<0.340 DLCI
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	1.05	1.28	1.14	1.16	1.14
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	0.565	0.638	0.577	0.582	0.518
benzo(b+j)fluoranthene	n/a	E641A-L	0.010	mg/kg	1.34	1.65	1.34	1.30	1.28
benzo(b+j+k)fluoranthene	n/a	E641A-L	0.015	mg/kg	1.52	1.84	1.46	1.44	1.40
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	0.522	0.649	0.539	0.516	0.503
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	0.178	0.188	0.120	0.141	0.124
chrysene	218-01-9	E641A-L	0.010	mg/kg	3.45	4.07	3.41	3.34	3.26
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	0.272	0.330	0.276	0.274	0.269
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	0.707	0.857	0.706	0.743	0.704
fluorene	86-73-7	E641A-L	0.010	mg/kg	4.60	5.37	4.35	4.32	4.31
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	0.186	0.213	0.193	0.188	0.183
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	24.1	32.1	21.9	20.8	20.0
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	38.8	52.0	33.6	30.8	29.6
naphthalene	91-20-3	E641A-L	0.010	mg/kg	13.9	19.0	11.2	9.73	9.03
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	16.3	20.2	17.6	18.1	17.6
pyrene	129-00-0	E641A-L	0.010	mg/kg	1.18	1.46	1.23	1.15	1.16
quinoline	91-22-5	E641A-L	0.010	mg/kg	<0.120 DLCI	<0.110 DLCI	<0.110 DLCI	<0.130 DLCI	<0.090 DLCI
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	1.15	1.35	1.17	1.17	1.10
IACR (CCME)	----	E641A-L	0.150	-	17.2	20.6	17.1	17.0	16.5

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	LC_RLPB_SO_ 2022-01-26_NP 1	LC_RLPB_SO_ 2022-01-26_NP 2	LC_RLPB_SO_ 2022-01-26_NP 3	LC_RLPB_SO_ 2022-01-26_NP 4	LC_RLPB_SO_ 2022-01-26_NP 5
				Client sampling date / time	26-Jan-2022 13:50	26-Jan-2022 14:10	26-Jan-2022 14:30	26-Jan-2022 14:50	26-Jan-2022 15:10
Analyte	CAS Number	Method	LOR	Unit	CG2200934-001	CG2200934-002	CG2200934-003	CG2200934-004	CG2200934-005
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.1	%	72.7	81.3	79.6	81.6	78.5
chrysene-d12	1719-03-5	E641A-L	0.1	%	84.7	83.7	87.3	88.5	82.6
naphthalene-d8	1146-65-2	E641A-L	0.1	%	78.0	84.5	85.7	87.3	83.3
phenanthrene-d10	1517-22-2	E641A-L	0.1	%	88.5	95.7	95.0	98.3	93.0

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid)**

				Client sample ID	LC_RLPB_SO_2022-01-26_NP6	----	----	----	----
				Client sampling date / time	26-Jan-2022 15:30	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	CG2200934-006	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
moisture	----	E144	0.25	%	32.6	----	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units	7.32	----	----	----	----
Metals									
aluminum	7429-90-5	E440	50	mg/kg	2770	----	----	----	----
antimony	7440-36-0	E440	0.10	mg/kg	0.66	----	----	----	----
arsenic	7440-38-2	E440	0.10	mg/kg	1.94	----	----	----	----
barium	7440-39-3	E440	0.50	mg/kg	337	----	----	----	----
beryllium	7440-41-7	E440	0.10	mg/kg	0.57	----	----	----	----
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	----	----	----	----
boron	7440-42-8	E440	5.0	mg/kg	8.7	----	----	----	----
cadmium	7440-43-9	E440	0.020	mg/kg	0.733	----	----	----	----
calcium	7440-70-2	E440	50	mg/kg	2310	----	----	----	----
chromium	7440-47-3	E440	0.50	mg/kg	3.58	----	----	----	----
cobalt	7440-48-4	E440	0.10	mg/kg	2.68	----	----	----	----
copper	7440-50-8	E440	0.50	mg/kg	19.1	----	----	----	----
iron	7439-89-6	E440	50	mg/kg	9520	----	----	----	----
lead	7439-92-1	E440	0.50	mg/kg	6.49	----	----	----	----
lithium	7439-93-2	E440	2.0	mg/kg	2.5	----	----	----	----
magnesium	7439-95-4	E440	20	mg/kg	598	----	----	----	----
manganese	7439-96-5	E440	1.0	mg/kg	67.5	----	----	----	----
mercury	7439-97-6	E510	0.0500	mg/kg	0.0550	----	----	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg	2.37	----	----	----	----
nickel	7440-02-0	E440	0.50	mg/kg	9.26	----	----	----	----
phosphorus	7723-14-0	E440	50	mg/kg	601	----	----	----	----
potassium	7440-09-7	E440	100	mg/kg	620	----	----	----	----
selenium	7782-49-2	E440	0.20	mg/kg	1.86	----	----	----	----
silver	7440-22-4	E440	0.10	mg/kg	0.16	----	----	----	----
sodium	7440-23-5	E440	50	mg/kg	<50	----	----	----	----
strontium	7440-24-6	E440	0.50	mg/kg	126	----	----	----	----
sulfur	7704-34-9	E440	1000	mg/kg	2100	----	----	----	----

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	LC_RLPB_SO_2022-01-26_NP6	----	----	----	----
				Client sampling date / time	26-Jan-2022 15:30	----	----	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**CG2200934-006**	--------	--------	--------	--------
					Result	----	----	----	----
Metals									
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	----	----	----	----
tin	7440-31-5	E440	2.0	mg/kg	<2.0	----	----	----	----
titanium	7440-32-6	E440	1.0	mg/kg	18.9	----	----	----	----
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	----	----	----	----
uranium	7440-61-1	E440	0.050	mg/kg	0.742	----	----	----	----
vanadium	7440-62-2	E440	0.20	mg/kg	34.2	----	----	----	----
zinc	7440-66-6	E440	2.0	mg/kg	52.4	----	----	----	----
zirconium	7440-67-7	E440	1.0	mg/kg	3.2	----	----	----	----
TCLP Anions & Nutrients									
fluoride, TCLP	16984-48-8	E240.F	10	mg/L	<10	----	----	----	----
TCLP Extractables									
acenaphthene, TCLP	83-32-9	E644	0.0050	mg/L	<0.0050	----	----	----	----
acenaphthylene, TCLP	208-96-8	E644	0.0050	mg/L	<0.0050	----	----	----	----
acridine, TCLP	260-94-6	E644	0.0050	mg/L	<0.0050	----	----	----	----
anthracene, TCLP	120-12-7	E644	0.0050	mg/L	<0.0050	----	----	----	----
benz(a)anthracene, TCLP	56-55-3	E644	0.0050	mg/L	<0.0050	----	----	----	----
benzo(a)pyrene, TCLP	50-32-8	E644	0.00050	mg/L	<0.00050	----	----	----	----
benzo(b+j)fluoranthene, TCLP	----	E644	0.0050	mg/L	<0.0050	----	----	----	----
benzo(g,h,i)perylene, TCLP	191-24-2	E644	0.0050	mg/L	<0.0050	----	----	----	----
benzo(k)fluoranthene, TCLP	207-08-9	E644	0.0050	mg/L	<0.0050	----	----	----	----
chrysene, TCLP	218-01-9	E644	0.0050	mg/L	<0.0050	----	----	----	----
dibenz(a,h)anthracene, TCLP	53-70-3	E644	0.0050	mg/L	<0.0050	----	----	----	----
fluoranthene, TCLP	206-44-0	E644	0.0050	mg/L	<0.0050	----	----	----	----
fluorene, TCLP	86-73-7	E644	0.0050	mg/L	<0.0050	----	----	----	----
indeno(1,2,3-c,d)pyrene, TCLP	193-39-5	E644	0.0050	mg/L	<0.0050	----	----	----	----
methylphenol, 2-, TCLP	95-48-7	E665A	0.50	mg/L	<0.50	----	----	----	----
methylphenol, 3+4-, TCLP	----	E665A	1.0	mg/L	<1.0	----	----	----	----
methylphenols, total, TCLP	----	E665A	5.0	mg/L	<5.0	----	----	----	----
naphthalene, TCLP	91-20-3	E644	0.0050	mg/L	<0.0050	----	----	----	----
nitrobenzene, TCLP	98-95-3	E665A	1.0	mg/L	<1.0	----	----	----	----

Analytical Results

Sub-Matrix: Soil
(Matrix: Soil/Solid)

Analyte	CAS Number	Method	LOR	Unit	LC_RLPB_SO_2022-01-26_NP6	----	----	----	----
				Client sampling date / time	26-Jan-2022 15:30	----	----	----	----
					CG2200934-006	--------	--------	--------	--------
					Result	----	----	----	----
TCLP Extractables									
phenanthrene, TCLP	85-01-8	E644	0.0050	mg/L	<0.0050	----	----	----	----
pyrene, TCLP	129-00-0	E644	0.0050	mg/L	<0.0050	----	----	----	----
TCLP Extractables Surrogates									
acenaphthene-d10, TCLP	15067-26-2	E644	5.0	%	97.7	----	----	----	----
chrysene-d12, TCLP	1719-03-5	E644	5.0	%	88.4	----	----	----	----
naphthalene-d8, TCLP	1146-65-2	E644	5.0	%	96.1	----	----	----	----
phenanthrene-d10, TCLP	1517-22-2	E644	5.0	%	97.2	----	----	----	----
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	6.78	----	----	----	----
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	1.51	----	----	----	----
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	4.91	----	----	----	----
pH, TCLP final	----	EPP444	0.010	pH units	5.03	----	----	----	----
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	----	----	----	----
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	----	----	----	----
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----	----	----	----
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----	----	----	----
boron, TCLP	7440-42-8	E444	0.50	mg/L	<0.50	----	----	----	----
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	<0.050	----	----	----	----
calcium, TCLP	7440-70-2	E444	10	mg/L	49	----	----	----	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----	----	----	----
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	<0.050	----	----	----	----
copper, TCLP	7440-50-8	E444	0.050	mg/L	<0.050	----	----	----	----
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	----	----	----	----
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----	----	----	----
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	9.4	----	----	----	----
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	----	----	----	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----	----	----	----
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	----	----	----	----
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	----	----	----	----
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	----	----	----	----

Analytical Results

Sub-Matrix: Soil
(Matrix: Soil/Solid)

Analyte	CAS Number	Method	LOR	Unit	LC_RLPB_SO_2022-01-26_NP6	----	----	----	----
				Client sampling date / time	26-Jan-2022 15:30	----	----	----	----
					CG2200934-006	--------	--------	--------	--------
					Result	----	----	----	----
TCLP Metals									
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	----	----	----	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----	----	----	----
zinc, TCLP	7440-66-6	E444	0.50	mg/L	<0.50	----	----	----	----
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----	----	----	----
TCLP VOCs									
benzene, TCLP	71-43-2	E615A	0.0050	mg/L	<0.0050	----	----	----	----
benzene, TCLP	71-43-2	E615B	0.0050	mg/L	<0.0050	----	----	----	----
bromodichloromethane, TCLP	75-27-4	E615B	0.10	mg/L	<0.10	----	----	----	----
bromoform, TCLP	75-25-2	E615B	0.10	mg/L	<0.10	----	----	----	----
carbon tetrachloride, TCLP	56-23-5	E615B	0.025	mg/L	<0.025	----	----	----	----
chlorobenzene, TCLP	108-90-7	E615B	0.025	mg/L	<0.025	----	----	----	----
chloroform, TCLP	67-66-3	E615B	0.10	mg/L	<0.10	----	----	----	----
dibromochloromethane, TCLP	124-48-1	E615B	0.10	mg/L	<0.10	----	----	----	----
dichlorobenzene, 1,2-, TCLP	95-50-1	E615B	0.025	mg/L	<0.025	----	----	----	----
dichlorobenzene, 1,4-, TCLP	106-46-7	E615B	0.025	mg/L	<0.025	----	----	----	----
dichloroethane, 1,2-, TCLP	107-06-2	E615B	0.025	mg/L	<0.025	----	----	----	----
dichloroethylene, 1,1-, TCLP	75-35-4	E615B	0.025	mg/L	<0.025	----	----	----	----
dichloromethane, TCLP	75-09-2	E615B	0.10	mg/L	<0.10	----	----	----	----
ethylbenzene, TCLP	100-41-4	E615A	0.0050	mg/L	<0.0050	----	----	----	----
ethylbenzene, TCLP	100-41-4	E615B	0.0050	mg/L	<0.0050	----	----	----	----
methyl ethyl ketone [MEK], TCLP	78-93-3	E615B	0.10	mg/L	<0.10	----	----	----	----
tetrachloroethylene, TCLP	127-18-4	E615B	0.025	mg/L	<0.025	----	----	----	----
toluene, TCLP	108-88-3	E615A	0.0050	mg/L	<0.0050	----	----	----	----
toluene, TCLP	108-88-3	E615B	0.0050	mg/L	<0.0050	----	----	----	----
trichloroethylene, TCLP	79-01-6	E615B	0.025	mg/L	<0.025	----	----	----	----
vinyl chloride, TCLP	75-01-4	E615B	0.050	mg/L	<0.050	----	----	----	----
xylene, m+p-, TCLP	179601-23-1	E615A	0.0050	mg/L	<0.0050	----	----	----	----
xylene, m+p-, TCLP	179601-23-1	E615B	0.0050	mg/L	<0.0050	----	----	----	----
xylene, o-, TCLP	95-47-6	E615A	0.0050	mg/L	<0.0050	----	----	----	----
xylene, o-, TCLP	95-47-6	E615B	0.0050	mg/L	<0.0050	----	----	----	----

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	LC_RLPB_SO_2022-01-26_NP6	----	----	----	----
				Client sampling date / time	26-Jan-2022 15:30	----	----	----	----
					CG2200934-006	--------	--------	--------	--------
					Result	----	----	----	----
TCLP VOCs									
xylenes, total, TCLP	1330-20-7	E615A	0.0075	mg/L	<0.0075	----	----	----	----
xylenes, total, TCLP	1330-20-7	E615B	0.0075	mg/L	<0.0075	----	----	----	----
trihalomethanes [THMs], total, TCLP	----	E615B	0.20	mg/L	<0.20	----	----	----	----
TCLP VOCs Surrogates									
bromofluorobenzene, 4-, TCLP	460-00-4	E615A	1.0	%	88.0	----	----	----	----
bromofluorobenzene, 4-, TCLP	460-00-4	E615B	1.0	%	99.5	----	----	----	----
difluorobenzene, 1,4-, TCLP	540-36-3	E615A	1.0	%	97.2	----	----	----	----
difluorobenzene, 1,4-, TCLP	540-36-3	E615B	1.0	%	100	----	----	----	----
Aggregate Organics									
waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	----	----	----	----
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611A	0.0050	mg/kg	1.57	----	----	----	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	0.902	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	----	----	----	----
styrene	100-42-5	E611A	0.050	mg/kg	<0.050	----	----	----	----
toluene	108-88-3	E611A	0.050	mg/kg	7.93	----	----	----	----
xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	10.3	----	----	----	----
xylene, o-	95-47-6	E611A	0.050	mg/kg	2.30	----	----	----	----
xylenes, total	1330-20-7	E611A	0.075	mg/kg	12.6	----	----	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.10	%	78.3	----	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.10	%	74.7	----	----	----	----
Hydrocarbons									
EPH (C10-C19)	----	E601A	200	mg/kg	1220	----	----	----	----
EPH (C19-C32)	----	E601A	200	mg/kg	870	----	----	----	----
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	83	----	----	----	----
HEPHs	----	EC600A	200	mg/kg	860	----	----	----	----
LEPHs	----	EC600A	200	mg/kg	1190	----	----	----	----
VPHs	----	EC580A	10	mg/kg	60	----	----	----	----
Hydrocarbons Surrogates									

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	LC_RLPB_SO_2022-01-26_NP6	----	----	----	----
				Client sampling date / time	26-Jan-2022 15:30	----	----	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**CG2200934-006**	--------	--------	--------	--------
					Result	----	----	----	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	136	----	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	75.5	----	----	----	----
Polycyclic Aromatic Hydrocarbons									
benzo(e)pyrene	192-97-2	E641A-L	0.010	mg/kg	1.17	----	----	----	----
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	1.21	----	----	----	----
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	0.356	----	----	----	----
acridine	260-94-6	E641A-L	0.010	mg/kg	2.51	----	----	----	----
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.330 DLCI	----	----	----	----
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	0.986	----	----	----	----
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	0.470	----	----	----	----
benzo(b+j)fluoranthene	n/a	E641A-L	0.010	mg/kg	1.14	----	----	----	----
benzo(b+j+k)fluoranthene	n/a	E641A-L	0.015	mg/kg	1.23	----	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	0.454	----	----	----	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	0.092	----	----	----	----
chrysene	218-01-9	E641A-L	0.010	mg/kg	2.82	----	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	0.233	----	----	----	----
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	0.653	----	----	----	----
fluorene	86-73-7	E641A-L	0.010	mg/kg	3.54	----	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	0.154	----	----	----	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	20.9	----	----	----	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	30.4	----	----	----	----
naphthalene	91-20-3	E641A-L	0.010	mg/kg	9.98	----	----	----	----
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	15.3	----	----	----	----
pyrene	129-00-0	E641A-L	0.010	mg/kg	0.973	----	----	----	----
quinoline	91-22-5	E641A-L	0.010	mg/kg	<0.070 DLCI	----	----	----	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	0.973	----	----	----	----
IACR (CCME)	----	E641A-L	0.150	-	14.4	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.1	%	76.3	----	----	----	----
chrysene-d12	1719-03-5	E641A-L	0.1	%	81.1	----	----	----	----

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid)**

				Client sample ID	**LC_RLPB_SO_2022-01-26_NP6**	**----**	**----**	**----**	**----**
				Client sampling date / time	26-Jan-2022 15:30	----	----	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**CG2200934-006**	**--------**	**--------**	**--------**	**--------**
					Result	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
naphthalene-d8	1146-65-2	E641A-L	0.1	%	82.2	----	----	----	----
phenanthrene-d10	1517-22-2	E641A-L	0.1	%	91.3	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **CG2200934**	Page	: 1 of 18
Client	: **Teck Coal Limited**	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 27-Jan-2022 08:40
PO	: VPO00809190	Issue Date	: 08-Feb-2022 21:20
C-O-C number	: RLPB 20220126		
Sampler	: SF		
Site	: ----		
Quote number	: Q68208		
No. of samples received	: 6		
No. of samples analysed	: 6		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP1	E569SG.A	26-Jan-2022	31-Jan-2022	28 days	5 days	✓	31-Jan-2022	40 days	0 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP2	E569SG.A	26-Jan-2022	31-Jan-2022	28 days	5 days	✓	31-Jan-2022	40 days	0 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP3	E569SG.A	26-Jan-2022	31-Jan-2022	28 days	5 days	✓	31-Jan-2022	40 days	0 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP4	E569SG.A	26-Jan-2022	31-Jan-2022	28 days	5 days	✓	31-Jan-2022	40 days	0 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP5	E569SG.A	26-Jan-2022	31-Jan-2022	28 days	5 days	✓	31-Jan-2022	40 days	0 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP6	E569SG.A	26-Jan-2022	31-Jan-2022	28 days	5 days	✓	31-Jan-2022	40 days	0 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP1	E601A	26-Jan-2022	28-Jan-2022	14 days	2 days	✓	29-Jan-2022	40 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP2	E601A	26-Jan-2022	28-Jan-2022	14 days	2 days	✓	29-Jan-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP3	E601A	26-Jan-2022	28-Jan-2022	14 days	2 days	✓	29-Jan-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP4	E601A	26-Jan-2022	28-Jan-2022	14 days	2 days	✓	29-Jan-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP5	E601A	26-Jan-2022	28-Jan-2022	14 days	2 days	✓	29-Jan-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP6	E601A	26-Jan-2022	28-Jan-2022	14 days	2 days	✓	29-Jan-2022	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_2022-01-26_NP1	E581.VH+F1	26-Jan-2022	28-Jan-2022	----	----		28-Jan-2022	40 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_2022-01-26_NP2	E581.VH+F1	26-Jan-2022	28-Jan-2022	----	----		28-Jan-2022	40 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_2022-01-26_NP3	E581.VH+F1	26-Jan-2022	28-Jan-2022	----	----		28-Jan-2022	40 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_2022-01-26_NP4	E581.VH+F1	26-Jan-2022	28-Jan-2022	----	----		28-Jan-2022	40 days	2 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_2022-01-26_NP5	E581.VH+F1	26-Jan-2022	28-Jan-2022	----	----		28-Jan-2022	40 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_2022-01-26_NP6	E581.VH+F1	26-Jan-2022	28-Jan-2022	----	----		28-Jan-2022	40 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP1	E510	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	28 days	4 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP2	E510	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	28 days	4 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP3	E510	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	28 days	4 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP4	E510	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	28 days	4 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP5	E510	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	28 days	4 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP6	E510	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	28 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP1	E440	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	180 days	4 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP2	E440	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	180 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP3	E440	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	180 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP4	E440	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	180 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP5	E440	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	180 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP6	E440	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	180 days	4 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP1	E144	26-Jan-2022	----	----	----		28-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP2	E144	26-Jan-2022	----	----	----		28-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP3	E144	26-Jan-2022	----	----	----		28-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP4	E144	26-Jan-2022	----	----	----		28-Jan-2022	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP5	E144	26-Jan-2022	----	----	----		28-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP6	E144	26-Jan-2022	----	----	----		28-Jan-2022	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP1	E108	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	30 days	4 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP2	E108	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	30 days	4 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP3	E108	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	30 days	4 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP4	E108	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	30 days	4 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP5	E108	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	30 days	4 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP6	E108	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	30 days	4 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP1	E641A-L	26-Jan-2022	28-Jan-2022	14 days	2 days	✓	29-Jan-2022	40 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP2	E641A-L	26-Jan-2022	28-Jan-2022	14 days	2 days	✓	29-Jan-2022	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP3	E641A-L	26-Jan-2022	28-Jan-2022	14 days	2 days	✓	29-Jan-2022	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP4	E641A-L	26-Jan-2022	28-Jan-2022	14 days	2 days	✓	29-Jan-2022	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP5	E641A-L	26-Jan-2022	28-Jan-2022	14 days	2 days	✓	29-Jan-2022	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP6	E641A-L	26-Jan-2022	28-Jan-2022	14 days	2 days	✓	29-Jan-2022	40 days	1 days	✓
TCLP Anions & Nutrients : Fluoride by IC (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP1	E240.F	26-Jan-2022	----	----	----		04-Feb-2022	----	9 days	
TCLP Anions & Nutrients : Fluoride by IC (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP2	E240.F	26-Jan-2022	----	----	----		04-Feb-2022	----	9 days	
TCLP Anions & Nutrients : Fluoride by IC (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP3	E240.F	26-Jan-2022	----	----	----		04-Feb-2022	----	9 days	
TCLP Anions & Nutrients : Fluoride by IC (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP4	E240.F	26-Jan-2022	----	----	----		04-Feb-2022	----	9 days	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
TCLP Anions & Nutrients : Fluoride by IC (TCLP)										
Glass soil jar/Teflon lined cap										
LC_RLPB_SO_2022-01-26_NP5	E240.F	26-Jan-2022	----	----	----		04-Feb-2022	----	9 days	
TCLP Anions & Nutrients : Fluoride by IC (TCLP)										
Glass soil jar/Teflon lined cap										
LC_RLPB_SO_2022-01-26_NP6	E240.F	26-Jan-2022	----	----	----		04-Feb-2022	----	9 days	
TCLP Extractables : Cresols & Nitrobenzene by GC-MS (TCLP)										
Amber glass/Teflon lined cap										
LC_RLPB_SO_2022-01-26_NP1	E665A	26-Jan-2022	01-Feb-2022	7 days	6 days	✓	01-Feb-2022	40 days	0 days	✓
TCLP Extractables : Cresols & Nitrobenzene by GC-MS (TCLP)										
Amber glass/Teflon lined cap										
LC_RLPB_SO_2022-01-26_NP2	E665A	26-Jan-2022	01-Feb-2022	7 days	6 days	✓	01-Feb-2022	40 days	0 days	✓
TCLP Extractables : Cresols & Nitrobenzene by GC-MS (TCLP)										
Amber glass/Teflon lined cap										
LC_RLPB_SO_2022-01-26_NP3	E665A	26-Jan-2022	01-Feb-2022	7 days	6 days	✓	01-Feb-2022	40 days	0 days	✓
TCLP Extractables : Cresols & Nitrobenzene by GC-MS (TCLP)										
Amber glass/Teflon lined cap										
LC_RLPB_SO_2022-01-26_NP4	E665A	26-Jan-2022	01-Feb-2022	7 days	6 days	✓	01-Feb-2022	40 days	0 days	✓
TCLP Extractables : Cresols & Nitrobenzene by GC-MS (TCLP)										
Amber glass/Teflon lined cap										
LC_RLPB_SO_2022-01-26_NP5	E665A	26-Jan-2022	01-Feb-2022	7 days	6 days	✓	01-Feb-2022	40 days	0 days	✓
TCLP Extractables : Cresols & Nitrobenzene by GC-MS (TCLP)										
Amber glass/Teflon lined cap										
LC_RLPB_SO_2022-01-26_NP6	E665A	26-Jan-2022	01-Feb-2022	7 days	6 days	✓	01-Feb-2022	40 days	0 days	✓
TCLP Extractables : PAHs by GC-MS (TCLP)										
Amber glass/Teflon lined cap										
LC_RLPB_SO_2022-01-26_NP1	E644	26-Jan-2022	04-Feb-2022	----	----		04-Feb-2022	----	9 days	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
TCLP Extractables : PAHs by GC-MS (TCLP)										
Amber glass/Teflon lined cap LC_RLPB_SO_2022-01-26_NP2	E644	26-Jan-2022	04-Feb-2022	----	----		04-Feb-2022	----	9 days	
TCLP Extractables : PAHs by GC-MS (TCLP)										
Amber glass/Teflon lined cap LC_RLPB_SO_2022-01-26_NP3	E644	26-Jan-2022	04-Feb-2022	----	----		04-Feb-2022	----	9 days	
TCLP Extractables : PAHs by GC-MS (TCLP)										
Amber glass/Teflon lined cap LC_RLPB_SO_2022-01-26_NP4	E644	26-Jan-2022	04-Feb-2022	----	----		04-Feb-2022	----	9 days	
TCLP Extractables : PAHs by GC-MS (TCLP)										
Amber glass/Teflon lined cap LC_RLPB_SO_2022-01-26_NP5	E644	26-Jan-2022	04-Feb-2022	----	----		04-Feb-2022	----	9 days	
TCLP Extractables : PAHs by GC-MS (TCLP)										
Amber glass/Teflon lined cap LC_RLPB_SO_2022-01-26_NP6	E644	26-Jan-2022	04-Feb-2022	----	----		04-Feb-2022	----	9 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP1	E512	26-Jan-2022	----	----	----		05-Feb-2022	----	10 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP2	E512	26-Jan-2022	----	----	----		05-Feb-2022	----	10 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP3	E512	26-Jan-2022	----	----	----		05-Feb-2022	----	10 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP4	E512	26-Jan-2022	----	----	----		05-Feb-2022	----	10 days	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP5	E512	26-Jan-2022	----	----	----		05-Feb-2022	----	10 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP6	E512	26-Jan-2022	----	----	----		05-Feb-2022	----	10 days	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
Lab Split - ZHE Leach 14 day HT(eg. CN BTEX) LC_RLPB_SO_2022-01-26_NP1	E444	26-Jan-2022	----	----	----		04-Feb-2022	----	9 days	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP2	E444	26-Jan-2022	----	----	----		04-Feb-2022	----	9 days	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP3	E444	26-Jan-2022	----	----	----		04-Feb-2022	----	9 days	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP4	E444	26-Jan-2022	----	----	----		04-Feb-2022	----	9 days	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP5	E444	26-Jan-2022	----	----	----		04-Feb-2022	----	9 days	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_2022-01-26_NP6	E444	26-Jan-2022	----	----	----		04-Feb-2022	----	9 days	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx) LC_RLPB_SO_2022-01-26_NP1	EPP444	26-Jan-2022	29-Jan-2022	----	----		----	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx)										
LC_RLPB_SO_2022-01-26_NP2	EPP444	26-Jan-2022	29-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx)										
LC_RLPB_SO_2022-01-26_NP3	EPP444	26-Jan-2022	29-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx)										
LC_RLPB_SO_2022-01-26_NP4	EPP444	26-Jan-2022	29-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx)										
LC_RLPB_SO_2022-01-26_NP5	EPP444	26-Jan-2022	29-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx)										
LC_RLPB_SO_2022-01-26_NP6	EPP444	26-Jan-2022	29-Jan-2022	----	----		----	----	----	
TCLP VOCs : BTEX by Headspace GC-MS (TCLP)										
Glass vial (sodium bisulfate)										
LC_RLPB_SO_2022-01-26_NP1	E615A	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	14 days	4 days	✓
TCLP VOCs : BTEX by Headspace GC-MS (TCLP)										
Glass vial (sodium bisulfate)										
LC_RLPB_SO_2022-01-26_NP2	E615A	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	14 days	4 days	✓
TCLP VOCs : BTEX by Headspace GC-MS (TCLP)										
Glass vial (sodium bisulfate)										
LC_RLPB_SO_2022-01-26_NP3	E615A	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	14 days	4 days	✓
TCLP VOCs : BTEX by Headspace GC-MS (TCLP)										
Glass vial (sodium bisulfate)										
LC_RLPB_SO_2022-01-26_NP4	E615A	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	14 days	4 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
TCLP VOCs : BTEX by Headspace GC-MS (TCLP)										
Glass vial (sodium bisulfate) LC_RLPB_SO_2022-01-26_NP5	E615A	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	14 days	4 days	✓
TCLP VOCs : BTEX by Headspace GC-MS (TCLP)										
Glass vial (sodium bisulfate) LC_RLPB_SO_2022-01-26_NP6	E615A	26-Jan-2022	30-Jan-2022	----	----		30-Jan-2022	14 days	4 days	✓
TCLP VOCs : VOCs by Headspace GC-MS (TCLP)										
Glass vial (sodium bisulfate) LC_RLPB_SO_2022-01-26_NP1	E615B	26-Jan-2022	07-Feb-2022	----	----		07-Feb-2022	14 days	12 days	✓
TCLP VOCs : VOCs by Headspace GC-MS (TCLP)										
Glass vial (sodium bisulfate) LC_RLPB_SO_2022-01-26_NP2	E615B	26-Jan-2022	07-Feb-2022	----	----		07-Feb-2022	14 days	12 days	✓
TCLP VOCs : VOCs by Headspace GC-MS (TCLP)										
Glass vial (sodium bisulfate) LC_RLPB_SO_2022-01-26_NP3	E615B	26-Jan-2022	07-Feb-2022	----	----		07-Feb-2022	14 days	12 days	✓
TCLP VOCs : VOCs by Headspace GC-MS (TCLP)										
Glass vial (sodium bisulfate) LC_RLPB_SO_2022-01-26_NP4	E615B	26-Jan-2022	07-Feb-2022	----	----		07-Feb-2022	14 days	12 days	✓
TCLP VOCs : VOCs by Headspace GC-MS (TCLP)										
Glass vial (sodium bisulfate) LC_RLPB_SO_2022-01-26_NP5	E615B	26-Jan-2022	07-Feb-2022	----	----		07-Feb-2022	14 days	12 days	✓
TCLP VOCs : VOCs by Headspace GC-MS (TCLP)										
Glass vial (sodium bisulfate) LC_RLPB_SO_2022-01-26_NP6	E615B	26-Jan-2022	07-Feb-2022	----	----		07-Feb-2022	14 days	12 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_2022-01-26_NP1	E611A	26-Jan-2022	28-Jan-2022	----	----		28-Jan-2022	40 days	2 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_2022-01-26_NP2	E611A	26-Jan-2022	28-Jan-2022	----	----		28-Jan-2022	40 days	2 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_2022-01-26_NP3	E611A	26-Jan-2022	28-Jan-2022	----	----		28-Jan-2022	40 days	2 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_2022-01-26_NP4	E611A	26-Jan-2022	28-Jan-2022	----	----		28-Jan-2022	40 days	2 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_2022-01-26_NP5	E611A	26-Jan-2022	28-Jan-2022	----	----		28-Jan-2022	40 days	2 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_2022-01-26_NP6	E611A	26-Jan-2022	28-Jan-2022	----	----		28-Jan-2022	40 days	2 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BC PHCs - EPH by GC-FID	E601A	397273	1	13	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	397322	1	6	16.6	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	398101	1	7	14.2	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	398102	1	7	14.2	5.0	✓
Moisture Content by Gravimetry	E144	397276	1	16	6.2	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	397274	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	398285	1	6	16.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	397323	1	6	16.6	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	398500	1	6	16.6	5.0	✓
Laboratory Control Samples (LCS)							
BC PHCs - EPH by GC-FID	E601A	397273	1	13	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	397322	1	6	16.6	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	398101	2	7	28.5	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	398102	2	7	28.5	10.0	✓
Moisture Content by Gravimetry	E144	397276	1	16	6.2	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	397274	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	398285	2	6	33.3	10.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	397323	1	6	16.6	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	398500	1	6	16.6	5.0	✓
Method Blanks (MB)							
BC PHCs - EPH by GC-FID	E601A	397273	1	13	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	397322	1	6	16.6	5.0	✓
BTEX by Headspace GC-MS (TCLP)	E615A	398085	1	7	14.2	5.0	✓
Cresols & Nitrobenzene by GC-MS (TCLP)	E665A	399410	1	6	16.6	5.0	✓
Fluoride by IC (TCLP)	E240.F	402742	1	6	16.6	5.2	✓
Mercury by CVAAS (TCLP)	E512	403374	1	10	10.0	5.2	✓
Mercury in Soil/Solid by CVAAS	E510	398101	1	7	14.2	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	402391	1	6	16.6	5.2	✓
Metals in Soil/Solid by CRC ICPMS	E440	398102	1	7	14.2	5.0	✓
Moisture Content by Gravimetry	E144	397276	1	16	6.2	5.0	✓
PAHs by GC-MS (TCLP)	E644	402414	1	6	16.6	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	397274	1	12	8.3	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	397323	1	6	16.6	5.0	✓
VOCs by Headspace GC-MS (TCLP)	E615B	404001	1	6	16.6	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	398500	1	6	16.6	5.0	✓
Matrix Spikes (MS)							
BC PHCs - EPH by GC-FID	E601A	397273	1	13	7.6	5.0	✓

Matrix: **Soil/Solid**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Matrix Spikes (MS) - Continued							
BTEX by Headspace GC-MS	E611A	397322	1	6	16.6	5.0	✓
BTEX by Headspace GC-MS (TCLP)	E615A	398085	1	7	14.2	5.0	✓
Cresols & Nitrobenzene by GC-MS (TCLP)	E665A	399410	1	6	16.6	5.0	✓
Fluoride by IC (TCLP)	E240.F	402742	1	6	16.6	5.2	✓
Mercury by CVAAS (TCLP)	E512	403374	1	10	10.0	5.2	✓
Metals by CRC ICPMS (TCLP)	E444	402391	1	6	16.6	5.2	✓
PAHs by GC-MS (TCLP)	E644	402414	1	6	16.6	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	397274	1	12	8.3	5.0	✓
VOCs by Headspace GC-MS (TCLP)	E615B	404001	1	6	16.6	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by “mod”).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Calgary - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Calgary - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Fluoride by IC (TCLP)	E240.F Calgary - Environmental	Soil/Solid	EPA 1311/EPA 300.1 (mod)	Inorganic anions are analyzed by obtaining an extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311, which is then analyzed by Ion Chromatography with conductivity and/or UV detection.
Metals in Soil/Solid by CRC ICPMS	E440 Calgary - Environmental	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Elemental Sulfur may be poorly recovered by this method. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 Calgary - Environmental	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Calgary - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 Calgary - Environmental	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A silica gel treated petroleum ether sample extract is evaporated to dryness. The weight of the residue is determined gravimetrically. For classification of samples as waste oil under the HWR, Waste Oil Content is reported by weight on an as-received basis.
VH and F1 by Headspace GC-FID	E581.VH+F1 Calgary - Environmental	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry’s law.
BC PHCs - EPH by GC-FID	E601A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
BTEX by Headspace GC-MS	E611A Calgary - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BTEX by Headspace GC-MS (TCLP)	E615A Calgary - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
VOCs by Headspace GC-MS (TCLP)	E615B Calgary - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Calgary - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are extracted with hexane/acetone and analyzed by GC-MS. If reported, IACR (index of additive cancer risk, unitless) and B(a)P toxic potency equivalent (in soil concentration units) are calculated as per CCME PAH Soil Quality Guidelines fact sheet (2010) or ABT1.
PAHs by GC-MS (TCLP)	E644 Calgary - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by GC-MS.
Cresols & Nitrobenzene by GC-MS (TCLP)	E665A Calgary - Environmental	Soil/Solid	EPA 8270E (mod)	Cresols & Nitrobenzene are analyzed by GC-MS.
VPH: VH-BTEX-Styrene	EC580A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VH-BTEX = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Calgary - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Calgary - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
Waste Oil Content (BC HWR) Extraction for Gravimetry	EP569SG Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A subsample is dried by magnesium sulfate and extracted with petroleum ether in Soxhlet. The extract is dried with sodium sulfate and treated with silica gel.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VOCs Methanol Extraction for Headspace Analysis	EP581 Calgary - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry 's law.
VOCs Preparation for Headspace Analysis (TCLP)	EP582 Calgary - Environmental	Soil/Solid	EPA 5021A (mod)	Liquid obtained after the TCLP process is prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 Calgary - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.
PHCs and PAHs Extraction (TCLP)	EP602 Calgary - Environmental	Soil/Solid	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.
Cresols & Nitrobenzene Extraction (TCLP)	EP665A Calgary - Environmental	Soil/Solid	EPA 3511 (mod)	Cresols & Nitrobenzene are extracted using dichloromethane with liquid-liquid extraction
TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)	EPP444 Calgary - Environmental	Soil/Solid	EPA 1311	Preparation of a Toxicity Characteristic Leaching Procedure (TCLP) solid sample involves particle size reduction, homogenization, then determination of appropriate extraction fluid. A measured portion of fresh subsample is placed in an extraction bottle with the appropriate extraction fluid then tumbled in a rotary extractor for 18+/- 2 hours at 23 +/- 2 C. The liquid leachate is filtered to separate from solids then bottled and prepared for analytical tests.
TCLP Leachate Preparation (VOCs)	EPP582 Calgary - Environmental	Soil/Solid	EPA 1311	An extract produced by the Toxicity Characteristic Leaching Procedure (TCLP) as per EPA 1311.

QUALITY CONTROL REPORT

Work Order	: **CG2200934**	Page	: 1 of 19
Client	: Teck Coal Limited	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 27-Jan-2022 08:40
PO	: VPO00809190	Date Analysis Commenced	: 28-Jan-2022
C-O-C number	: RLPB 20220126	Issue Date	: 08-Feb-2022 21:20
Sampler	: SF		
Site	: ----		
Quote number	: Q68208		
No. of samples received	: 6		
No. of samples analysed	: 6		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Aulora Alexander	Lab Assistant	Inorganics, Calgary, Alberta
Brian Wong	Laboratory Assistant	Organics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Metals, Calgary, Alberta
Jeanie Mark	Laboratory Analyst	Organics, Calgary, Alberta
Joshua Stessun	Laboratory Analyst	Organics, Calgary, Alberta
Kevin Baxter		Metals, Calgary, Alberta
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Oscar Ruiz	Lab Assistant	Metals, Calgary, Alberta
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Sara Niroomand		Metals, Calgary, Alberta
Sorina Motea	Laboratory Analyst	Organics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percentage Difference
# = Indicates a QC result that did not meet the ALS DQO.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 397276)											
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	moisture	----	E144	0.25	%	41.6	42.9	3.15%	20%	----
Physical Tests (QC Lot: 398285)											
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	pH (1:2 soil:water)	----	E108	0.10	pH units	7.41	7.45	0.538%	5%	----
Metals (QC Lot: 398101)											
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 398102)											
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	aluminum	7429-90-5	E440	50	mg/kg	2180	1930	11.8%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.53	0.51	0.02	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	1.43	1.33	6.80%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	245	254	3.50%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.42	0.37	0.04	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	8.2	7.5	0.7	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.450	0.408	9.56%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	2790	2610	6.52%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	3.64	3.26	10.9%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	2.19	1.99	9.39%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	15.4	14.1	8.15%	30%	----
		iron	7439-89-6	E440	50	mg/kg	2200	2280	3.62%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	5.63	5.26	6.98%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		magnesium	7439-95-4	E440	20	mg/kg	529	500	5.80%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	20.7	18.5	11.5%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	1.81	1.83	1.39%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	6.72	6.23	7.54%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	579	532	8.38%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	380	350	20	Diff <2x LOR	----
		selenium	7782-49-2	E440	0.20	mg/kg	1.84	1.72	6.74%	30%	----
		silver	7440-22-4	E440	0.10	mg/kg	0.10	0.10	0.0007	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	52	55	3	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Metals (QC Lot: 398102) - continued											
CG2200934-001	LC_RLPB_SO_2022-01-26 _NP1	strontium	7440-24-6	E440	0.50	mg/kg	97.0	90.8	6.65%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.054	<0.050	0.004	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	20.4	19.1	6.22%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.713	0.669	6.36%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	24.4	22.9	6.35%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	25.7	23.9	7.00%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	3.1	2.7	0.4	Diff <2x LOR	----
Aggregate Organics (QC Lot: 398500)											
CG2200934-001	LC_RLPB_SO_2022-01-26 _NP1	waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	<1000	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 397322)											
CG2200934-001	LC_RLPB_SO_2022-01-26 _NP1	benzene	71-43-2	E611A	0.0050	mg/kg	1.63	1.44	12.3%	40%	----
		ethylbenzene	100-41-4	E611A	0.015	mg/kg	1.13	0.925	20.2%	40%	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.050	mg/kg	8.70	7.71	12.1%	40%	----
		xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	12.4	9.71	24.1%	40%	----
		xylene, o-	95-47-6	E611A	0.050	mg/kg	2.79	2.30	19.2%	40%	----
Hydrocarbons (QC Lot: 397273)											
CG2200934-001	LC_RLPB_SO_2022-01-26 _NP1	EPH (C10-C19)	----	E601A	200	mg/kg	1560	1610	3.05%	40%	----
		EPH (C19-C32)	----	E601A	200	mg/kg	970	1020	50	Diff <2x LOR	----
Hydrocarbons (QC Lot: 397323)											
CG2200934-001	LC_RLPB_SO_2022-01-26 _NP1	VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	97	94	2.54%	40%	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 397274)											
CG2200934-001	LC_RLPB_SO_2022-01-26 _NP1	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	1.52	1.57	3.75%	50%	----
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	0.326	0.355	8.61%	50%	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	3.16	3.31	4.74%	50%	----
		anthracene	120-12-7	E641A-L	0.420	mg/kg	<0.420	<0.420	0	Diff <2x LOR	----
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	1.05	1.15	8.80%	50%	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	0.565	0.552	2.38%	50%	----
		benzo(b+j)fluoranthene	n/a	E641A-L	0.010	mg/kg	1.34	1.43	6.65%	50%	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Polycyclic Aromatic Hydrocarbons (QC Lot: 397274) - continued											
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	benzo(e)pyrene	192-97-2	E641A-L	0.010	mg/kg	1.45	1.50	3.15%	50%	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	0.522	0.533	2.09%	50%	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	0.178	0.155	13.7%	50%	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	3.45	3.64	5.39%	50%	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	0.272	0.280	2.94%	50%	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	0.707	0.734	3.76%	50%	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	4.60	4.99	8.09%	50%	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	0.186	0.187	0.582%	50%	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	24.1	26.5	9.54%	50%	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	38.8	42.8	9.86%	50%	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	13.9	15.3	9.34%	50%	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	16.3	17.7	8.26%	50%	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	1.18	1.27	7.25%	50%	----
		quinoline	91-22-5	E641A-L	0.120	mg/kg	<0.120	<0.120	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 397276)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 398101)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0100	----
Metals (QCLot: 398102)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 398102) - continued						
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
TCLP Extractables (QCLot: 399410)						
methylphenol, 2-, TCLP	95-48-7	E665A	0.5	mg/L	<0.50	----
methylphenol, 3+4-, TCLP	----	E665A	1	mg/L	<1.0	----
nitrobenzene, TCLP	98-95-3	E665A	1	mg/L	<1.0	----
TCLP Extractables (QCLot: 402414)						
acenaphthene, TCLP	83-32-9	E644	5	µg/L	<5.0	----
acenaphthylene, TCLP	208-96-8	E644	5	µg/L	<5.0	----
acridine, TCLP	260-94-6	E644	5	µg/L	<5.0	----
anthracene, TCLP	120-12-7	E644	5	µg/L	<5.0	----
benz(a)anthracene, TCLP	56-55-3	E644	5	µg/L	<5.0	----
benzo(a)pyrene, TCLP	50-32-8	E644	0.5	µg/L	<0.50	----
benzo(b+j)fluoranthene, TCLP	----	E644	5	µg/L	<5.0	----
benzo(g,h,i)perylene, TCLP	191-24-2	E644	5	µg/L	<5.0	----
benzo(k)fluoranthene, TCLP	207-08-9	E644	5	µg/L	<5.0	----
chrysene, TCLP	218-01-9	E644	5	µg/L	<5.0	----
dibenz(a,h)anthracene, TCLP	53-70-3	E644	5	µg/L	<5.0	----
fluoranthene, TCLP	206-44-0	E644	5	µg/L	<5.0	----
fluorene, TCLP	86-73-7	E644	5	µg/L	<5.0	----
indeno(1,2,3-c,d)pyrene, TCLP	193-39-5	E644	5	µg/L	<5.0	----
naphthalene, TCLP	91-20-3	E644	5	µg/L	<5.0	----
phenanthrene, TCLP	85-01-8	E644	5	µg/L	<5.0	----
pyrene, TCLP	129-00-0	E644	5	µg/L	<5.0	----
TCLP Extractables (QCLot: 402742)						
fluoride, TCLP	16984-48-8	E240.F	10	mg/L	<10	----
TCLP Metals (QCLot: 402391)						
antimony, TCLP	7440-36-0	E444	1	mg/L	<1.0	----
arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
TCLP Metals (QCLot: 402391) - continued						
calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----
TCLP Metals (QCLot: 403374)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP VOCs (QCLot: 398085)						
benzene, TCLP	71-43-2	E615A	5	µg/L	<5.0	----
ethylbenzene, TCLP	100-41-4	E615A	5	µg/L	<5.0	----
toluene, TCLP	108-88-3	E615A	5	µg/L	<5.0	----
xylene, m+p-, TCLP	179601-23-1	E615A	5	µg/L	<5.0	----
xylene, o-, TCLP	95-47-6	E615A	5	µg/L	<5.0	----
TCLP VOCs (QCLot: 404001)						
benzene, TCLP	71-43-2	E615B	5	µg/L	<5.0	----
bromodichloromethane, TCLP	75-27-4	E615B	100	µg/L	<100	----
bromoform, TCLP	75-25-2	E615B	100	µg/L	<100	----
carbon tetrachloride, TCLP	56-23-5	E615B	25	µg/L	<25	----
chlorobenzene, TCLP	108-90-7	E615B	25	µg/L	<25	----
chloroform, TCLP	67-66-3	E615B	100	µg/L	<100	----
dibromochloromethane, TCLP	124-48-1	E615B	100	µg/L	<100	----
dichlorobenzene, 1,2-, TCLP	95-50-1	E615B	25	µg/L	<25	----
dichlorobenzene, 1,4-, TCLP	106-46-7	E615B	25	µg/L	<25	----
dichloroethane, 1,2-, TCLP	107-06-2	E615B	25	µg/L	<25	----
dichloroethylene, 1,1-, TCLP	75-35-4	E615B	25	µg/L	<25	----
dichloromethane, TCLP	75-09-2	E615B	100	µg/L	<100	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
TCLP VOCs (QCLot: 404001) - continued						
ethylbenzene, TCLP	100-41-4	E615B	5	µg/L	<5.0	----
methyl ethyl ketone [MEK], TCLP	78-93-3	E615B	100	µg/L	<100	----
tetrachloroethylene, TCLP	127-18-4	E615B	25	µg/L	<25	----
toluene, TCLP	108-88-3	E615B	5	µg/L	<5.0	----
trichloroethylene, TCLP	79-01-6	E615B	25	µg/L	<25	----
vinyl chloride, TCLP	75-01-4	E615B	50	µg/L	<50	----
xylene, m+p-, TCLP	179601-23-1	E615B	5	µg/L	<5.0	----
xylene, o-, TCLP	95-47-6	E615B	5	µg/L	<5.0	----
Aggregate Organics (QCLot: 398500)						
waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	----
Volatile Organic Compounds (QCLot: 397322)						
benzene	71-43-2	E611A	0.005	mg/kg	<0.0050	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	<0.040	----
styrene	100-42-5	E611A	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611A	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611A	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611A	0.05	mg/kg	<0.050	----
Hydrocarbons (QCLot: 397273)						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
Hydrocarbons (QCLot: 397323)						
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	<10	----
Polycyclic Aromatic Hydrocarbons (QCLot: 397274)						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	<0.010	----
benzo(e)pyrene	192-97-2	E641A-L	0.01	mg/kg	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 397274) - continued						
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
quinoline	91-22-5	E641A-L	0.01	mg/kg	<0.010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 397276)									
moisture	----	E144	0.25	%	50 %	98.9	90.0	110	----
Physical Tests (QCLot: 398285)									
pH (1:2 soil:water)	----	E108	----	pH units	7 pH units	99.8	97.0	103	----
Metals (QCLot: 398101)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	118	80.0	120	----
Metals (QCLot: 398102)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	103	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	101	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	101	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	99.0	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	97.7	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	97.7	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	99.6	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	103	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	118	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	101	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	109	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	103	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	104	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	108	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	104	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	99.1	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	113	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	100	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	97.9	80.0	120	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 398102) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	104	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	103	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	91.4	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	91.7	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	104	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	100	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	95.3	80.0	120	----
Aggregate Organics (QCLot: 398500)									
waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	4250 mg/kg wwt	75.9	70.0	130	----
Volatile Organic Compounds (QCLot: 397322)									
benzene	71-43-2	E611A	0.005	mg/kg	2.5 mg/kg	95.8	70.0	130	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	2.5 mg/kg	95.2	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	2.5 mg/kg	102	70.0	130	----
styrene	100-42-5	E611A	0.05	mg/kg	2.5 mg/kg	91.0	70.0	130	----
toluene	108-88-3	E611A	0.05	mg/kg	2.5 mg/kg	95.8	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.05	mg/kg	5 mg/kg	92.4	70.0	130	----
xylene, o-	95-47-6	E611A	0.05	mg/kg	2.5 mg/kg	95.8	70.0	130	----
Hydrocarbons (QCLot: 397273)									
EPH (C10-C19)	----	E601A	200	mg/kg	1158.1 mg/kg	90.8	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	529.3 mg/kg	90.3	70.0	130	----
Hydrocarbons (QCLot: 397323)									
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	3.438 mg/kg	97.7	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 397274)									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	97.3	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	93.7	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	89.0	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	96.3	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	95.4	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	85.0	60.0	130	----
benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	0.5 mg/kg	85.0	60.0	130	----
benzo(e)pyrene	192-97-2	E641A-L	0.01	mg/kg	0.5 mg/kg	89.9	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	92.5	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	93.2	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	95.9	60.0	130	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 397274) - continued									
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	82.1	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	96.5	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	91.9	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	75.0	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	96.6	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	94.1	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	103	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	101	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	99.4	60.0	130	----
quinoline	91-22-5	E641A-L	0.01	mg/kg	0.5 mg/kg	80.7	60.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Extractables (QCLot: 399410)										
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	methylphenol, 2-, TCLP	95-48-7	E665A	2.53 mg/L	2.5 mg/L	101	50.0	130	----
		methylphenol, 3+4-, TCLP	----	E665A	2.6 mg/L	2.5 mg/L	104	50.0	130	----
		nitrobenzene, TCLP	98-95-3	E665A	2.8 mg/L	2.5 mg/L	113	50.0	130	----
TCLP Extractables (QCLot: 402414)										
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	acenaphthene, TCLP	83-32-9	E644	0.6 µg/L	0.5 µg/L	103	50.0	150	----
		acenaphthylene, TCLP	208-96-8	E644	ND µg/L	0.5 µg/L	ND	50.0	150	----
		acridine, TCLP	260-94-6	E644	ND µg/L	0.5 µg/L	ND	50.0	150	----
		anthracene, TCLP	120-12-7	E644	ND µg/L	0.5 µg/L	ND	50.0	150	----
		benz(a)anthracene, TCLP	56-55-3	E644	0.5 µg/L	0.5 µg/L	85.7	50.0	150	----
		benzo(a)pyrene, TCLP	50-32-8	E644	ND µg/L	0.5 µg/L	ND	50.0	150	----
		benzo(b+j)fluoranthene, TCLP	----	E644	0.4 µg/L	0.5 µg/L	67.4	50.0	150	----
		benzo(g,h,i)perylene, TCLP	191-24-2	E644	ND µg/L	0.5 µg/L	ND	50.0	150	----
		benzo(k)fluoranthene, TCLP	207-08-9	E644	ND µg/L	0.5 µg/L	ND	50.0	150	----
		chrysene, TCLP	218-01-9	E644	0.7 µg/L	0.5 µg/L	112	50.0	150	----
		dibenz(a,h)anthracene, TCLP	53-70-3	E644	ND µg/L	0.5 µg/L	ND	50.0	150	----
		fluoranthene, TCLP	206-44-0	E644	0.6 µg/L	0.5 µg/L	104	50.0	150	----
		fluorene, TCLP	86-73-7	E644	ND µg/L	0.5 µg/L	ND	50.0	150	----
		indeno(1,2,3-c,d)pyrene, TCLP	193-39-5	E644	ND µg/L	0.5 µg/L	ND	50.0	150	----
		naphthalene, TCLP	91-20-3	E644	ND µg/L	0.5 µg/L	ND	50.0	150	----
		phenanthrene, TCLP	85-01-8	E644	ND µg/L	0.5 µg/L	ND	50.0	150	----
		pyrene, TCLP	129-00-0	E644	0.7 µg/L	0.5 µg/L	123	50.0	150	----
TCLP Extractables (QCLot: 402742)										
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	fluoride, TCLP	16984-48-8	E240.F	276 mg/L	250 mg/L	110	50.0	140	----
TCLP Metals (QCLot: 402391)										
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	antimony, TCLP	7440-36-0	E444	10.6 mg/L	10 mg/L	106	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	10.1 mg/L	10 mg/L	101	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.8 mg/L	12.5 mg/L	102	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	11.5 mg/L	10 mg/L	115	50.0	140	----
		boron, TCLP	7440-42-8	E444	10.7 mg/L	10 mg/L	107	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	10.5 mg/L	10 mg/L	105	50.0	140	----

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 402391) - continued										
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	calcium, TCLP	7440-70-2	E444	ND mg/L	25 mg/L	ND	50.0	140	----
		chromium, TCLP	7440-47-3	E444	10.3 mg/L	10 mg/L	103	50.0	140	----
		cobalt, TCLP	7440-48-4	E444	10.4 mg/L	10 mg/L	104	50.0	140	----
		copper, TCLP	7440-50-8	E444	10.4 mg/L	10 mg/L	104	50.0	140	----
		iron, TCLP	7439-89-6	E444	52.8 mg/L	50 mg/L	106	50.0	140	----
		lead, TCLP	7439-92-1	E444	11.0 mg/L	10 mg/L	110	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	26.4 mg/L	25 mg/L	105	50.0	140	----
		nickel, TCLP	7440-02-0	E444	10.6 mg/L	10 mg/L	106	50.0	140	----
		selenium, TCLP	7782-49-2	E444	10.1 mg/L	10 mg/L	101	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.104 mg/L	0.1 mg/L	104	50.0	140	----
		thallium, TCLP	7440-28-0	E444	10.3 mg/L	10 mg/L	103	50.0	140	----
		uranium, TCLP	7440-61-1	E444	10.2 mg/L	10 mg/L	102	50.0	140	----
		vanadium, TCLP	7440-62-2	E444	10.4 mg/L	10 mg/L	104	50.0	140	----
		zinc, TCLP	7440-66-6	E444	10.7 mg/L	10 mg/L	107	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	10 mg/L	10 mg/L	105	50.0	140	----
TCLP Metals (QCLot: 403374)										
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	mercury, TCLP	7439-97-6	E512	0.1000 mg/L	0.1 mg/L	100.0	50.0	140	----
TCLP VOCs (QCLot: 398085)										
CG2200974-001	Anonymous	benzene, TCLP	71-43-2	E615A	501 µg/L	500 µg/L	100	50.0	140	----
		ethylbenzene, TCLP	100-41-4	E615A	386 µg/L	500 µg/L	77.2	50.0	140	----
		toluene, TCLP	108-88-3	E615A	476 µg/L	500 µg/L	95.3	50.0	140	----
		xylene, m+p-, TCLP	179601-23-1	E615A	919 µg/L	1000 µg/L	91.9	50.0	140	----
		xylene, o-, TCLP	95-47-6	E615A	407 µg/L	500 µg/L	81.4	50.0	140	----
TCLP VOCs (QCLot: 404001)										
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	benzene, TCLP	71-43-2	E615B	204 µg/L	250 µg/L	81.5	50.0	140	----
		bromodichloromethane, TCLP	75-27-4	E615B	200 µg/L	250 µg/L	81.7	50.0	140	----
		bromoform, TCLP	75-25-2	E615B	190 µg/L	250 µg/L	76.4	50.0	140	----
		carbon tetrachloride, TCLP	56-23-5	E615B	239 µg/L	250 µg/L	95.8	50.0	140	----
		chlorobenzene, TCLP	108-90-7	E615B	264 µg/L	250 µg/L	106	50.0	140	----
		chloroform, TCLP	67-66-3	E615B	240 µg/L	250 µg/L	94.7	50.0	140	----
		dibromochloromethane, TCLP	124-48-1	E615B	190 µg/L	250 µg/L	74.5	50.0	140	----
		dichlorobenzene, 1,2-, TCLP	95-50-1	E615B	257 µg/L	250 µg/L	103	50.0	140	----
		dichlorobenzene, 1,4-, TCLP	106-46-7	E615B	294 µg/L	250 µg/L	118	50.0	140	----
		dichloroethane, 1,2-, TCLP	107-06-2	E615B	186 µg/L	250 µg/L	74.6	50.0	140	----
		dichloroethylene, 1,1-, TCLP	75-35-4	E615B	245 µg/L	250 µg/L	98.0	50.0	140	----

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*Concentration*	*Target*	*MS*	*Low*	*High*	*Qualifier*
TCLP VOCs (QCLot: 404001) - continued										
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	dichloromethane, TCLP	75-09-2	E615B	250 µg/L	250 µg/L	101	50.0	140	----
		ethylbenzene, TCLP	100-41-4	E615B	210 µg/L	250 µg/L	84.1	50.0	140	----
		methyl ethyl ketone [MEK], TCLP	78-93-3	E615B	4360 µg/L	5000 µg/L	87.3	50.0	140	----
		tetrachloroethylene, TCLP	127-18-4	E615B	241 µg/L	250 µg/L	96.4	50.0	140	----
		toluene, TCLP	108-88-3	E615B	179 µg/L	250 µg/L	71.7	50.0	140	----
		trichloroethylene, TCLP	79-01-6	E615B	231 µg/L	250 µg/L	92.5	50.0	140	----
		vinyl chloride, TCLP	75-01-4	E615B	296 µg/L	250 µg/L	118	50.0	140	----
		xylene, m+p-, TCLP	179601-23-1	E615B	528 µg/L	500 µg/L	106	50.0	140	----
		xylene, o-, TCLP	95-47-6	E615B	222 µg/L	250 µg/L	89.0	50.0	140	----
Volatile Organic Compounds (QCLot: 397322)										
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	benzene	71-43-2	E611A	2.55 mg/kg	2.5 mg/kg	111	60.0	140	----
		ethylbenzene	100-41-4	E611A	2.47 mg/kg	2.5 mg/kg	107	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	2.52 mg/kg	2.5 mg/kg	109	60.0	140	----
		styrene	100-42-5	E611A	2.53 mg/kg	2.5 mg/kg	110	60.0	140	----
		toluene	108-88-3	E611A	ND mg/kg	2.5 mg/kg	ND	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	ND mg/kg	5 mg/kg	ND	60.0	140	----
		xylene, o-	95-47-6	E611A	2.60 mg/kg	2.5 mg/kg	112	60.0	140	----
Hydrocarbons (QCLot: 397273)										
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	EPH (C10-C19)	----	E601A	ND mg/kg	1158.1 mg/kg	ND	60.0	140	----
		EPH (C19-C32)	----	E601A	ND mg/kg	529.3 mg/kg	ND	60.0	140	----
Polycyclic Aromatic Hydrocarbons (QCLot: 397274)										
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	acenaphthene	83-32-9	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		acenaphthylene	208-96-8	E641A-L	0.279 mg/kg	0.5 mg/kg	74.8	50.0	140	----
		acridine	260-94-6	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		anthracene	120-12-7	E641A-L	0.258 mg/kg	0.5 mg/kg	69.2	50.0	140	----
		benz(a)anthracene	56-55-3	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		benzo(a)pyrene	50-32-8	E641A-L	0.241 mg/kg	0.5 mg/kg	64.6	50.0	140	----
		benzo(b+j)fluoranthene	n/a	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		benzo(e)pyrene	192-97-2	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.249 mg/kg	0.5 mg/kg	66.8	50.0	140	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.251 mg/kg	0.5 mg/kg	67.3	50.0	140	----
		chrysene	218-01-9	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.215 mg/kg	0.5 mg/kg	57.7	50.0	140	----
		fluoranthene	206-44-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		fluorene	86-73-7	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.197 mg/kg	0.5 mg/kg	52.8	50.0	140	----

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 397274) - continued										
CG2200934-001	LC_RLPB_SO_2022-01-26_NP1	methylnaphthalene, 1-	90-12-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		methylnaphthalene, 2-	91-57-6	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		naphthalene	91-20-3	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		phenanthrene	85-01-8	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		pyrene	129-00-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		quinoline	91-22-5	E641A-L	0.241 mg/kg	0.5 mg/kg	64.7	50.0	140	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Physical Tests (QCLot: 398285)									
QC-398285-002	RM	pH (1:2 soil:water)	----	E108	8 pH units	97.4	96.0	104	----
Metals (QCLot: 398101)									
QC-398101-003	RM	mercury	7439-97-6	E510	0.062 mg/kg	122	70.0	130	----
Metals (QCLot: 398102)									
QC-398102-003	RM	aluminum	7429-90-5	E440	9817 mg/kg	117	70.0	130	----
QC-398102-003	RM	antimony	7440-36-0	E440	3.99 mg/kg	90.9	70.0	130	----
QC-398102-003	RM	arsenic	7440-38-2	E440	3.73 mg/kg	99.2	70.0	130	----
QC-398102-003	RM	barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
QC-398102-003	RM	beryllium	7440-41-7	E440	0.349 mg/kg	107	70.0	130	----
QC-398102-003	RM	boron	7440-42-8	E440	8.5 mg/kg	107	40.0	160	----
QC-398102-003	RM	cadmium	7440-43-9	E440	0.91 mg/kg	97.2	70.0	130	----
QC-398102-003	RM	calcium	7440-70-2	E440	31082 mg/kg	99.4	70.0	130	----
QC-398102-003	RM	chromium	7440-47-3	E440	101 mg/kg	103	70.0	130	----
QC-398102-003	RM	cobalt	7440-48-4	E440	6.9 mg/kg	104	70.0	130	----
QC-398102-003	RM	copper	7440-50-8	E440	123 mg/kg	102	70.0	130	----
QC-398102-003	RM	iron	7439-89-6	E440	23558 mg/kg	102	70.0	130	----
QC-398102-003	RM	lead	7439-92-1	E440	267 mg/kg	98.7	70.0	130	----
QC-398102-003	RM	lithium	7439-93-2	E440	9.5 mg/kg	107	70.0	130	----
QC-398102-003	RM	magnesium	7439-95-4	E440	5509 mg/kg	111	70.0	130	----
QC-398102-003	RM	manganese	7439-96-5	E440	269 mg/kg	105	70.0	130	----
QC-398102-003	RM	molybdenum	7439-98-7	E440	1.03 mg/kg	105	70.0	130	----
QC-398102-003	RM	nickel	7440-02-0	E440	26.7 mg/kg	103	70.0	130	----
QC-398102-003	RM	phosphorus	7723-14-0	E440	752 mg/kg	98.1	70.0	130	----
QC-398102-003	RM	potassium	7440-09-7	E440	1587 mg/kg	103	70.0	130	----
QC-398102-003	RM	silver	7440-22-4	E440	4.06 mg/kg	105	70.0	130	----
QC-398102-003	RM	sodium	7440-23-5	E440	797 mg/kg	84.4	70.0	130	----
QC-398102-003	RM	strontium	7440-24-6	E440	86.1 mg/kg	98.7	70.0	130	----
QC-398102-003	RM	thallium	7440-28-0	E440	0.0786 mg/kg	81.7	40.0	160	----
QC-398102-003	RM	tin	7440-31-5	E440	10.6 mg/kg	110	70.0	130	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	High	Qualifier
Metals (QCLot: 398102) - continued									
QC-398102-003	RM	titanium	7440-32-6	E440	839 mg/kg	113	70.0	130	----
QC-398102-003	RM	uranium	7440-61-1	E440	0.52 mg/kg	92.4	70.0	130	----
QC-398102-003	RM	vanadium	7440-62-2	E440	32.7 mg/kg	105	70.0	130	----
QC-398102-003	RM	zinc	7440-66-6	E440	297 mg/kg	98.6	70.0	130	----
QC-398102-003	RM	zirconium	7440-67-7	E440	5.73 mg/kg	98.6	70.0	130	----

Teck

COC ID:	RLPB 20220126	TURNAROUND TIME:	2-3 Days	RUSH:	Priority

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	ALS Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Tom Jeffery			Lab Contact	Lyudmyla Shvets			Email 1:	tom.jeffery@teck.com	x	x	
Email	Tom.jeffery@teck.com			Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:	teckcoal@equisonline.com			x
Address	Box 2003			Address	2559 29 Street NE			Email 3:	drake.tymstra@teck.com	x	x	
	15km North Hwy 43							Email 4:	shanise.fossen@teck.com	x	x	
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 4:	tanya.dick@teck.com	x	x	
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada	PO number	VPO00809190			
Phone Number	250-425-3196			Phone Number	403 407 1794							

CG2200934

Environmental Division Calgary
Work Order Reference
CG2200934
Telephone : +1 403 407 1800

SAMPLE DETAILS | **ANALYSIS REQUESTED** — Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Q68208 (Filt.: N; Preserv.: NONE)
LC_RLPB_SO_2022-01-26_NP1	LC_RLPB	SO		1/26/2022	13:50	C	6	X
LC_RLPB_SO_2022-01-26_NP2	LC_RLPB	SO		1/26/2022	14:10	C	6	X
LC_RLPB_SO_2022-01-26_NP3	LC_RLPB	SO		1/26/2022	14:30	C	6	X
LC_RLPB_SO_2022-01-26_NP4	LC_RLPB	SO		1/26/2022	14:50	C	6	X
LC_RLPB_SO_2022-01-26_NP5	LC_RLPB	SO		1/26/2022	15:10	C	6	X
LC_RLPB_SO_2022-01-26_NP6	LC_RLPB	SO		1/26/2022	15:30	C	6	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Please analyze according to quote Q68208 dated May 11, 2018 requested as per Teck Contact Chris Blurton LCO for soil analysis. Samples include 4 soil jars (or 6 if sample had 50% moisture) and 2 vials per each location.

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
S.Fossen	26-Jan	[signature]	1/27 8:43

SERVICE REQUEST (rush - subject to availability)

Regular (default)	
Priority (2-3 business days) - 50% surcharge	X
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	S.Fossen	**Mobile #**	
Sampler's Signature	[signature]	**Date/Time**	January 26, 2022

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **CG2206888**	Page	: 1 of 12
Client	: **Teck Coal Limited**	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 03-Jun-2022 09:00
PO	: VPO00809190	Date Analysis Commenced	: 05-Jun-2022
C-O-C number	: RLPA_SO_20220602	Issue Date	: 05-Jul-2022 08:59
Sampler	: D. Tymstra		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 6		
No. of samples analysed	: 6		

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Cynthia Bauer	Organic Supervisor	Organics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Metals, Calgary, Alberta
Jeanie Mark	Laboratory Analyst	Organics, Calgary, Alberta
Jyotsnarani Devi	Laboratory Analyst	Organics, Calgary, Alberta
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
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General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight
mg/L	milligrams per litre
mV	millivolts
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
DLCI	*Detection Limit Raised: Chromatographic interference due to co-elution.*

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid)**

Analyte	CAS Number	Method	LOR	Unit	LC_RLPA_SO_2022-06-02_NP1	LC_RLPA_SO_2022-06-02_NP2	LC_RLPA_SO_2022-06-02_NP3	LC_RLPA_SO_2022-06-02_NP4	LC_RLPA_SO_2022-06-02_NP5
Client sampling date / time					02-Jun-2022 10:15	02-Jun-2022 10:20	02-Jun-2022 10:25	02-Jun-2022 10:30	02-Jun-2022 10:35
					CG2206888-001	CG2206888-002	CG2206888-003	CG2206888-004	CG2206888-005
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	17.5	30.6	25.7	31.0	34.4
pH (1:2 soil:water)	----	E108	0.10	pH units	7.86	8.00	7.70	7.15	7.40
Metals									
aluminum	7429-90-5	E440	50	mg/kg	1210	1400	1680	1920	2010
antimony	7440-36-0	E440	0.10	mg/kg	0.55	0.64	0.54	0.55	0.74
arsenic	7440-38-2	E440	0.10	mg/kg	1.11	1.07	1.26	1.63	1.81
barium	7440-39-3	E440	0.50	mg/kg	168	183	385	303	284
beryllium	7440-41-7	E440	0.10	mg/kg	0.31	0.36	0.44	0.51	0.55
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	0.22	0.30	0.43	0.56
boron	7440-42-8	E440	5.0	mg/kg	6.0	6.8	11.3	8.3	10.8
cadmium	7440-43-9	E440	0.020	mg/kg	0.286	0.300	0.485	0.612	0.725
calcium	7440-70-2	E440	50	mg/kg	1860	2030	1990	2200	1960
chromium	7440-47-3	E440	0.50	mg/kg	2.57	2.70	2.22	3.63	3.72
cobalt	7440-48-4	E440	0.10	mg/kg	1.76	1.83	1.72	2.15	2.57
copper	7440-50-8	E440	0.50	mg/kg	13.7	14.5	12.3	16.0	17.0
iron	7439-89-6	E440	50	mg/kg	5400	6200	2250	3290	4150
lead	7439-92-1	E440	0.50	mg/kg	4.97	5.44	5.19	6.89	7.35
lithium	7439-93-2	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
magnesium	7439-95-4	E440	20	mg/kg	365	398	347	314	321
manganese	7439-96-5	E440	1.0	mg/kg	19.1	27.3	24.9	34.7	42.7
mercury	7439-97-6	E510	0.0050	mg/kg	0.0241	0.0264	0.0222	0.0202	0.0301
molybdenum	7439-98-7	E440	0.10	mg/kg	1.57	1.62	1.75	2.25	2.48
nickel	7440-02-0	E440	0.50	mg/kg	4.52	4.62	5.51	7.78	9.44
phosphorus	7723-14-0	E440	50	mg/kg	389	372	685	717	582
potassium	7440-09-7	E440	100	mg/kg	260	300	300	400	440
selenium	7782-49-2	E440	0.20	mg/kg	1.09	1.20	1.81	2.27	2.68
silver	7440-22-4	E440	0.10	mg/kg	<0.10	0.10	0.11	0.14	0.16
sodium	7440-23-5	E440	50	mg/kg	<50	51	<50	<50	<50
strontium	7440-24-6	E440	0.50	mg/kg	79.2	77.3	174	151	135

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	LC_RLPA_SO_2022-06-02_NP1	LC_RLPA_SO_2022-06-02_NP2	LC_RLPA_SO_2022-06-02_NP3	LC_RLPA_SO_2022-06-02_NP4	LC_RLPA_SO_2022-06-02_NP5
				Client sampling date / time	02-Jun-2022 10:15	02-Jun-2022 10:20	02-Jun-2022 10:25	02-Jun-2022 10:30	02-Jun-2022 10:35
					CG2206888-001	CG2206888-002	CG2206888-003	CG2206888-004	CG2206888-005
					Result	Result	Result	Result	Result
Metals									
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	1100	1200
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	mg/kg	20.7	21.1	27.9	25.0	27.4
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	mg/kg	0.478	0.514	0.644	0.817	0.886
vanadium	7440-62-2	E440	0.20	mg/kg	38.1	36.0	18.8	24.0	25.2
zinc	7440-66-6	E440	2.0	mg/kg	14.7	18.1	24.9	31.9	44.9
zirconium	7440-67-7	E440	1.0	mg/kg	2.3	2.4	2.5	3.3	3.1
BC LSP Extractables (target pH = Natural)									
conductivity, leachable (target pH=Natural)	n/a	EPP445A	20	µS/cm	137	158	----	----	----
oxidation-reduction potential [ORP], leachable (target pH=Natural)	----	EPP445A	0.10	mV	440	391	----	----	----
pH, leachable final (target pH=Natural)	----	EPP445A	0.10	pH units	8.05	8.08	----	----	----
BC LSP Metals (target pH= 5)									
aluminum, leachable	7429-90-5	E445A	0.0050	mg/L	0.0064	0.450	----	----	----
antimony, leachable	7440-36-0	E445A	0.00010	mg/L	0.00133	0.00182	----	----	----
arsenic, leachable	7440-38-2	E445A	0.0010	mg/L	<0.0010	0.0018	----	----	----
barium, leachable	7440-39-3	E445A	0.0010	mg/L	0.500	0.685	----	----	----
beryllium, leachable	7440-41-7	E445A	0.00050	mg/L	<0.00050	<0.00050	----	----	----
cadmium, leachable	7440-43-9	E445A	0.000050	mg/L	0.000211	0.00157	----	----	----
chromium, leachable	7440-47-3	E445A	0.00050	mg/L	<0.00050	<0.00050	----	----	----
cobalt, leachable	7440-48-4	E445A	0.00010	mg/L	0.00361	0.0122	----	----	----
copper, leachable	7440-50-8	E445A	0.0010	mg/L	<0.0010	<0.0010	----	----	----
lead, leachable	7439-92-1	E445A	0.00010	mg/L	<0.00010	<0.00010	----	----	----
manganese, leachable	7439-96-5	E445A	0.00050	mg/L	0.0921	0.180	----	----	----
molybdenum, leachable	7439-98-7	E445A	0.00010	mg/L	0.00313	0.00125	----	----	----
nickel, leachable	7440-02-0	E445A	0.00050	mg/L	0.00534	0.0273	----	----	----
oxidation-reduction potential [ORP], leachable (target pH=5)	----	EPP445A	0.10	mV	436	301	----	----	----
pH, leachable final (target pH=5)	----	EPP445A	0.10	pH units	5.41	4.88	----	----	----

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	LC_RLPA_SO_2022-06-02_NP1	LC_RLPA_SO_2022-06-02_NP2	LC_RLPA_SO_2022-06-02_NP3	LC_RLPA_SO_2022-06-02_NP4	LC_RLPA_SO_2022-06-02_NP5
Client sampling date / time					02-Jun-2022 10:15	02-Jun-2022 10:20	02-Jun-2022 10:25	02-Jun-2022 10:30	02-Jun-2022 10:35
					CG2206888-001	CG2206888-002	CG2206888-003	CG2206888-004	CG2206888-005
					Result	Result	Result	Result	Result
BC LSP Metals (target pH= 5)									
selenium, leachable	7782-49-2	E445A	0.00050	mg/L	0.00204	0.00201	----	----	----
uranium, leachable	7440-61-1	E445A	0.000010	mg/L	<0.000010	<0.000010	----	----	----
vanadium, leachable	7440-62-2	E445A	0.0010	mg/L	0.0035	0.0044	----	----	----
zinc, leachable	7440-66-6	E445A	0.010	mg/L	0.011	0.103	----	----	----
BC LSP Metals (target pH= 7)									
aluminum, leachable	7429-90-5	E445B	0.0050	mg/L	<0.0050	<0.0050	----	----	----
antimony, leachable	7440-36-0	E445B	0.00010	mg/L	0.00110	0.00095	----	----	----
arsenic, leachable	7440-38-2	E445B	0.0010	mg/L	<0.0010	<0.0010	----	----	----
beryllium, leachable	7440-41-7	E445B	0.00050	mg/L	<0.00050	<0.00050	----	----	----
cadmium, leachable	7440-43-9	E445B	0.000050	mg/L	0.000068	0.000078	----	----	----
chromium, leachable	7440-47-3	E445B	0.00050	mg/L	<0.00050	<0.00050	----	----	----
cobalt, leachable	7440-48-4	E445B	0.00010	mg/L	0.00092	0.00109	----	----	----
copper, leachable	7440-50-8	E445B	0.0010	mg/L	<0.0010	<0.0010	----	----	----
lead, leachable	7439-92-1	E445B	0.00010	mg/L	<0.00010	<0.00010	----	----	----
manganese, leachable	7439-96-5	E445B	0.00050	mg/L	0.0496	0.0528	----	----	----
molybdenum, leachable	7439-98-7	E445B	0.00010	mg/L	0.00356	0.00365	----	----	----
nickel, leachable	7440-02-0	E445B	0.00050	mg/L	0.00137	0.00155	----	----	----
oxidation-reduction potential [ORP], leachable (target pH=7)	----	EPP445A	0.10	mV	299	285	----	----	----
pH, leachable final (target pH=7)	----	EPP445A	0.10	pH units	7.39	7.27	----	----	----
selenium, leachable	7782-49-2	E445B	0.00050	mg/L	0.00136	0.00118	----	----	----
uranium, leachable	7440-61-1	E445B	0.000010	mg/L	0.000014	0.000019	----	----	----
vanadium, leachable	7440-62-2	E445B	0.0010	mg/L	<0.0010	<0.0010	----	----	----
zinc, leachable	7440-66-6	E445B	0.010	mg/L	<0.010	<0.010	----	----	----
barium, leachable	7440-39-3	E445B	0.0010	mg/L	0.448	0.438	----	----	----
BC LSP Metals (target pH= 9)									
aluminum, leachable	7429-90-5	E445C	0.0050	mg/L	0.282	0.161	----	----	----
antimony, leachable	7440-36-0	E445C	0.00010	mg/L	0.00160	0.00142	----	----	----
arsenic, leachable	7440-38-2	E445C	0.0010	mg/L	<0.0010	<0.0010	----	----	----
barium, leachable	7440-39-3	E445C	0.0010	mg/L	0.250	0.249	----	----	----

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)				Client sample ID	LC_RLPA_SO_2022-06-02_NP 1	LC_RLPA_SO_2022-06-02_NP 2	LC_RLPA_SO_2022-06-02_NP 3	LC_RLPA_SO_2022-06-02_NP 4	LC_RLPA_SO_2022-06-02_NP 5
				Client sampling date / time	02-Jun-2022 10:15	02-Jun-2022 10:20	02-Jun-2022 10:25	02-Jun-2022 10:30	02-Jun-2022 10:35
Analyte	CAS Number	Method	LOR	Unit	CG2206888-001	CG2206888-002	CG2206888-003	CG2206888-004	CG2206888-005
					Result	Result	Result	Result	Result
BC LSP Metals (target pH= 9)									
beryllium, leachable	7440-41-7	E445C	0.00050	mg/L	<0.00050	<0.00050	----	----	----
cadmium, leachable	7440-43-9	E445C	0.000050	mg/L	<0.000050	<0.000050	----	----	----
chromium, leachable	7440-47-3	E445C	0.00050	mg/L	<0.00050	<0.00050	----	----	----
cobalt, leachable	7440-48-4	E445C	0.00010	mg/L	0.00011	0.00012	----	----	----
copper, leachable	7440-50-8	E445C	0.0010	mg/L	<0.0010	<0.0010	----	----	----
lead, leachable	7439-92-1	E445C	0.00010	mg/L	<0.00010	<0.00010	----	----	----
manganese, leachable	7439-96-5	E445C	0.00050	mg/L	0.00116	0.00256	----	----	----
molybdenum, leachable	7439-98-7	E445C	0.00010	mg/L	0.00661	0.00749	----	----	----
nickel, leachable	7440-02-0	E445C	0.00050	mg/L	0.00070	0.00067	----	----	----
oxidation-reduction potential [ORP], leachable (target pH=9)	----	EPP445A	0.10	mV	276	307	----	----	----
pH, leachable final (target pH=9)	----	EPP445A	0.10	pH units	8.65	8.62	----	----	----
selenium, leachable	7782-49-2	E445C	0.00050	mg/L	0.00388	0.00286	----	----	----
uranium, leachable	7440-61-1	E445C	0.000010	mg/L	0.000211	0.000301	----	----	----
vanadium, leachable	7440-62-2	E445C	0.0010	mg/L	0.0023	0.0013	----	----	----
zinc, leachable	7440-66-6	E445C	0.010	mg/L	<0.010	<0.010	----	----	----
BC LSP VOCs (target pH = Natural)									
benzene, leachable	71-43-2	E618	0.0010	mg/L	<0.0010	<0.0010	----	----	----
ethylbenzene, leachable	100-41-4	E618	0.0010	mg/L	<0.0010	<0.0010	----	----	----
naphthalene, leachable	91-20-3	E618	0.0010	mg/L	<0.0010	<0.0010	----	----	----
tetrachloroethylene, leachable	127-18-4	E618	0.0010	mg/L	<0.0010	<0.0010	----	----	----
toluene, leachable	108-88-3	E618	0.0010	mg/L	<0.0010	<0.0010	----	----	----
trichloroethylene, leachable	79-01-6	E618	0.0010	mg/L	<0.0010	<0.0010	----	----	----
xylene, m+p-, leachable	179601-23-1	E618	0.0010	mg/L	<0.0010	<0.0010	----	----	----
xylene, o-, leachable	95-47-6	E618	0.0010	mg/L	<0.0010	<0.0010	----	----	----
xylenes, total, leachable	1330-20-7	E618	0.0015	mg/L	<0.0015	<0.0015	----	----	----
BC LSP VOCs Surrogates (target pH = Natural)									
bromofluorobenzene, 4-, leachable	460-00-4	E618	1.0	%	109	106	----	----	----
difluorobenzene, 1,4-, leachable	540-36-3	E618	1.0	%	96.6	96.0	----	----	----
Aggregate Organics									

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	LC_RLPA_SO_2022-06-02_NP 1	LC_RLPA_SO_2022-06-02_NP 2	LC_RLPA_SO_2022-06-02_NP 3	LC_RLPA_SO_2022-06-02_NP 4	LC_RLPA_SO_2022-06-02_NP 5
				Client sampling date / time	02-Jun-2022 10:15	02-Jun-2022 10:20	02-Jun-2022 10:25	02-Jun-2022 10:30	02-Jun-2022 10:35
Analyte	CAS Number	Method	LOR	Unit	CG2206888-001	CG2206888-002	CG2206888-003	CG2206888-004	CG2206888-005
					Result	Result	Result	Result	Result
Aggregate Organics									
waste oil content (BC HWR 41.1)	----	EC569SG	0.10	%	<0.10	<0.10	<0.10	<0.10	<0.10
waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	<1000	<1000	<1000	<1000
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611A	0.0050	mg/kg	0.892	1.33	0.213	0.358	0.238
ethylbenzene	100-41-4	E611A	0.015	mg/kg	1.08	1.51	0.427	0.609	0.537
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	<0.200	<0.200	<0.200	<0.200
styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611A	0.050	mg/kg	5.58	8.18	1.48	2.30	1.71
xylene, m+p-	179601-23-1	E611A	0.030	mg/kg	11.3	15.6	3.15	4.91	3.73
xylene, o-	95-47-6	E611A	0.030	mg/kg	2.46	3.44	1.04	1.74	1.31
xylenes, total	1330-20-7	E611A	0.050	mg/kg	13.8	19.0	4.19	6.65	5.04
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.10	%	74.7	76.5	79.5	76.6	73.9
difluorobenzene, 1,4-	540-36-3	E611A	0.10	%	81.6	78.7	84.9	83.2	72.6
Hydrocarbons									
EPH (C10-C19)	----	E601A	200	mg/kg	1270	1470	1390	1540	1530
EPH (C19-C32)	----	E601A	200	mg/kg	940	900	1100	1230	1120
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	102	155	57	92	82
HEPHs	----	EC600A	200	mg/kg	940	890	1100	1220	1110
LEPHs	----	EC600A	200	mg/kg	1240	1440	1360	1510	1500
VPHs	----	EC580A	10	mg/kg	81	125	51	82	74
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	87.1	87.2	89.5	92.4	86.6
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	76.3	72.3	80.2	78.2	76.1
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<1.66 DLCI	<1.95 DLCI	<1.75 DLCI	<1.85 DLCI	<1.74 DLCI
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.400 DLCI	<0.350 DLCI	<0.550 DLCI	<0.600 DLCI	<0.520 DLCI
acridine	260-94-6	E641A-L	0.010	mg/kg	<3.32 DLCI	3.71	3.41	3.64	3.55
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.500 DLCI	<1.25 DLCI	<0.620 DLCI	<0.680 DLCI	<0.592 DLCI
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	1.07	1.13	1.28	1.40	1.28

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid)**

				Client sample ID	LC_RLPA_SO_2022-06-02_NP 1	LC_RLPA_SO_2022-06-02_NP 2	LC_RLPA_SO_2022-06-02_NP 3	LC_RLPA_SO_2022-06-02_NP 4	LC_RLPA_SO_2022-06-02_NP 5
				Client sampling date / time	02-Jun-2022 10:15	02-Jun-2022 10:20	02-Jun-2022 10:25	02-Jun-2022 10:30	02-Jun-2022 10:35
Analyte	CAS Number	Method	LOR	Unit	CG2206888-001	CG2206888-002	CG2206888-003	CG2206888-004	CG2206888-005
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	0.492	0.535	0.524	0.573	0.562
benzo(b+j)fluoranthene	n/a	E641A-L	0.010	mg/kg	1.15	1.38	1.23	1.26	1.32
benzo(b+j+k)fluoranthene	n/a	E641A-L	0.015	mg/kg	1.18	1.51	1.25	1.28	1.36
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	0.448	0.550	0.472	0.458	0.486
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	0.030	0.130	0.018	0.025	0.041
chrysene	218-01-9	E641A-L	0.010	mg/kg	3.43	3.97	3.62	3.78	3.80
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	0.273	0.349	0.264	0.274	0.291
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	0.687	0.736	0.752	0.814	0.782
fluorene	86-73-7	E641A-L	0.010	mg/kg	5.16	6.26	5.04	5.31	5.22
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	0.165	0.204	0.170	0.186	0.192
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	21.6	24.6	21.7	22.8	21.8
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	33.6	44.4	30.1	29.7	31.2
naphthalene	91-20-3	E641A-L	0.010	mg/kg	9.07	13.6	7.06	6.96	8.43
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	17.7	18.7	21.8	24.0	22.6
pyrene	129-00-0	E641A-L	0.010	mg/kg	1.16	1.32	1.45	1.34	1.39
quinoline	91-22-5	E641A-L	0.010	mg/kg	<0.060 DLCI	<0.120 DLCI	<0.120 DLCI	<0.140 DLCI	<0.160 DLCI
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	1.04	1.21	1.10	1.18	1.18
IACR (CCME)	----	E641A-L	0.150	-	14.9	17.9	16.1	16.9	17.1
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.1	%	66.6	72.8	60.6	61.3	66.4
chrysene-d12	1719-03-5	E641A-L	0.1	%	87.0	92.0	86.5	86.1	91.6
naphthalene-d8	1146-65-2	E641A-L	0.1	%	87.3	90.7	91.6	92.3	95.8
phenanthrene-d10	1517-22-2	E641A-L	0.1	%	94.7	99.2	98.5	98.6	103

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

					Client sample ID	LC_RLPA_SO_2022-06-02_NP6	----	----	----	----
					Client sampling date / time	02-Jun-2022 10:40	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit		CG2206888-006	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
moisture	----	E144	0.25	%		33.0	----	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units		7.89	----	----	----	----
Metals										
aluminum	7429-90-5	E440	50	mg/kg		2040	----	----	----	----
antimony	7440-36-0	E440	0.10	mg/kg		0.67	----	----	----	----
arsenic	7440-38-2	E440	0.10	mg/kg		1.76	----	----	----	----
barium	7440-39-3	E440	0.50	mg/kg		273	----	----	----	----
beryllium	7440-41-7	E440	0.10	mg/kg		0.48	----	----	----	----
bismuth	7440-69-9	E440	0.20	mg/kg		0.36	----	----	----	----
boron	7440-42-8	E440	5.0	mg/kg		8.9	----	----	----	----
cadmium	7440-43-9	E440	0.020	mg/kg		0.586	----	----	----	----
calcium	7440-70-2	E440	50	mg/kg		7530	----	----	----	----
chromium	7440-47-3	E440	0.50	mg/kg		3.78	----	----	----	----
cobalt	7440-48-4	E440	0.10	mg/kg		2.46	----	----	----	----
copper	7440-50-8	E440	0.50	mg/kg		16.4	----	----	----	----
iron	7439-89-6	E440	50	mg/kg		4340	----	----	----	----
lead	7439-92-1	E440	0.50	mg/kg		6.64	----	----	----	----
lithium	7439-93-2	E440	2.0	mg/kg		<2.0	----	----	----	----
magnesium	7439-95-4	E440	20	mg/kg		1460	----	----	----	----
manganese	7439-96-5	E440	1.0	mg/kg		53.9	----	----	----	----
mercury	7439-97-6	E510	0.0050	mg/kg		0.0283	----	----	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg		2.20	----	----	----	----
nickel	7440-02-0	E440	0.50	mg/kg		8.56	----	----	----	----
phosphorus	7723-14-0	E440	50	mg/kg		567	----	----	----	----
potassium	7440-09-7	E440	100	mg/kg		420	----	----	----	----
selenium	7782-49-2	E440	0.20	mg/kg		2.05	----	----	----	----
silver	7440-22-4	E440	0.10	mg/kg		0.14	----	----	----	----
sodium	7440-23-5	E440	50	mg/kg		53	----	----	----	----
strontium	7440-24-6	E440	0.50	mg/kg		123	----	----	----	----
sulfur	7704-34-9	E440	1000	mg/kg		<1000	----	----	----	----

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid)**

				Client sample ID	LC_RLPA_SO_2022-06-02_NP6	----	----	----	----
				Client sampling date / time	02-Jun-2022 10:40	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	CG2206888-006	--------	--------	--------	--------
					Result	----	----	----	----
Metals									
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	----	----	----	----
tin	7440-31-5	E440	2.0	mg/kg	<2.0	----	----	----	----
titanium	7440-32-6	E440	1.0	mg/kg	25.6	----	----	----	----
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	----	----	----	----
uranium	7440-61-1	E440	0.050	mg/kg	0.780	----	----	----	----
vanadium	7440-62-2	E440	0.20	mg/kg	26.1	----	----	----	----
zinc	7440-66-6	E440	2.0	mg/kg	32.3	----	----	----	----
zirconium	7440-67-7	E440	1.0	mg/kg	3.1	----	----	----	----
Aggregate Organics									
waste oil content (BC HWR 41.1)	----	EC569SG	0.10	%	<0.10	----	----	----	----
waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	----	----	----	----
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611A	0.0050	mg/kg	0.836	----	----	----	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	0.735	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	----	----	----	----
styrene	100-42-5	E611A	0.050	mg/kg	<0.050	----	----	----	----
toluene	108-88-3	E611A	0.050	mg/kg	4.40	----	----	----	----
xylene, m+p-	179601-23-1	E611A	0.030	mg/kg	6.84	----	----	----	----
xylene, o-	95-47-6	E611A	0.030	mg/kg	1.88	----	----	----	----
xylenes, total	1330-20-7	E611A	0.050	mg/kg	8.72	----	----	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.10	%	74.6	----	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.10	%	77.3	----	----	----	----
Hydrocarbons									
EPH (C10-C19)	----	E601A	200	mg/kg	1500	----	----	----	----
EPH (C19-C32)	----	E601A	200	mg/kg	1070	----	----	----	----
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	88	----	----	----	----
HEPHs	----	EC600A	200	mg/kg	1060	----	----	----	----
LEPHs	----	EC600A	200	mg/kg	1470	----	----	----	----
VPHs	----	EC580A	10	mg/kg	73	----	----	----	----

Analytical Results

Sub-Matrix: Soil
(Matrix: Soil/Solid)

Analyte	CAS Number	Method	LOR	Unit	LC_RLPA_SO_2022-06-02_NP6	----	----	----	----
				Client sampling date / time	02-Jun-2022 10:40	----	----	----	----
					CG2206888-006	--------	--------	--------	--------
					Result	----	----	----	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	89.0	----	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	75.2	----	----	----	----
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<1.70 DLCI	----	----	----	----
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.500 DLCI	----	----	----	----
acridine	260-94-6	E641A-L	0.010	mg/kg	3.44	----	----	----	----
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.532 DLCI	----	----	----	----
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	1.14	----	----	----	----
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	0.521	----	----	----	----
benzo(b+j)fluoranthene	n/a	E641A-L	0.010	mg/kg	1.25	----	----	----	----
benzo(b+j+k)fluoranthene	n/a	E641A-L	0.015	mg/kg	1.31	----	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	0.467	----	----	----	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	0.062	----	----	----	----
chrysene	218-01-9	E641A-L	0.010	mg/kg	3.67	----	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	0.275	----	----	----	----
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	0.702	----	----	----	----
fluorene	86-73-7	E641A-L	0.010	mg/kg	5.21	----	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	0.190	----	----	----	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	22.2	----	----	----	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	34.1	----	----	----	----
naphthalene	91-20-3	E641A-L	0.010	mg/kg	9.72	----	----	----	----
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	20.6	----	----	----	----
pyrene	129-00-0	E641A-L	0.010	mg/kg	1.24	----	----	----	----
quinoline	91-22-5	E641A-L	0.010	mg/kg	<0.130 DLCI	----	----	----	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	1.10	----	----	----	----
IACR (CCME)	----	E641A-L	0.150	-	16.1	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.1	%	68.7	----	----	----	----
chrysene-d12	1719-03-5	E641A-L	0.1	%	87.8	----	----	----	----
naphthalene-d8	1146-65-2	E641A-L	0.1	%	90.0	----	----	----	----

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	LC_RLPA_SO_2022-06-02_NP6	----	----	----	----
				Client sampling date / time	02-Jun-2022 10:40	----	----	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**CG2206888-006**	--------	--------	--------	--------
					Result	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
phenanthrene-d10	1517-22-2	E641A-L	0.1	%	99.8	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **CG2206888**	Page	: 1 of 16
Client	: **Teck Coal Limited**	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 03-Jun-2022 09:00
PO	: VPO00809190	Issue Date	: 05-Jul-2022 08:59
C-O-C number	: RLPA_SO_20220602		
Sampler	: D. Tymstra		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 6		
No. of samples analysed	: 6		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	E569SG.A	02-Jun-2022	12-Jun-2022	28 days	10 days	✓	13-Jun-2022	40 days	2 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP2	E569SG.A	02-Jun-2022	12-Jun-2022	28 days	10 days	✓	13-Jun-2022	40 days	2 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP3	E569SG.A	02-Jun-2022	12-Jun-2022	28 days	10 days	✓	13-Jun-2022	40 days	2 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP4	E569SG.A	02-Jun-2022	12-Jun-2022	28 days	10 days	✓	13-Jun-2022	40 days	2 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP5	E569SG.A	02-Jun-2022	12-Jun-2022	28 days	10 days	✓	13-Jun-2022	40 days	2 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP6	E569SG.A	02-Jun-2022	12-Jun-2022	28 days	10 days	✓	13-Jun-2022	40 days	2 days	✓
BC LSP Extractables (target pH = Natural) : Liquid-Solid Partitioning Leachability (BC LSP)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	EPP445A	02-Jun-2022	23-Jun-2022	----	----		----	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
BC LSP Extractables (target pH = Natural) : Liquid-Solid Partitioning Leachability (BC LSP)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx) LC_RLPA_SO_2022-06-02_NP2	EPP445A	02-Jun-2022	23-Jun-2022	----	----		----	----	----	
BC LSP Metals (target pH= 5) : Liquid-Solid Partitioning Leachability (BC LSP) Preparation										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	EPP445A	02-Jun-2022	23-Jun-2022	----	----		----	----	----	
BC LSP Metals (target pH= 5) : Liquid-Solid Partitioning Leachability (BC LSP) Preparation										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx) LC_RLPA_SO_2022-06-02_NP2	EPP445A	02-Jun-2022	23-Jun-2022	----	----		----	----	----	
BC LSP Metals (target pH= 5) : Metals by CRC ICPMS (BC LSP Target pH=5)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	E445A	02-Jun-2022	----	----	----		27-Jun-2022	180 days	25 days	✓
BC LSP Metals (target pH= 5) : Metals by CRC ICPMS (BC LSP Target pH=5)										
HDPE (lab preserved) LC_RLPA_SO_2022-06-02_NP2	E445A	02-Jun-2022	----	----	----		27-Jun-2022	180 days	25 days	✓
BC LSP Metals (target pH= 7) : Liquid-Solid Partitioning Leachability (BC LSP) Preparation										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	EPP445A	02-Jun-2022	23-Jun-2022	----	----		----	----	----	
BC LSP Metals (target pH= 7) : Liquid-Solid Partitioning Leachability (BC LSP) Preparation										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx) LC_RLPA_SO_2022-06-02_NP2	EPP445A	02-Jun-2022	23-Jun-2022	----	----		----	----	----	
BC LSP Metals (target pH= 7) : Metals by CRC ICPMS (BC LSP Target pH=7)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	E445B	02-Jun-2022	----	----	----		27-Jun-2022	180 days	25 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
BC LSP Metals (target pH= 7) : Metals by CRC ICPMS (BC LSP Target pH=7)										
HDPE (lab preserved) LC_RLPA_SO_2022-06-02_NP2	E445B	02-Jun-2022	----	----	----		27-Jun-2022	180 days	25 days	✓
BC LSP Metals (target pH= 9) : Liquid-Solid Partitioning Leachability (BC LSP) Preparation										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	EPP445A	02-Jun-2022	23-Jun-2022	----	----		----	----	----	
BC LSP Metals (target pH= 9) : Liquid-Solid Partitioning Leachability (BC LSP) Preparation										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx) LC_RLPA_SO_2022-06-02_NP2	EPP445A	02-Jun-2022	23-Jun-2022	----	----		----	----	----	
BC LSP Metals (target pH= 9) : Metals by CRC ICPMS (BC LSP Target pH=9)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	E445C	02-Jun-2022	----	----	----		27-Jun-2022	180 days	25 days	✓
BC LSP Metals (target pH= 9) : Metals by CRC ICPMS (BC LSP Target pH=9)										
HDPE (lab preserved) LC_RLPA_SO_2022-06-02_NP2	E445C	02-Jun-2022	----	----	----		27-Jun-2022	180 days	25 days	✓
BC LSP VOCs (target pH = Natural) : VOCs by Headspace GC-MS (BC LSP)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	E618	02-Jun-2022	12-Jun-2022	14 days	10 days	✓	12-Jun-2022	4 days	0 days	✓
BC LSP VOCs (target pH = Natural) : VOCs by Headspace GC-MS (BC LSP)										
Glass vial (sodium bisulfate) LC_RLPA_SO_2022-06-02_NP2	E618	02-Jun-2022	12-Jun-2022	----	----		12-Jun-2022	14 days	10 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	E601A	02-Jun-2022	05-Jun-2022	14 days	3 days	✓	06-Jun-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP2	E601A	02-Jun-2022	05-Jun-2022	14 days	3 days	✓	06-Jun-2022	40 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP3	E601A	02-Jun-2022	05-Jun-2022	14 days	3 days	✓	06-Jun-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP4	E601A	02-Jun-2022	05-Jun-2022	14 days	3 days	✓	06-Jun-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP5	E601A	02-Jun-2022	05-Jun-2022	14 days	3 days	✓	06-Jun-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP6	E601A	02-Jun-2022	05-Jun-2022	14 days	3 days	✓	06-Jun-2022	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPA_SO_2022-06-02_NP1	E581.VH+F1	02-Jun-2022	05-Jun-2022	----	----		05-Jun-2022	40 days	3 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPA_SO_2022-06-02_NP2	E581.VH+F1	02-Jun-2022	05-Jun-2022	----	----		05-Jun-2022	40 days	3 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPA_SO_2022-06-02_NP3	E581.VH+F1	02-Jun-2022	05-Jun-2022	----	----		05-Jun-2022	40 days	3 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPA_SO_2022-06-02_NP4	E581.VH+F1	02-Jun-2022	05-Jun-2022	----	----		05-Jun-2022	40 days	3 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPA_SO_2022-06-02_NP5	E581.VH+F1	02-Jun-2022	05-Jun-2022	----	----		05-Jun-2022	40 days	3 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPA_SO_2022-06-02_NP6	E581.VH+F1	02-Jun-2022	05-Jun-2022	----	----		05-Jun-2022	40 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	E510	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP2	E510	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP3	E510	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP4	E510	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP5	E510	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP6	E510	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	28 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	E440	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP2	E440	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	180 days	9 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP3	E440	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP4	E440	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP5	E440	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP6	E440	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	180 days	9 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	E144	02-Jun-2022	----	----	----		05-Jun-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP2	E144	02-Jun-2022	----	----	----		05-Jun-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP3	E144	02-Jun-2022	----	----	----		05-Jun-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP4	E144	02-Jun-2022	----	----	----		05-Jun-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP5	E144	02-Jun-2022	----	----	----		05-Jun-2022	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP6	E144	02-Jun-2022	----	----	----		05-Jun-2022	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	E108	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP2	E108	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP3	E108	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP4	E108	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP5	E108	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP6	E108	02-Jun-2022	10-Jun-2022	----	----		10-Jun-2022	30 days	8 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP1	E641A-L	02-Jun-2022	05-Jun-2022	14 days	3 days	✓	06-Jun-2022	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP2	E641A-L	02-Jun-2022	05-Jun-2022	14 days	3 days	✓	06-Jun-2022	40 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP3	E641A-L	02-Jun-2022	05-Jun-2022	14 days	3 days	✓	06-Jun-2022	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP4	E641A-L	02-Jun-2022	05-Jun-2022	14 days	3 days	✓	06-Jun-2022	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP5	E641A-L	02-Jun-2022	05-Jun-2022	14 days	3 days	✓	06-Jun-2022	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPA_SO_2022-06-02_NP6	E641A-L	02-Jun-2022	05-Jun-2022	14 days	3 days	✓	06-Jun-2022	40 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPA_SO_2022-06-02_NP1	E611A	02-Jun-2022	05-Jun-2022	----	----		05-Jun-2022	40 days	3 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPA_SO_2022-06-02_NP2	E611A	02-Jun-2022	05-Jun-2022	----	----		05-Jun-2022	40 days	3 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPA_SO_2022-06-02_NP3	E611A	02-Jun-2022	05-Jun-2022	----	----		05-Jun-2022	40 days	3 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPA_SO_2022-06-02_NP4	E611A	02-Jun-2022	05-Jun-2022	----	----		05-Jun-2022	40 days	3 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPA_SO_2022-06-02_NP5	E611A	02-Jun-2022	05-Jun-2022	----	----		05-Jun-2022	40 days	3 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial										
LC_RLPA_SO_2022-06-02_NP6	E611A	02-Jun-2022	05-Jun-2022	----	----		05-Jun-2022	40 days	3 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BC PHCs - EPH by GC-FID	E601A	511602	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	511610	1	20	5.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	518337	1	20	5.0	5.0	✓
Metals by CRC ICPMS (BC LSP Target pH=5)	E445A	538777	1	2	50.0	5.0	✓
Metals by CRC ICPMS (BC LSP Target pH=7)	E445B	539602	1	6	16.6	5.0	✓
Metals by CRC ICPMS (BC LSP Target pH=9)	E445C	539603	1	6	16.6	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	518338	1	20	5.0	5.0	✓
Moisture Content by Gravimetry	E144	511604	1	20	5.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	511603	1	20	5.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	518959	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	511611	1	20	5.0	5.0	✓
VOCs by Headspace GC-MS (BC LSP)	E618	519116	1	2	50.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	520620	1	11	9.0	5.0	✓
Laboratory Control Samples (LCS)							
BC PHCs - EPH by GC-FID	E601A	511602	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	511610	1	20	5.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	518337	2	20	10.0	10.0	✓
Metals by CRC ICPMS (BC LSP Target pH=5)	E445A	538777	1	2	50.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	518338	2	20	10.0	10.0	✓
Moisture Content by Gravimetry	E144	511604	1	20	5.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	511603	1	20	5.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	518959	2	20	10.0	10.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	511611	1	20	5.0	5.0	✓
VOCs by Headspace GC-MS (BC LSP)	E618	519116	1	2	50.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	520620	1	11	9.0	5.0	✓
Method Blanks (MB)							
BC PHCs - EPH by GC-FID	E601A	511602	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	511610	1	20	5.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	518337	1	20	5.0	5.0	✓
Metals by CRC ICPMS (BC LSP Target pH=5)	E445A	538777	1	2	50.0	5.0	✓
Metals by CRC ICPMS (BC LSP Target pH=9)	E445C	539603	1	6	16.6	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	518338	1	20	5.0	5.0	✓
Moisture Content by Gravimetry	E144	511604	1	20	5.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	511603	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	511611	1	20	5.0	5.0	✓
VOCs by Headspace GC-MS (BC LSP)	E618	519116	1	2	50.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	520620	1	11	9.0	5.0	✓

Matrix: **Soil/Solid**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Matrix Spikes (MS)							
BC PHCs - EPH by GC-FID	E601A	511602	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	511610	1	20	5.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	511603	1	20	5.0	5.0	✓
VOCs by Headspace GC-MS (BC LSP)	E618	519116	1	2	50.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Calgary - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Calgary - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 Calgary - Environmental	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (BC LSP Target pH=5)	E445A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (pH5)/EPA 1313 (mod)/EPA 6020B (mod)	An extract buffered to pH 5 from the BC Liquid Solid Partitioning Procedure (BC LSP) is preserved with nitric acid and analyzed by CRC ICPMS.
Metals by CRC ICPMS (BC LSP Target pH=7)	E445B Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (pH5)/EPA 1313 (mod)/EPA 6020B (mod)	An extract buffered to pH 7 from the BC Liquid Solid Partitioning Procedure (BC LSP) is preserved with nitric acid and analyzed by CRC ICPMS.
Metals by CRC ICPMS (BC LSP Target pH=9)	E445C Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (pH5)/EPA 1313 (mod)/EPA 6020B (mod)	An extract buffered to pH 9 from the BC Liquid Solid Partitioning Procedure (BC LSP) is preserved with nitric acid and analyzed by CRC ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Calgary - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A silica gel treated petroleum ether sample extract is evaporated to dryness. The weight of the residue is determined gravimetrically. For classification of samples as waste oil under the HWR, Waste Oil Content is reported by weight on an as-received basis.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VH and F1 by Headspace GC-FID	E581.VH+F1 Calgary - Environmental	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHCs - EPH by GC-FID	E601A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
BTEX by Headspace GC-MS	E611A Calgary - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
VOCs by Headspace GC-MS (BC LSP)	E618 Vancouver - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Calgary - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are extracted with hexane/acetone and analyzed by GC-MS. If reported, IACR (index of additive cancer risk, unitless) and B(a)P toxic potency equivalent (in soil concentration units) are calculated as per CCME PAH Soil Quality Guidelines fact sheet (2010) or ABT1.
Waste Oil Content (BC HWR 41.1) by Gravimetry	EC569SG Vancouver - Environmental	Soil/Solid	unit conversion	Convert waste oil content from sample wet weight basis to dry weight basis by using moisture. For assessment of compliance of the Total Oil standard under section 41.1 of the HWR (Standards for Management of Hydrocarbon Contaminated Soils), Waste Oil Content is reported on a dry weight basis.
VPH: VH-BTEX-Styrene	EC580A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VH-BTEX = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Calgary - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Calgary - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
Waste Oil Content (BC HWR) Extraction for Gravimetry	EP569SG Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A subsample is dried by magnesium sulfate and extracted with petroleum ether in Soxhlet. The extract is dried with sodium sulfate and treated with silica gel.

Preparation Methods	*Method / Lab*	*Matrix*	*Method Reference*	*Method Descriptions*
VOCs Methanol Extraction for Headspace Analysis	EP581 Calgary - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
VOCs Preparation for Headspace Analysis (BC LSP)	EP585 Vancouver - Environmental	Soil/Solid	EPA 5021A (mod)	An extract obtained after the BC LSP process is prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 Calgary - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.
Liquid-Solid Partitioning Leachability (BC LSP) Preparation (Metals, Inorganics, SVOCs)	EPP445A Vancouver - Environmental	Soil/Solid	BC Lab Manual (Leachate Method, Inorganics/SVOC)	50g sub-samples of soil are leached at a 20:1 liquid:solid ratio for 48 +/- 4 hrs using DI water adjusted to pH 5, 7, and 9 using KOH or HNO3, and at the native sample pH if outside 4.5 to 9.5. Prior to analysis, extracts are filtered through 0.45um (inorganics) or 0.6 to 0.8 micron glass fibre (SVOCs).
Liquid-Solid Partitioning Leachability (BC LSP) Preparation (VOCs)	EPP585 Vancouver - Environmental	Soil/Solid	BC Lab Manual	An extract produced by the Liquid Solid Partition as per EPA 1313

QUALITY CONTROL REPORT

Work Order	: **CG2206888**	Page	: 1 of 19
Client	: Teck Coal Limited	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 03-Jun-2022 09:00
PO	: VPO00809190	Date Analysis Commenced	: 05-Jun-2022
C-O-C number	: RLPA_SO_20220602	Issue Date	: 05-Jul-2022 08:59
Sampler	: D. Tymstra		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 6		
No. of samples analysed	: 6		

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Cynthia Bauer	Organic Supervisor	Calgary Organics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Metals, Calgary, Alberta
Jeanie Mark	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Jyotsnarani Devi	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Vancouver Organics, Burnaby, British Columbia
Sorina Motea	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Vishnu Patel		Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 511604)											
CG2206844-001	Anonymous	moisture	----	E144	0.25	%	13.9	14.3	2.76%	20%	----
Physical Tests (QC Lot: 518959)											
CG2206498-001	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	8.86	8.90	0.450%	5%	----
Metals (QC Lot: 518337)											
CG2206498-001	Anonymous	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 518338)											
CG2206498-001	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	3080	3300	7.14%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	1.49	1.37	8.42%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	2.86	2.79	2.47%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	245	249	1.55%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.43	0.47	0.04	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.970	0.952	1.81%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	10700	10600	0.718%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	5.86	6.50	10.5%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	5.62	5.57	0.901%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	17.0	17.7	3.55%	30%	----
		iron	7439-89-6	E440	50	mg/kg	4840	4960	2.46%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	8.23	8.20	0.364%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	<2.0	2.0	0.05	Diff <2x LOR	----
		magnesium	7439-95-4	E440	20	mg/kg	3200	3150	1.51%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	103	102	0.753%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	8.43	8.79	4.15%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	20.8	20.4	1.88%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	851	825	3.13%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	1060	1120	5.78%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	1.52	1.53	0.566%	30%	----
		silver	7440-22-4	E440	0.10	mg/kg	0.21	0.23	0.02	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	<50	<50	0	Diff <2x LOR	----
		strontium	7440-24-6	E440	0.50	mg/kg	61.3	67.6	9.77%	40%	----

Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 518338) - continued											
CG2206498-001	Anonymous	sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	5.3	7.2	31.5%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.722	0.723	0.0842%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	18.1	19.6	8.09%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	72.9	75.1	3.02%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	2.4	2.3	0.07	Diff <2x LOR	----
BC LSP Metals (target pH= 5) (QC Lot: 538777)											
CG2206888-002	LC_RLPA_SO_2022-06-02 _NP2	aluminum, leachable	7429-90-5	E445A	0.0050	mg/L	0.450	0.379	16.9%	50%	----
		antimony, leachable	7440-36-0	E445A	0.00010	mg/L	0.00182	0.00174	4.64%	50%	----
		arsenic, leachable	7440-38-2	E445A	0.0010	mg/L	0.0018	0.0016	0.0002	Diff <2x LOR	----
		barium, leachable	7440-39-3	E445A	0.0010	mg/L	0.685	0.648	5.57%	50%	----
		beryllium, leachable	7440-41-7	E445A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cadmium, leachable	7440-43-9	E445A	0.000050	mg/L	0.00157	0.00140	11.9%	50%	----
		chromium, leachable	7440-47-3	E445A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, leachable	7440-48-4	E445A	0.00010	mg/L	0.0122	0.0117	4.45%	50%	----
		copper, leachable	7440-50-8	E445A	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		lead, leachable	7439-92-1	E445A	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		manganese, leachable	7439-96-5	E445A	0.00050	mg/L	0.180	0.181	0.624%	50%	----
		molybdenum, leachable	7439-98-7	E445A	0.00010	mg/L	0.00125	0.00140	11.9%	50%	----
		nickel, leachable	7440-02-0	E445A	0.00050	mg/L	0.0273	0.0253	7.57%	50%	----
		selenium, leachable	7782-49-2	E445A	0.00050	mg/L	0.00201	0.00204	1.88%	50%	----
		uranium, leachable	7440-61-1	E445A	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		vanadium, leachable	7440-62-2	E445A	0.0010	mg/L	0.0044	0.0049	11.2%	50%	----
		zinc, leachable	7440-66-6	E445A	0.010	mg/L	0.103	0.093	9.77%	50%	----
BC LSP Metals (target pH= 7) (QC Lot: 539602)											
CG2206888-002	LC_RLPA_SO_2022-06-02 _NP2	aluminum, leachable	7429-90-5	E445B	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		antimony, leachable	7440-36-0	E445B	0.00010	mg/L	0.00095	0.00096	1.38%	50%	----
		arsenic, leachable	7440-38-2	E445B	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		barium, leachable	7440-39-3	E445B	0.0010	mg/L	0.438	0.426	2.75%	50%	----
		beryllium, leachable	7440-41-7	E445B	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cadmium, leachable	7440-43-9	E445B	0.000050	mg/L	0.000078	0.000083	0.000005	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
BC LSP Metals (target pH= 7) (QC Lot: 539602) - continued											
CG2206888-002	LC_RLPA_SO_2022-06-02_NP2	chromium, leachable	7440-47-3	E445B	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, leachable	7440-48-4	E445B	0.00010	mg/L	0.00109	0.00114	5.00%	50%	----
		copper, leachable	7440-50-8	E445B	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		lead, leachable	7439-92-1	E445B	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		manganese, leachable	7439-96-5	E445B	0.00050	mg/L	0.0528	0.0525	0.405%	50%	----
		molybdenum, leachable	7439-98-7	E445B	0.00010	mg/L	0.00365	0.00356	2.55%	50%	----
		nickel, leachable	7440-02-0	E445B	0.00050	mg/L	0.00155	0.00157	0.00002	Diff <2x LOR	----
		selenium, leachable	7782-49-2	E445B	0.00050	mg/L	0.00118	0.00116	0.00002	Diff <2x LOR	----
		uranium, leachable	7440-61-1	E445B	0.000010	mg/L	0.000019	0.000018	0.000001	Diff <2x LOR	----
		vanadium, leachable	7440-62-2	E445B	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zinc, leachable	7440-66-6	E445B	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
BC LSP Metals (target pH= 9) (QC Lot: 539603)											
CG2206888-002	LC_RLPA_SO_2022-06-02_NP2	aluminum, leachable	7429-90-5	E445C	0.0050	mg/L	0.161	0.158	1.41%	50%	----
		antimony, leachable	7440-36-0	E445C	0.00010	mg/L	0.00142	0.00143	1.18%	50%	----
		arsenic, leachable	7440-38-2	E445C	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		barium, leachable	7440-39-3	E445C	0.0010	mg/L	0.249	0.248	0.297%	50%	----
		beryllium, leachable	7440-41-7	E445C	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cadmium, leachable	7440-43-9	E445C	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		chromium, leachable	7440-47-3	E445C	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, leachable	7440-48-4	E445C	0.00010	mg/L	0.00012	0.00011	0.000008	Diff <2x LOR	----
		copper, leachable	7440-50-8	E445C	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		lead, leachable	7439-92-1	E445C	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		manganese, leachable	7439-96-5	E445C	0.00050	mg/L	0.00256	0.00287	11.2%	50%	----
		molybdenum, leachable	7439-98-7	E445C	0.00010	mg/L	0.00749	0.00748	0.129%	50%	----
		nickel, leachable	7440-02-0	E445C	0.00050	mg/L	0.00067	0.00069	0.00002	Diff <2x LOR	----
		selenium, leachable	7782-49-2	E445C	0.00050	mg/L	0.00286	0.00274	4.47%	50%	----
		uranium, leachable	7440-61-1	E445C	0.000010	mg/L	0.000301	0.000294	2.12%	50%	----
		vanadium, leachable	7440-62-2	E445C	0.0010	mg/L	0.0013	0.0013	0.00004	Diff <2x LOR	----
		zinc, leachable	7440-66-6	E445C	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
BC LSP VOCs (target pH = Natural) (QC Lot: 519116)											
CG2206888-001	LC_RLPA_SO_2022-06-02_NP1	benzene, leachable	71-43-2	E618	1.0	µg/L	<0.0010 mg/L	<1.0	0	Diff <2x LOR	----
		ethylbenzene, leachable	100-41-4	E618	1.0	µg/L	<0.0010 mg/L	<1.0	0	Diff <2x LOR	----
		naphthalene, leachable	91-20-3	E618	1.0	µg/L	<0.0010 mg/L	<1.0	0	Diff <2x LOR	----
		tetrachloroethylene, leachable	127-18-4	E618	1.0	µg/L	<0.0010 mg/L	<1.0	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
BC LSP VOCs (target pH = Natural) (QC Lot: 519116) - continued											
CG2206888-001	LC_RLPA_SO_2022-06-02 _NP1	toluene, leachable	108-88-3	E618	1.0	µg/L	<0.0010 mg/L	<1.0	0	Diff <2x LOR	----
		trichloroethylene, leachable	79-01-6	E618	1.0	µg/L	<0.0010 mg/L	<1.0	0	Diff <2x LOR	----
		xylene, m+p-, leachable	179601-23-1	E618	1.0	µg/L	<0.0010 mg/L	<1.0	0	Diff <2x LOR	----
		xylene, o-, leachable	95-47-6	E618	1.0	µg/L	<0.0010 mg/L	<1.0	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 520620)											
CG2206888-001	LC_RLPA_SO_2022-06-02 _NP1	waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	<1000	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 511610)											
CG2206844-001	Anonymous	benzene	71-43-2	E611A	0.0050	mg/kg	0.272	0.322	16.9%	40%	----
		ethylbenzene	100-41-4	E611A	0.015	mg/kg	0.410	0.497	19.1%	40%	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.050	mg/kg	2.36	2.81	17.6%	40%	----
		xylene, m+p-	179601-23-1	E611A	0.030	mg/kg	4.11	4.87	16.8%	40%	----
		xylene, o-	95-47-6	E611A	0.030	mg/kg	0.805	0.951	16.6%	40%	----
Hydrocarbons (QC Lot: 511602)											
CG2206844-001	Anonymous	EPH (C10-C19)	----	E601A	200	mg/kg	760	750	6	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	3370	3430	1.89%	40%	----
Hydrocarbons (QC Lot: 511611)											
CG2206844-001	Anonymous	VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	21	18	3	Diff <2x LOR	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 511603)											
CG2206844-001	Anonymous	acenaphthene	83-32-9	E641A-L	0.155	mg/kg	<0.155	<0.155	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0.0300	mg/kg	<0.0300	<0.0300	0	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.200	mg/kg	<0.380	<0.200	0.180	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0.144	mg/kg	<0.144	<0.144	0	Diff <2x LOR	----
		benz(a)anthracene	56-55-3	E641A-L	0.080	mg/kg	<0.080	<0.080	0	Diff <2x LOR	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	0.050	0.057	13.9%	50%	----
		benzo(b+j)fluoranthene	n/a	E641A-L	0.010	mg/kg	0.134	0.155	14.8%	50%	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	0.070	0.082	16.2%	50%	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.450	mg/kg	<0.450	<0.450	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	0.0355	0.0418	16.4%	50%	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	0.061	0.067	8.57%	50%	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	0.415	0.452	8.72%	50%	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	0.023	0.028	0.005	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Polycyclic Aromatic Hydrocarbons (QC Lot: 511603) - continued											
CG2206844-001	Anonymous	methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	1.36	1.52	11.5%	50%	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	2.96	3.17	6.99%	50%	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	0.932	1.02	9.28%	50%	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	1.19	1.33	11.2%	50%	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	0.175	0.178	1.49%	50%	----
		quinoline	91-22-5	E641A-L	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 511604)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 518337)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 518338)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 518338) - continued						
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
BC LSP Metals (target pH= 5) (QCLot: 538777)						
aluminum, leachable	7429-90-5	E445A	0.005	mg/L	<0.0050	----
antimony, leachable	7440-36-0	E445A	0.0001	mg/L	<0.00010	----
arsenic, leachable	7440-38-2	E445A	0.001	mg/L	<0.0010	----
barium, leachable	7440-39-3	E445A	0.001	mg/L	<0.0010	----
beryllium, leachable	7440-41-7	E445A	0.0005	mg/L	<0.00050	----
cadmium, leachable	7440-43-9	E445A	0.00005	mg/L	<0.000050	----
chromium, leachable	7440-47-3	E445A	0.0005	mg/L	<0.00050	----
cobalt, leachable	7440-48-4	E445A	0.0001	mg/L	<0.00010	----
copper, leachable	7440-50-8	E445A	0.001	mg/L	<0.0010	----
lead, leachable	7439-92-1	E445A	0.0001	mg/L	<0.00010	----
manganese, leachable	7439-96-5	E445A	0.0005	mg/L	<0.00050	----
molybdenum, leachable	7439-98-7	E445A	0.0001	mg/L	<0.00010	----
nickel, leachable	7440-02-0	E445A	0.0005	mg/L	<0.00050	----
selenium, leachable	7782-49-2	E445A	0.0005	mg/L	<0.00050	----
uranium, leachable	7440-61-1	E445A	0.00001	mg/L	<0.000010	----
vanadium, leachable	7440-62-2	E445A	0.001	mg/L	<0.0010	----
zinc, leachable	7440-66-6	E445A	0.01	mg/L	<0.010	----
BC LSP Metals (target pH= 9) (QCLot: 539603)						
aluminum, leachable	7429-90-5	E445C	0.005	mg/L	<0.0050	----
antimony, leachable	7440-36-0	E445C	0.0001	mg/L	<0.00010	----
arsenic, leachable	7440-38-2	E445C	0.001	mg/L	<0.0010	----
barium, leachable	7440-39-3	E445C	0.001	mg/L	<0.0010	----
beryllium, leachable	7440-41-7	E445C	0.0005	mg/L	<0.00050	----
cadmium, leachable	7440-43-9	E445C	0.00005	mg/L	<0.000050	----
chromium, leachable	7440-47-3	E445C	0.0005	mg/L	<0.00050	----
cobalt, leachable	7440-48-4	E445C	0.0001	mg/L	<0.00010	----
copper, leachable	7440-50-8	E445C	0.001	mg/L	<0.0010	----
lead, leachable	7439-92-1	E445C	0.0001	mg/L	<0.00010	----
manganese, leachable	7439-96-5	E445C	0.0005	mg/L	<0.00050	----
molybdenum, leachable	7439-98-7	E445C	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
BC LSP Metals (target pH= 9) (QCLot: 539603) - continued						
nickel, leachable	7440-02-0	E445C	0.0005	mg/L	<0.00050	----
selenium, leachable	7782-49-2	E445C	0.0005	mg/L	<0.00050	----
uranium, leachable	7440-61-1	E445C	0.00001	mg/L	<0.000010	----
vanadium, leachable	7440-62-2	E445C	0.001	mg/L	<0.0010	----
zinc, leachable	7440-66-6	E445C	0.01	mg/L	<0.010	----
BC LSP VOCs (target pH = Natural) (QCLot: 519116)						
benzene, leachable	71-43-2	E618	1	μg/L	<1.0	----
ethylbenzene, leachable	100-41-4	E618	1	μg/L	<1.0	----
naphthalene, leachable	91-20-3	E618	1	μg/L	<1.0	----
tetrachloroethylene, leachable	127-18-4	E618	1	μg/L	<1.0	----
toluene, leachable	108-88-3	E618	1	μg/L	<1.0	----
trichloroethylene, leachable	79-01-6	E618	1	μg/L	<1.0	----
xylene, m+p-, leachable	179601-23-1	E618	1	μg/L	<1.0	----
xylene, o-, leachable	95-47-6	E618	1	μg/L	<1.0	----
Aggregate Organics (QCLot: 520620)						
waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	----
Volatile Organic Compounds (QCLot: 511610)						
benzene	71-43-2	E611A	0.005	mg/kg	<0.0050	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	<0.040	----
styrene	100-42-5	E611A	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611A	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611A	0.03	mg/kg	<0.030	----
xylene, o-	95-47-6	E611A	0.03	mg/kg	<0.030	----
Hydrocarbons (QCLot: 511602)						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
Hydrocarbons (QCLot: 511611)						
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	<10	----
Polycyclic Aromatic Hydrocarbons (QCLot: 511603)						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 511603) - continued						
benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
quinoline	91-22-5	E641A-L	0.01	mg/kg	<0.010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 511604)									
moisture	----	E144	0.25	%	50 %	93.3	90.0	110	----
Physical Tests (QCLot: 518959)									
pH (1:2 soil:water)	----	E108	----	pH units	7 pH units	100	97.0	103	----
Metals (QCLot: 518337)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	80.0	80.0	120	----
Metals (QCLot: 518338)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	95.5	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	93.7	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	87.3	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	91.3	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	92.1	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	91.2	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	89.0	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	92.3	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	90.7	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	93.1	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	91.1	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	90.6	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	92.4	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	90.4	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	82.8	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	94.0	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	95.0	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	96.8	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	91.8	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	94.2	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	92.6	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	94.2	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	88.8	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	94.2	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	91.7	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	93.6	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	90.6	80.0	120	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 518338) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	92.5	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	94.4	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	93.5	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	90.4	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	94.5	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	87.4	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	91.0	80.0	120	----
BC LSP Metals (target pH= 5) (QCLot: 538777)									
aluminum, leachable	7429-90-5	E445A	0.005	mg/L	0.2 mg/L	101	80.0	120	----
antimony, leachable	7440-36-0	E445A	0.0001	mg/L	0.02 mg/L	104	80.0	120	----
arsenic, leachable	7440-38-2	E445A	0.001	mg/L	0.02 mg/L	98.9	80.0	120	----
barium, leachable	7440-39-3	E445A	0.001	mg/L	0.02 mg/L	98.4	80.0	120	----
beryllium, leachable	7440-41-7	E445A	0.0005	mg/L	0.04 mg/L	104	80.0	120	----
cadmium, leachable	7440-43-9	E445A	0.00005	mg/L	0.004 mg/L	103	80.0	120	----
chromium, leachable	7440-47-3	E445A	0.0005	mg/L	0.04 mg/L	99.5	80.0	120	----
cobalt, leachable	7440-48-4	E445A	0.0001	mg/L	0.02 mg/L	101	80.0	120	----
copper, leachable	7440-50-8	E445A	0.001	mg/L	0.02 mg/L	102	80.0	120	----
lead, leachable	7439-92-1	E445A	0.0001	mg/L	0.02 mg/L	99.0	80.0	120	----
manganese, leachable	7439-96-5	E445A	0.0005	mg/L	0.02 mg/L	99.7	80.0	120	----
molybdenum, leachable	7439-98-7	E445A	0.0001	mg/L	0.02 mg/L	106	80.0	120	----
nickel, leachable	7440-02-0	E445A	0.0005	mg/L	0.04 mg/L	101	80.0	120	----
selenium, leachable	7782-49-2	E445A	0.0005	mg/L	0.04 mg/L	95.1	80.0	120	----
uranium, leachable	7440-61-1	E445A	0.00001	mg/L	0.004 mg/L	103	80.0	120	----
vanadium, leachable	7440-62-2	E445A	0.001	mg/L	0.1 mg/L	102	80.0	120	----
zinc, leachable	7440-66-6	E445A	0.01	mg/L	0.4 mg/L	102	80.0	120	----
BC LSP VOCs (target pH = Natural) (QCLot: 519116)									
benzene, leachable	71-43-2	E618	1	µg/L	250 µg/L	94.0	60.0	140	----
ethylbenzene, leachable	100-41-4	E618	1	µg/L	250 µg/L	91.5	60.0	140	----
naphthalene, leachable	91-20-3	E618	1	µg/L	250 µg/L	94.4	60.0	140	----
tetrachloroethylene, leachable	127-18-4	E618	1	µg/L	250 µg/L	97.2	60.0	140	----
toluene, leachable	108-88-3	E618	1	µg/L	250 µg/L	93.6	60.0	140	----
trichloroethylene, leachable	79-01-6	E618	1	µg/L	250 µg/L	101	60.0	140	----
xylene, m+p-, leachable	179601-23-1	E618	1	µg/L	500 µg/L	92.8	60.0	140	----
xylene, o-, leachable	95-47-6	E618	1	µg/L	250 µg/L	93.8	60.0	140	----
Aggregate Organics (QCLot: 520620)									

Laboratory Control Sample (LCS) Report

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Aggregate Organics (QCLot: 520620) - continued									
waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	4250 mg/kg wwt	84.1	70.0	130	----
Volatile Organic Compounds (QCLot: 511610)									
benzene	71-43-2	E611A	0.005	mg/kg	2.5 mg/kg	99.5	70.0	130	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	2.5 mg/kg	93.6	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	2.5 mg/kg	100	70.0	130	----
styrene	100-42-5	E611A	0.05	mg/kg	2.5 mg/kg	89.8	70.0	130	----
toluene	108-88-3	E611A	0.05	mg/kg	2.5 mg/kg	94.8	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.03	mg/kg	5 mg/kg	88.0	70.0	130	----
xylene, o-	95-47-6	E611A	0.03	mg/kg	2.5 mg/kg	91.8	70.0	130	----
Hydrocarbons (QCLot: 511602)									
EPH (C10-C19)	----	E601A	200	mg/kg	1002.5 mg/kg	104	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	515.625 mg/kg	104	70.0	130	----
Hydrocarbons (QCLot: 511611)									
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	3.438 mg/kg	119	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 511603)									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	103	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	95.8	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	93.3	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	102	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	98.1	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	95.2	60.0	130	----
benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	0.5 mg/kg	107	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	97.5	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	105	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	96.6	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	88.3	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	99.4	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	97.6	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	96.8	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	98.9	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	109	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	107	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
quinoline	91-22-5	E641A-L	0.01	mg/kg	0.5 mg/kg	93.2	60.0	130	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
BC LSP VOCs (target pH = Natural) (QCLot: 519116)										
CG2206888-001	LC_RLPA_SO_2022-06-02_NP1	benzene, leachable	71-43-2	E618	249 µg/L	250 µg/L	99.6	50.0	140	----
		ethylbenzene, leachable	100-41-4	E618	232 µg/L	250 µg/L	92.8	50.0	140	----
		naphthalene, leachable	91-20-3	E618	287 µg/L	250 µg/L	115	50.0	140	----
		tetrachloroethylene, leachable	127-18-4	E618	247 µg/L	250 µg/L	98.9	50.0	140	----
		toluene, leachable	108-88-3	E618	238 µg/L	250 µg/L	95.1	50.0	140	----
		trichloroethylene, leachable	79-01-6	E618	268 µg/L	250 µg/L	107	50.0	140	----
		xylene, m+p-, leachable	179601-23-1	E618	474 µg/L	500 µg/L	94.7	50.0	140	----
		xylene, o-, leachable	95-47-6	E618	240 µg/L	250 µg/L	96.1	50.0	140	----
Volatile Organic Compounds (QCLot: 511610)										
CG2206844-001	Anonymous	benzene	71-43-2	E611A	4.45 mg/kg	3.4375 mg/kg	122	60.0	140	----
		ethylbenzene	100-41-4	E611A	4.11 mg/kg	3.4375 mg/kg	112	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	4.20 mg/kg	3.4375 mg/kg	115	60.0	140	----
		styrene	100-42-5	E611A	4.14 mg/kg	3.4375 mg/kg	113	60.0	140	----
		toluene	108-88-3	E611A	3.44 mg/kg	3.4375 mg/kg	94.0	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	9.43 mg/kg	6.875 mg/kg	129	60.0	140	----
		xylene, o-	95-47-6	E611A	4.19 mg/kg	3.4375 mg/kg	114	60.0	140	----
Hydrocarbons (QCLot: 511602)										
CG2206844-001	Anonymous	EPH (C10-C19)	----	E601A	720 mg/kg	1002.5 mg/kg	94.9	60.0	140	----
		EPH (C19-C32)	----	E601A	ND mg/kg	515.625 mg/kg	ND	60.0	140	----
Polycyclic Aromatic Hydrocarbons (QCLot: 511603)										
CG2206844-001	Anonymous	acenaphthene	83-32-9	E641A-L	0.392 mg/kg	0.5 mg/kg	104	50.0	140	----
		acenaphthylene	208-96-8	E641A-L	0.368 mg/kg	0.5 mg/kg	97.8	50.0	140	----
		acridine	260-94-6	E641A-L	0.310 mg/kg	0.5 mg/kg	82.4	50.0	140	----
		anthracene	120-12-7	E641A-L	0.379 mg/kg	0.5 mg/kg	101	50.0	140	----
		benz(a)anthracene	56-55-3	E641A-L	0.377 mg/kg	0.5 mg/kg	100	50.0	140	----
		benzo(a)pyrene	50-32-8	E641A-L	0.363 mg/kg	0.5 mg/kg	96.4	50.0	140	----
		benzo(b+j)fluoranthene	n/a	E641A-L	0.392 mg/kg	0.5 mg/kg	104	50.0	140	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.328 mg/kg	0.5 mg/kg	87.3	50.0	140	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.401 mg/kg	0.5 mg/kg	107	50.0	140	----
		chrysene	218-01-9	E641A-L	0.354 mg/kg	0.5 mg/kg	94.3	50.0	140	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.322 mg/kg	0.5 mg/kg	85.7	50.0	140	----
		fluoranthene	206-44-0	E641A-L	0.380 mg/kg	0.5 mg/kg	101	50.0	140	----

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 511603) - continued										
CG2206844-001	Anonymous	fluorene	86-73-7	E641A-L	0.383 mg/kg	0.5 mg/kg	102	50.0	140	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.324 mg/kg	0.5 mg/kg	86.1	50.0	140	----
		methylnaphthalene, 1-	90-12-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		methylnaphthalene, 2-	91-57-6	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		naphthalene	91-20-3	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		phenanthrene	85-01-8	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		pyrene	129-00-0	E641A-L	0.377 mg/kg	0.5 mg/kg	100	50.0	140	----
		quinoline	91-22-5	E641A-L	0.361 mg/kg	0.5 mg/kg	96.0	50.0	140	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Physical Tests (QCLot: 518959)									
	RM	pH (1:2 soil:water)	----	E108	8.06 pH units	100	96.0	104	----
Metals (QCLot: 518337)									
	RM	mercury	7439-97-6	E510	0.062 mg/kg	78.9	70.0	130	----
Metals (QCLot: 518338)									
	RM	aluminum	7429-90-5	E440	9817 mg/kg	103	70.0	130	----
	RM	antimony	7440-36-0	E440	3.99 mg/kg	105	70.0	130	----
	RM	arsenic	7440-38-2	E440	3.73 mg/kg	103	70.0	130	----
	RM	barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
	RM	beryllium	7440-41-7	E440	0.349 mg/kg	107	70.0	130	----
	RM	boron	7440-42-8	E440	8.5 mg/kg	114	40.0	160	----
	RM	cadmium	7440-43-9	E440	0.91 mg/kg	102	70.0	130	----
	RM	calcium	7440-70-2	E440	31082 mg/kg	106	70.0	130	----
	RM	chromium	7440-47-3	E440	101 mg/kg	102	70.0	130	----
	RM	cobalt	7440-48-4	E440	6.9 mg/kg	103	70.0	130	----
	RM	copper	7440-50-8	E440	123 mg/kg	104	70.0	130	----
	RM	iron	7439-89-6	E440	23558 mg/kg	105	70.0	130	----
	RM	lead	7439-92-1	E440	267 mg/kg	105	70.0	130	----
	RM	lithium	7439-93-2	E440	9.5 mg/kg	95.6	70.0	130	----
	RM	magnesium	7439-95-4	E440	5509 mg/kg	104	70.0	130	----
	RM	manganese	7439-96-5	E440	269 mg/kg	105	70.0	130	----
	RM	molybdenum	7439-98-7	E440	1.03 mg/kg	101	70.0	130	----
	RM	nickel	7440-02-0	E440	26.7 mg/kg	107	70.0	130	----
	RM	phosphorus	7723-14-0	E440	752 mg/kg	101	70.0	130	----
	RM	potassium	7440-09-7	E440	1587 mg/kg	99.2	70.0	130	----
	RM	silver	7440-22-4	E440	4.06 mg/kg	112	70.0	130	----
	RM	sodium	7440-23-5	E440	797 mg/kg	98.2	70.0	130	----
	RM	strontium	7440-24-6	E440	86.1 mg/kg	106	70.0	130	----
	RM	thallium	7440-28-0	E440	0.0786 mg/kg	117	40.0	160	----
	RM	tin	7440-31-5	E440	10.6 mg/kg	103	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 518338) - continued									
	RM	titanium	7440-32-6	E440	839 mg/kg	102	70.0	130	----
	RM	uranium	7440-61-1	E440	0.52 mg/kg	106	70.0	130	----
	RM	vanadium	7440-62-2	E440	32.7 mg/kg	102	70.0	130	----
	RM	zinc	7440-66-6	E440	297 mg/kg	96.8	70.0	130	----
	RM	zirconium	7440-67-7	E440	5.73 mg/kg	101	70.0	130	----

Teck

COC ID:	RLPA_SO_20220602	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO			
Facility Name / Job#	Line Creek Operation	Lab Name	ALS Calgary	Report Format / Distribution		Excel	PDF
Project Manager	Tom Jeffery	Lab Contact	Lyudmyla Shvets	Email 1:	tom.jeffery@teck.com	x	x
Email	tom.jeffery@teck.com	Email	Lyudmyla.Shvets@ALSGlobal.com	Email 2:	teckcoal@equisonline.com		
Address	Box 2003	Address	2559 29 Street NE	Email 3:	drake.tymstra@teck.com	x	x
	15km North Hwy 43			Email 4:	shanise.fossen@teck.com	x	x
City	Sparwood; Province BC	City	Calgary; Province AB	Email 4:	tanya.dick@teck.com	x	x
Postal Code	V0B 2G0; Country Canada	Postal Code	T1Y 7B5; Country Canada	PO number	VPO00809190		
Phone Number	250-425-3196	Phone Number	403 407 1794				

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	LSP BTEX	Metals	LEPH_HEPH	Total Oil	BTEX & VPH (Methanol)	LSP Metals
LC_RLPA_SO_2022-06-02_NP1	LC_RLPA	SO	No	6/2/2022	10:15	G	2	1	2	1	1	2	1
LC_RLPA_SO_2022-06-02_NP2	LC_RLPA	SO	No	6/2/2022	10:20	G	2	1	2	1	1	2	1
LC_RLPA_SO_2022-06-02_NP3	LC_RLPA	SO	No	6/2/2022	10:25	G	2		2	1	1	2	
LC_RLPA_SO_2022-06-02_NP4	LC_RLPA	SO	No	6/2/2022	10:30	G	2		2	1	1	2	
LC_RLPA_SO_2022-06-02_NP5	LC_RLPA	SO	No	6/2/2022	10:35	G	2		2	1	1	2	
LC_RLPA_SO_2022-06-02_NP6	LC_RLPA	SO	No	6/2/2022	10:40	G	2		2	1	1	2	

ADDITIONAL COMMENTS/SPECIAL	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Updated distribution info	D. Tymstra	2-Jun		6/3 900

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	D. Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	June 2, 2022
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Environmental Division
Calgary
Work Order Reference
CG2206888

Environmental Division
Calgary
CG2206888

Telephone : +1 403 407 1800

CERTIFICATE OF ANALYSIS

Work Order	: **CG2212398**	Page	: 1 of 12
Amendment	: **1**		
Client	: **Teck Coal Limited**	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 13-Sep-2022 09:11
PO	: VPO00809190	Date Analysis Commenced	: 14-Sep-2022
C-O-C number	: SBP & NNCP Sept 12	Issue Date	: 21-Sep-2022 17:07
Sampler	: T.Dick		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Amber Sheikh	Laboratory Assistant	Organics, Calgary, Alberta
Anthony Calero	Supervisor - Inorganic	Metals, Calgary, Alberta
Aulora Alexander	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Metals, Calgary, Alberta
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Joshua Stessun	Laboratory Analyst	Organics, Calgary, Alberta
Kevin Baxter		Metals, Calgary, Alberta
Sorina Motea	Laboratory Analyst	Organics, Calgary, Alberta
Vishnu Patel		Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µg/L	micrograms per litre
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
SMI	*Surrogate recovery could not be measured due to sample matrix interference.*

Analytical Results

Sub-Matrix: **Soil/Solid**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	LC_NNCP_SO_ 2022-09-12_NP 1	LC_NNCP_SO_ 2022-09-12_NP 2	LC_SBP1_SO_ 2022-09-12_NP	LC_SBP2_SO_ 2022-09-12_NP	LC_SBP3_SO_ 2022-09-12_NP 1
				Client sampling date / time	12-Sep-2022 13:00	12-Sep-2022 13:10	12-Sep-2022 12:40	12-Sep-2022 12:30	12-Sep-2022 12:15
					CG2212398-001	CG2212398-002	CG2212398-003	CG2212398-004	CG2212398-005
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	13.4	24.7	25.4	23.1	14.2
pH (1:2 soil:water)	----	E108	0.10	pH units	8.44	7.87	8.04	8.30	8.61
Metals									
aluminum	7429-90-5	E440	50	mg/kg	3340	3690	6900	7970	3830
antimony	7440-36-0	E440	0.10	mg/kg	1.07	1.15	1.90	1.80	1.19
arsenic	7440-38-2	E440	0.10	mg/kg	3.47	4.05	5.40	5.21	5.35
barium	7440-39-3	E440	0.50	mg/kg	380	414	712	790	329
beryllium	7440-41-7	E440	0.10	mg/kg	0.60	0.59	0.89	0.94	0.64
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20
boron	7440-42-8	E440	5.0	mg/kg	6.0	6.7	9.1	8.9	5.6
cadmium	7440-43-9	E440	0.020	mg/kg	1.36	1.63	2.07	1.90	2.03
calcium	7440-70-2	E440	50	mg/kg	12000	12400	16500	15600	78900
chromium	7440-47-3	E440	0.50	mg/kg	6.57	7.72	13.9	15.7	12.7
cobalt	7440-48-4	E440	0.10	mg/kg	3.88	4.89	9.80	10.0	4.72
copper	7440-50-8	E440	0.50	mg/kg	21.9	22.1	35.7	38.3	27.4
iron	7439-89-6	E440	50	mg/kg	7960	6860	8870	9540	19900
lead	7439-92-1	E440	0.50	mg/kg	9.30	8.50	15.6	15.4	8.78
lithium	7439-93-2	E440	2.0	mg/kg	2.2	3.0	4.8	5.6	2.9
magnesium	7439-95-4	E440	20	mg/kg	3440	4580	3970	3890	12900
manganese	7439-96-5	E440	1.0	mg/kg	148	143	187	188	328
mercury	7439-97-6	E510	0.0500	mg/kg	0.0682	0.0801	0.101	0.0868	0.0625
molybdenum	7439-98-7	E440	0.10	mg/kg	3.15	3.80	36.3	32.1	6.83
nickel	7440-02-0	E440	0.50	mg/kg	15.3	20.1	43.9	45.2	21.2
phosphorus	7723-14-0	E440	50	mg/kg	1060	1060	1410	1380	1520
potassium	7440-09-7	E440	100	mg/kg	1020	1170	1920	2260	1370
selenium	7782-49-2	E440	0.20	mg/kg	2.23	1.95	3.60	3.01	2.14
silver	7440-22-4	E440	0.10	mg/kg	0.24	0.26	0.50	0.49	0.30
sodium	7440-23-5	E440	50	mg/kg	62	172	104	87	106
strontium	7440-24-6	E440	0.50	mg/kg	109	103	134	128	133

Analytical Results

Sub-Matrix: Soil/Solid
(Matrix: Soil/Solid)

Analyte	CAS Number	Method	LOR	Unit	LC_NNCP_SO_2022-09-12_NP1	LC_NNCP_SO_2022-09-12_NP2	LC_SBP1_SO_2022-09-12_NP	LC_SBP2_SO_2022-09-12_NP	LC_SBP3_SO_2022-09-12_NP1
Client sampling date / time					12-Sep-2022 13:00	12-Sep-2022 13:10	12-Sep-2022 12:40	12-Sep-2022 12:30	12-Sep-2022 12:15
					CG2212398-001	CG2212398-002	CG2212398-003	CG2212398-004	CG2212398-005
					Result	Result	Result	Result	Result
Metals									
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	<1000	<1000
thallium	7440-28-0	E440	0.050	mg/kg	0.081	0.077	0.067	0.075	0.242
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	mg/kg	11.5	10.4	11.1	12.2	8.4
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	mg/kg	1.00	1.10	1.40	1.38	1.62
vanadium	7440-62-2	E440	0.20	mg/kg	24.1	27.6	51.7	51.1	30.2
zinc	7440-66-6	E440	2.0	mg/kg	92.8	108	170	169	120
zirconium	7440-67-7	E440	1.0	mg/kg	2.8	3.1	3.7	3.7	2.7
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	8.86	8.98	8.91	9.09	9.71
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	1.68	1.64	1.66	1.66	1.61
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	4.89	4.89	4.89	4.89	4.89
pH, TCLP final	----	EPP444	0.010	pH units	5.30	5.39	5.62	5.59	6.24
antimony, TCLP	7440-36-0	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	2.7	3.1	<2.5
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
boron, TCLP	7440-42-8	E444	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
calcium, TCLP	7440-70-2	E444	10	mg/L	202	220	341	329	672
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
copper, TCLP	7440-50-8	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
iron, TCLP	7439-89-6	E444	5.0	mg/L	10.0	11.7	<5.0	<5.0	<5.0
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	45.3	70.3	67.5	66.9	15.8
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
selenium, TCLP	7782-49-2	E444	100	µg/L	<100	<100	<100	<100	<100

Analytical Results

Sub-Matrix: Soil/Solid
(Matrix: Soil/Solid)

Analyte	CAS Number	Method	LOR	Unit	LC_NNCP_SO_2022-09-12_NP1	LC_NNCP_SO_2022-09-12_NP2	LC_SBP1_SO_2022-09-12_NP	LC_SBP2_SO_2022-09-12_NP	LC_SBP3_SO_2022-09-12_NP1
Client sampling date / time					12-Sep-2022 13:00	12-Sep-2022 13:10	12-Sep-2022 12:40	12-Sep-2022 12:30	12-Sep-2022 12:15
					CG2212398-001	CG2212398-002	CG2212398-003	CG2212398-004	CG2212398-005
					Result	Result	Result	Result	Result
TCLP Metals									
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	<0.50	<0.50	0.79	0.79	<0.50
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10
Aggregate Organics									
waste oil content (BC HWR 41.1)	----	EC569SG	0.10	%	<0.10	<0.10	0.34	0.46	<0.10
waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	<1000	2500	3500	<1000
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611A	0.0050	mg/kg	1.54	2.34	0.194	0.442	0.403
ethylbenzene	100-41-4	E611A	0.015	mg/kg	1.47	1.21	0.757	1.14	0.366
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	<0.200	<0.200	<0.200	<0.200
styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611A	0.050	mg/kg	10.2	14.4	2.38	4.48	3.23
xylene, m+p-	179601-23-1	E611A	0.030	mg/kg	17.6	14.8	9.08	13.0	4.26
xylene, o-	95-47-6	E611A	0.030	mg/kg	3.82	3.04	2.98	4.09	0.922
xylenes, total	1330-20-7	E611A	0.050	mg/kg	21.4	17.8	12.1	17.1	5.18
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.10	%	78.9	76.7	70.8	73.2	90.8
difluorobenzene, 1,4-	540-36-3	E611A	0.10	%	73.6	92.9	90.2	104	108
Hydrocarbons									
EPH (C10-C19)	----	E601A	200	mg/kg	570	1260	670	1520	<200
EPH (C19-C32)	----	E601A	200	mg/kg	430	740	1330	2760	340
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	76	55	53	64	22
HEPHs	----	EC600A	200	mg/kg	430	740	1330	2760	340
LEPHs	----	EC600A	200	mg/kg	560	1240	660	1500	<200
VPHs	----	EC580A	10	mg/kg	41	<22	38	41	13
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	130	121	104	112	98.8

Analytical Results

Sub-Matrix: **Soil/Solid**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	LC_NNCP_SO_2022-09-12_NP1	LC_NNCP_SO_2022-09-12_NP2	LC_SBP1_SO_2022-09-12_NP	LC_SBP2_SO_2022-09-12_NP	LC_SBP3_SO_2022-09-12_NP1
				Client sampling date / time	12-Sep-2022 13:00	12-Sep-2022 13:10	12-Sep-2022 12:40	12-Sep-2022 12:30	12-Sep-2022 12:15
					CG2212398-001	CG2212398-002	CG2212398-003	CG2212398-004	CG2212398-005
					Result	Result	Result	Result	Result
Hydrocarbons Surrogates									
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	72.7	74.6	72.8	73.1	93.8
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	0.572	0.609	0.338	0.770	0.0440
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	0.140	0.156	0.0964	0.221	0.0104
acridine	260-94-6	E641A-L	0.010	mg/kg	0.979	1.27	0.081	0.199	0.070
anthracene	120-12-7	E641A-L	0.0040	mg/kg	0.0200	0.0389	0.0066	<0.0040	<0.0040
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	0.366	0.413	0.240	0.423	0.024
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	0.219	0.250	0.145	0.208	0.021
benzo(b+j)fluoranthene	n/a	E641A-L	0.010	mg/kg	0.521	0.614	0.455	0.747	0.058
benzo(b+j+k)fluoranthene	n/a	E641A-L	0.015	mg/kg	0.623	0.698	0.550	0.888	0.058
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	0.237	0.273	0.172	0.272	0.024
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	0.102	0.084	0.095	0.141	<0.010
chrysene	218-01-9	E641A-L	0.010	mg/kg	1.27	1.53	1.11	2.15	0.121
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	0.0968	0.115	0.0792	0.134	0.0084
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	0.260	0.295	0.209	0.387	0.020
fluorene	86-73-7	E641A-L	0.010	mg/kg	1.52	1.86	0.885	2.10	0.094
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	0.072	0.079	0.058	0.093	<0.010
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	12.6	14.0	6.10	14.0	0.837
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	20.9	23.0	8.83	20.4	1.38
naphthalene	91-20-3	E641A-L	0.010	mg/kg	8.67	9.00	2.71	6.12	0.534
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	5.90	6.79	4.28	9.23	0.498
pyrene	129-00-0	E641A-L	0.010	mg/kg	0.474	0.564	0.405	0.830	0.043
quinoline	91-22-5	E641A-L	0.010	mg/kg	0.034	0.075	0.034	0.081	<0.010
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	0.437	0.502	0.322	0.507	0.040
IACR (CCME)	----	E641A-L	0.150	-	6.68	7.59	5.48	9.07	0.623
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.1	%	92.8	85.8	84.6	83.2	100
chrysene-d12	1719-03-5	E641A-L	0.1	%	105	121	112	102	127
naphthalene-d8	1146-65-2	E641A-L	0.1	%	96.4	115	110	110	115
phenanthrene-d10	1517-22-2	E641A-L	0.1	%	104	119	107	111	115

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: Soil/Solid
(Matrix: Soil/Solid)

Analyte	CAS Number	Method	LOR	Unit	LC_SBP3_SO_ 2022-09-12_NP 2	LC_SBP4_SO_ 2022-09-12_NP 1	LC_SBP4_SO_ 2022-09-12_NP 2	----	----
				Client sampling date / time	12-Sep-2022 12:05	12-Sep-2022 11:45	12-Sep-2022 11:55	----	----
					CG2212398-006	CG2212398-007	CG2212398-008	--------	--------
					Result	Result	Result	----	----
Physical Tests									
moisture	----	E144	0.25	%	32.4	25.8	24.8	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units	7.96	7.88	8.04	----	----
Metals									
aluminum	7429-90-5	E440	50	mg/kg	3220	6740	7080	----	----
antimony	7440-36-0	E440	0.10	mg/kg	0.11	1.54	1.84	----	----
arsenic	7440-38-2	E440	0.10	mg/kg	2.07	6.19	7.63	----	----
barium	7440-39-3	E440	0.50	mg/kg	219	650	714	----	----
beryllium	7440-41-7	E440	0.10	mg/kg	0.48	0.84	0.89	----	----
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	----	----
boron	7440-42-8	E440	5.0	mg/kg	<5.0	6.6	7.6	----	----
cadmium	7440-43-9	E440	0.020	mg/kg	1.17	2.56	3.08	----	----
calcium	7440-70-2	E440	50	mg/kg	7960	21600	29500	----	----
chromium	7440-47-3	E440	0.50	mg/kg	5.79	15.7	17.9	----	----
cobalt	7440-48-4	E440	0.10	mg/kg	4.42	8.76	9.20	----	----
copper	7440-50-8	E440	0.50	mg/kg	16.8	32.5	35.3	----	----
iron	7439-89-6	E440	50	mg/kg	3140	12200	16400	----	----
lead	7439-92-1	E440	0.50	mg/kg	7.11	13.6	14.7	----	----
lithium	7439-93-2	E440	2.0	mg/kg	<2.0	3.5	3.5	----	----
magnesium	7439-95-4	E440	20	mg/kg	1690	6490	9030	----	----
manganese	7439-96-5	E440	1.0	mg/kg	66.0	222	278	----	----
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0963	0.104	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg	33.7	13.7	11.9	----	----
nickel	7440-02-0	E440	0.50	mg/kg	24.2	40.4	42.6	----	----
phosphorus	7723-14-0	E440	50	mg/kg	607	1370	1610	----	----
potassium	7440-09-7	E440	100	mg/kg	800	2040	2210	----	----
selenium	7782-49-2	E440	0.20	mg/kg	3.23	2.99	3.30	----	----
silver	7440-22-4	E440	0.10	mg/kg	0.15	0.45	0.47	----	----
sodium	7440-23-5	E440	50	mg/kg	<50	109	130	----	----
strontium	7440-24-6	E440	0.50	mg/kg	70.9	126	136	----	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	----	----

Analytical Results

Sub-Matrix: **Soil/Solid**
(Matrix: **Soil/Solid**)

				Client sample ID	LC_SBP3_SO_ 2022-09-12_NP 2	LC_SBP4_SO_ 2022-09-12_NP 1	LC_SBP4_SO_ 2022-09-12_NP 2	----	----
				Client sampling date / time	12-Sep-2022 12:05	12-Sep-2022 11:45	12-Sep-2022 11:55	----	----
Analyte	CAS Number	Method	LOR	Unit	CG2212398-006	CG2212398-007	CG2212398-008	--------	--------
					Result	Result	Result	----	----
Metals									
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.102	0.151	----	----
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	----	----
titanium	7440-32-6	E440	1.0	mg/kg	1.8	11.5	14.2	----	----
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	----	----
uranium	7440-61-1	E440	0.050	mg/kg	0.467	1.47	1.71	----	----
vanadium	7440-62-2	E440	0.20	mg/kg	14.5	47.6	52.3	----	----
zinc	7440-66-6	E440	2.0	mg/kg	115	180	220	----	----
zirconium	7440-67-7	E440	1.0	mg/kg	1.5	4.8	4.8	----	----
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	9.14	9.29	9.00	----	----
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	1.62	1.69	1.78	----	----
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	4.89	4.89	4.89	----	----
pH, TCLP final	----	EPP444	0.010	pH units	5.46	5.57	5.61	----	----
antimony, TCLP	7440-36-0	E444	0.10	mg/L	<0.10	<0.10	<0.10	----	----
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	----	----
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	----	----
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	----	----
boron, TCLP	7440-42-8	E444	0.50	mg/L	<0.50	<0.50	<0.50	----	----
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	<0.050	<0.050	<0.050	----	----
calcium, TCLP	7440-70-2	E444	10	mg/L	256	352	366	----	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	----	----
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.050	<0.050	<0.050	----	----
copper, TCLP	7440-50-8	E444	0.050	mg/L	<0.050	<0.050	<0.050	----	----
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	<5.0	----	----
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	----	----
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	53.2	50.0	42.5	----	----
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	<0.25	<0.25	----	----
selenium, TCLP	7782-49-2	E444	100	µg/L	<100	<100	<100	----	----
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	----	----

Analytical Results

Sub-Matrix: Soil/Solid
(Matrix: Soil/Solid)

Analyte	CAS Number	Method	LOR	Unit	LC_SBP3_SO_2022-09-12_NP2	LC_SBP4_SO_2022-09-12_NP1	LC_SBP4_SO_2022-09-12_NP2	----	----
				Client sampling date / time	12-Sep-2022 12:05	12-Sep-2022 11:45	12-Sep-2022 11:55	----	----
					CG2212398-006	CG2212398-007	CG2212398-008	--------	--------
					Result	Result	Result	----	----
TCLP Metals									
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	----	----
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	----	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	----	----
zinc, TCLP	7440-66-6	E444	0.50	mg/L	0.94	<0.50	<0.50	----	----
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	----	----
Aggregate Organics									
waste oil content (BC HWR 41.1)	----	EC569SG	0.10	%	2.62	0.16	<0.10	----	----
waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	17700	1200	<1000	----	----
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611A	0.0050	mg/kg	0.480	0.850	0.521	----	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	0.877	1.83	1.77	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	<0.200	<0.200	----	----
styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
toluene	108-88-3	E611A	0.050	mg/kg	4.23	5.93	6.24	----	----
xylene, m+p-	179601-23-1	E611A	0.030	mg/kg	9.75	12.2	11.2	----	----
xylene, o-	95-47-6	E611A	0.030	mg/kg	2.98	4.53	3.22	----	----
xylenes, total	1330-20-7	E611A	0.050	mg/kg	12.7	16.7	14.4	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.10	%	77.1	70.2	77.2	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.10	%	106	101	96.8	----	----
Hydrocarbons									
EPH (C10-C19)	----	E601A	200	mg/kg	5000	410	400	----	----
EPH (C19-C32)	----	E601A	200	mg/kg	26400	460	510	----	----
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	53	39	61	----	----
HEPHs	----	EC600A	200	mg/kg	26400	460	510	----	----
LEPHs	----	EC600A	200	mg/kg	4980	400	390	----	----
VPHs	----	EC580A	10	mg/kg	35	<15	38	----	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	117	96.4	100	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	76.7	76.3	74.5	----	----

Analytical Results

Sub-Matrix: Soil/Solid

(Matrix: Soil/Solid)

Analyte	CAS Number	Method	LOR	Unit	LC_SBP3_SO_ 2022-09-12_NP 2	LC_SBP4_SO_ 2022-09-12_NP 1	LC_SBP4_SO_ 2022-09-12_NP 2	----	----
Client sampling date / time					12-Sep-2022 12:05	12-Sep-2022 11:45	12-Sep-2022 11:55	----	----
					CG2212398-006	CG2212398-007	CG2212398-008	--------	--------
					Result	Result	Result	----	----
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	1.06	0.223	0.278	----	----
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	0.209	0.0576	0.0782	----	----
acridine	260-94-6	E641A-L	0.010	mg/kg	1.74	0.420	0.478	----	----
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0400	0.0049	3.72	----	----
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	0.432	0.155	0.187	----	----
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	0.286	0.102	0.113	----	----
benzo(b+j)fluoranthene	n/a	E641A-L	0.010	mg/kg	0.839	0.279	0.304	----	----
benzo(b+j+k)fluoranthene	n/a	E641A-L	0.015	mg/kg	1.08	0.321	0.360	----	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	0.335	0.114	0.136	----	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	0.238	0.042	0.056	----	----
chrysene	218-01-9	E641A-L	0.010	mg/kg	2.04	0.700	0.806	----	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	0.136	0.0468	0.0571	----	----
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	0.371	0.130	0.161	----	----
fluorene	86-73-7	E641A-L	0.010	mg/kg	2.50	0.650	0.694	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	0.110	0.029	0.038	----	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	15.0	5.11	5.38	----	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	22.9	7.39	7.75	----	----
naphthalene	91-20-3	E641A-L	0.010	mg/kg	7.94	3.18	3.00	----	----
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	9.69	3.22	3.73	----	----
pyrene	129-00-0	E641A-L	0.010	mg/kg	1.01	0.250	0.279	----	----
quinoline	91-22-5	E641A-L	0.010	mg/kg	0.127	0.035	0.032	----	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	0.608	0.207	0.238	----	----
IACR (CCME)	----	E641A-L	0.150	-	10.5	3.32	3.79	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.1	%	96.8	100.0	99.0	----	----
chrysene-d12	1719-03-5	E641A-L	0.1	%	Not Determined SMI	118	118	----	----
naphthalene-d8	1146-65-2	E641A-L	0.1	%	Not Determined SMI	100	109	----	----
phenanthrene-d10	1517-22-2	E641A-L	0.1	%	130	109	111	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

ALS Environmental

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **CG2212398**	Page	: 1 of 18
Amendment	: 1		
Client	: **Teck Coal Limited**	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 13-Sep-2022 09:11
PO	: VPO00809190	Issue Date	: 21-Sep-2022 17:07
C-O-C number	: SBP & NNCP Sept 12		
Sampler	: T.Dick		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Matrix Spike outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries								
Metals	QC-MRG2-648338002	----	iron	7439-89-6	E440	123 % MES	80.0-120%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	*Description*
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP1	E569SG.A	12-Sep-2022	15-Sep-2022	28 days	3 days	✓	16-Sep-2022	40 days	1 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP2	E569SG.A	12-Sep-2022	15-Sep-2022	28 days	3 days	✓	16-Sep-2022	40 days	1 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_SBP1_SO_2022-09-12_NP	E569SG.A	12-Sep-2022	15-Sep-2022	28 days	3 days	✓	16-Sep-2022	40 days	1 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_SBP2_SO_2022-09-12_NP	E569SG.A	12-Sep-2022	15-Sep-2022	28 days	3 days	✓	16-Sep-2022	40 days	1 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP1	E569SG.A	12-Sep-2022	15-Sep-2022	28 days	3 days	✓	16-Sep-2022	40 days	1 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP2	E569SG.A	12-Sep-2022	15-Sep-2022	28 days	3 days	✓	16-Sep-2022	40 days	1 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP1	E569SG.A	12-Sep-2022	15-Sep-2022	28 days	3 days	✓	16-Sep-2022	40 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP2	E569SG.A	12-Sep-2022	15-Sep-2022	28 days	3 days	✓	16-Sep-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP1	E601A	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	15-Sep-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP2	E601A	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	15-Sep-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_SBP1_SO_2022-09-12_NP	E601A	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	15-Sep-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_SBP2_SO_2022-09-12_NP	E601A	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	15-Sep-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP1	E601A	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	15-Sep-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP2	E601A	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	15-Sep-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP1	E601A	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	15-Sep-2022	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP2	E601A	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	15-Sep-2022	40 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_NNCP_SO_2022-09-12_NP1	E581.VH+F1	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_NNCP_SO_2022-09-12_NP2	E581.VH+F1	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_SBP1_SO_2022-09-12_NP	E581.VH+F1	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_SBP2_SO_2022-09-12_NP	E581.VH+F1	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_SBP3_SO_2022-09-12_NP1	E581.VH+F1	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_SBP3_SO_2022-09-12_NP2	E581.VH+F1	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_SBP4_SO_2022-09-12_NP1	E581.VH+F1	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_SBP4_SO_2022-09-12_NP2	E581.VH+F1	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP1	E510	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	28 days	3 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP2	E510	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_SBP1_SO_2022-09-12_NP	E510	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_SBP2_SO_2022-09-12_NP	E510	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP1	E510	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP2	E510	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP1	E510	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP2	E510	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	28 days	3 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP1	E440	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	180 days	3 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP2	E440	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	180 days	3 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_SBP1_SO_2022-09-12_NP	E440	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	180 days	3 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_SBP2_SO_2022-09-12_NP	E440	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	180 days	3 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP1	E440	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	180 days	3 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP2	E440	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	180 days	3 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP1	E440	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	180 days	3 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP2	E440	12-Sep-2022	15-Sep-2022	----	----		15-Sep-2022	180 days	3 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP1	E144	12-Sep-2022	----	----	----		14-Sep-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP2	E144	12-Sep-2022	----	----	----		14-Sep-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_SBP1_SO_2022-09-12_NP	E144	12-Sep-2022	----	----	----		14-Sep-2022	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_SBP2_SO_2022-09-12_NP	E144	12-Sep-2022	----	----	----		14-Sep-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP1	E144	12-Sep-2022	----	----	----		14-Sep-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP2	E144	12-Sep-2022	----	----	----		14-Sep-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP1	E144	12-Sep-2022	----	----	----		14-Sep-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP2	E144	12-Sep-2022	----	----	----		14-Sep-2022	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP1	E108	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	30 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP2	E108	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	30 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_SBP1_SO_2022-09-12_NP	E108	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	30 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_SBP2_SO_2022-09-12_NP	E108	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	30 days	2 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP1	E108	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	30 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP2	E108	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	30 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP1	E108	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	30 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP2	E108	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	30 days	2 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP1	E641A-L	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	14-Sep-2022	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_NNCP_SO_2022-09-12_NP2	E641A-L	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	14-Sep-2022	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_SBP1_SO_2022-09-12_NP	E641A-L	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	14-Sep-2022	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_SBP2_SO_2022-09-12_NP	E641A-L	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	14-Sep-2022	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP1	E641A-L	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	14-Sep-2022	40 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_SBP3_SO_2022-09-12_NP2	E641A-L	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	14-Sep-2022	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP1	E641A-L	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	14-Sep-2022	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_SBP4_SO_2022-09-12_NP2	E641A-L	12-Sep-2022	14-Sep-2022	14 days	2 days	✓	14-Sep-2022	40 days	0 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) LC_NNCP_SO_2022-09-12_NP1	E512	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	28 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) LC_NNCP_SO_2022-09-12_NP2	E512	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	28 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) LC_SBP1_SO_2022-09-12_NP	E512	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	28 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) LC_SBP2_SO_2022-09-12_NP	E512	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	28 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) LC_SBP3_SO_2022-09-12_NP1	E512	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	28 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) LC_SBP3_SO_2022-09-12_NP2	E512	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	28 days	8 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) LC_SBP4_SO_2022-09-12_NP1	E512	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	28 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) LC_SBP4_SO_2022-09-12_NP2	E512	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	28 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) LC_NNCP_SO_2022-09-12_NP1	E444	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	180 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) LC_NNCP_SO_2022-09-12_NP2	E444	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	180 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) LC_SBP1_SO_2022-09-12_NP	E444	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	180 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) LC_SBP2_SO_2022-09-12_NP	E444	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	180 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) LC_SBP3_SO_2022-09-12_NP1	E444	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	180 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) LC_SBP3_SO_2022-09-12_NP2	E444	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	180 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) LC_SBP4_SO_2022-09-12_NP1	E444	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	180 days	8 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) LC_SBP4_SO_2022-09-12_NP2	E444	12-Sep-2022	20-Sep-2022	----	----		20-Sep-2022	180 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx) LC_NNCP_SO_2022-09-12_NP1	EPP444	12-Sep-2022	19-Sep-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx) LC_NNCP_SO_2022-09-12_NP2	EPP444	12-Sep-2022	19-Sep-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx) LC_SBP1_SO_2022-09-12_NP	EPP444	12-Sep-2022	19-Sep-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx) LC_SBP2_SO_2022-09-12_NP	EPP444	12-Sep-2022	19-Sep-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx) LC_SBP3_SO_2022-09-12_NP1	EPP444	12-Sep-2022	19-Sep-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx) LC_SBP3_SO_2022-09-12_NP2	EPP444	12-Sep-2022	19-Sep-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx) LC_SBP4_SO_2022-09-12_NP1	EPP444	12-Sep-2022	19-Sep-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 14 day HT (e.g. CN, SVOC, NOx) LC_SBP4_SO_2022-09-12_NP2	EPP444	12-Sep-2022	19-Sep-2022	----	----		----	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_NNCP_SO_2022-09-12_NP1	E611A	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_NNCP_SO_2022-09-12_NP2	E611A	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_SBP1_SO_2022-09-12_NP	E611A	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_SBP2_SO_2022-09-12_NP	E611A	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_SBP3_SO_2022-09-12_NP1	E611A	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_SBP3_SO_2022-09-12_NP2	E611A	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_SBP4_SO_2022-09-12_NP1	E611A	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_SBP4_SO_2022-09-12_NP2	E611A	12-Sep-2022	14-Sep-2022	----	----		14-Sep-2022	40 days	2 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BC PHCs - EPH by GC-FID	E601A	646338	1	8	12.5	5.0	✓
BTEX by Headspace GC-MS	E611A	646343	1	8	12.5	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	648338	1	8	12.5	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	648339	1	8	12.5	5.0	✓
Moisture Content by Gravimetry	E144	646340	1	8	12.5	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	646339	1	8	12.5	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	647372	2	26	7.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	646344	1	8	12.5	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	649428	1	8	12.5	5.0	✓
Laboratory Control Samples (LCS)							
BC PHCs - EPH by GC-FID	E601A	646338	1	8	12.5	5.0	✓
BTEX by Headspace GC-MS	E611A	646343	1	8	12.5	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	648338	2	8	25.0	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	648339	2	8	25.0	10.0	✓
Moisture Content by Gravimetry	E144	646340	1	8	12.5	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	646339	1	8	12.5	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	647372	4	26	15.3	10.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	646344	1	8	12.5	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	649428	1	8	12.5	5.0	✓
Method Blanks (MB)							
BC PHCs - EPH by GC-FID	E601A	646338	1	8	12.5	5.0	✓
BTEX by Headspace GC-MS	E611A	646343	1	8	12.5	5.0	✓
Mercury by CVAAS (TCLP)	E512	655902	1	10	10.0	5.2	✓
Mercury in Soil/Solid by CVAAS	E510	648338	1	8	12.5	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	655888	1	11	9.0	5.2	✓
Metals in Soil/Solid by CRC ICPMS	E440	648339	1	8	12.5	5.0	✓
Moisture Content by Gravimetry	E144	646340	1	8	12.5	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	646339	1	8	12.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	646344	1	8	12.5	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	649428	1	8	12.5	5.0	✓
Matrix Spikes (MS)							
BC PHCs - EPH by GC-FID	E601A	646338	1	8	12.5	5.0	✓
BTEX by Headspace GC-MS	E611A	646343	1	8	12.5	5.0	✓
Mercury by CVAAS (TCLP)	E512	655902	1	10	10.0	5.2	✓
Metals by CRC ICPMS (TCLP)	E444	655888	1	11	9.0	5.2	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	646339	1	8	12.5	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Calgary - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Calgary - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 Calgary - Environmental	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 Calgary - Environmental	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Calgary - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 Calgary - Environmental	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A silica gel treated petroleum ether sample extract is evaporated to dryness. The weight of the residue is determined gravimetrically. For classification of samples as waste oil under the HWR, Waste Oil Content is reported by weight on an as-received basis.
VH and F1 by Headspace GC-FID	E581.VH+F1 Calgary - Environmental	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHCs - EPH by GC-FID	E601A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
BTEX by Headspace GC-MS	E611A Calgary - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Calgary - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are extracted with hexane/acetone and analyzed by GC-MS. If reported, IACR (index of additive cancer risk, unitless) and B(a)P toxic potency equivalent (in soil concentration units) are calculated as per CCME PAH Soil Quality Guidelines fact sheet (2010) or ABT1.
Waste Oil Content (BC HWR 41.1) by Gravimetry	EC569SG Vancouver - Environmental	Soil/Solid	unit conversion	Convert waste oil content from sample wet weight basis to dry weight basis by using moisture. For assessment of compliance of the Total Oil standard under section 41.1 of the HWR (Standards for Management of Hydrocarbon Contaminated Soils), Waste Oil Content is reported on a dry weight basis.
VPH: VH-BTEX-Styrene	EC580A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VH-BTEX = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Calgary - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Calgary - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
Waste Oil Content (BC HWR) Extraction for Gravimetry	EP569SG Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A subsample is dried by magnesium sulfate and extracted with petroleum ether in Soxhlet. The extract is dried with sodium sulfate and treated with silica gel.
VOCs Methanol Extraction for Headspace Analysis	EP581 Calgary - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 Calgary - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.
TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)	EPP444 Calgary - Environmental	Soil/Solid	EPA 1311	Preparation of a Toxicity Characteristic Leaching Procedure (TCLP) solid sample involves particle size reduction, homogenization, then determination of appropriate extraction fluid. A measured portion of fresh subsample is placed in an extraction bottle with the appropriate extraction fluid then tumbled in a rotary extractor for 18+/- 2 hours at 23 +/- 2 C. The liquid leachate is filtered to separate from solids then bottled and prepared for analytical tests.

QUALITY CONTROL REPORT

Work Order	: **CG2212398**	Page	: 1 of 15
Amendment	: **1**		
Client	: Teck Coal Limited	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 13-Sep-2022 09:11
PO	: VPO00809190	Date Analysis Commenced	: 14-Sep-2022
C-O-C number	: SBP & NNCP Sept 12	Issue Date	: 21-Sep-2022 17:07
Sampler	: T.Dick		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
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General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 646340)											
CG2212398-001	LC_NNCP_SO_2022-09-12_NP1	moisture	----	E144	0.25	%	13.4	14.0	4.05%	20%	----
Physical Tests (QC Lot: 647371)											
CG2212311-021	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	7.55	7.57	0.264%	5%	----
Physical Tests (QC Lot: 647372)											
CG2212398-003	LC_SBP1_SO_2022-09-12_NP	pH (1:2 soil:water)	----	E108	0.10	pH units	8.04	8.06	0.248%	5%	----
Metals (QC Lot: 648338)											
CG2212398-001	LC_NNCP_SO_2022-09-12_NP1	mercury	7439-97-6	E510	0.0500	mg/kg	0.0682	0.0920	0.0238	Diff <2x LOR	----
Metals (QC Lot: 648339)											
CG2212398-001	LC_NNCP_SO_2022-09-12_NP1	aluminum	7429-90-5	E440	50	mg/kg	3340	3580	7.10%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	1.07	1.04	2.45%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	3.47	4.42	24.2%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	380	355	6.82%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.60	0.65	0.05	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	6.0	6.5	0.4	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	1.36	1.57	14.5%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	12000	13100	8.61%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	6.57	6.67	1.60%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	3.88	4.19	7.74%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	21.9	23.5	7.30%	30%	----
		iron	7439-89-6	E440	50	mg/kg	7960	7350	7.94%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	9.30	8.74	6.26%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	2.2	2.3	0.1	Diff <2x LOR	----
		magnesium	7439-95-4	E440	20	mg/kg	3440	3590	4.51%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	148	149	0.510%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	3.15	3.23	2.42%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	15.3	16.6	7.80%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	1060	1070	1.19%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	1020	1100	8.41%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	2.23	1.90	16.3%	30%	----

Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 648339) - continued											
CG2212398-001	LC_NNCP_SO_2022-09-1 2_NP1	silver	7440-22-4	E440	0.10	mg/kg	0.24	0.27	0.02	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	62	62	0.7	Diff <2x LOR	----
		strontium	7440-24-6	E440	0.50	mg/kg	109	103	5.36%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.081	0.104	0.023	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	11.5	11.6	0.547%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	1.00	1.05	4.86%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	24.1	24.9	3.47%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	92.8	103	10.8%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	2.8	3.0	0.1	Diff <2x LOR	----
Aggregate Organics (QC Lot: 649428)											
CG2212398-001	LC_NNCP_SO_2022-09-1 2_NP1	waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	<1000	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 646343)											
CG2212398-001	LC_NNCP_SO_2022-09-1 2_NP1	benzene	71-43-2	E611A	0.0093	mg/kg	1.54	1.57	2.41%	40%	----
		ethylbenzene	100-41-4	E611A	0.023	mg/kg	1.47	1.43	2.76%	40%	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.050	mg/kg	10.2	10.5	2.78%	40%	----
		xylene, m+p-	179601-23-1	E611A	0.035	mg/kg	17.6	17.4	0.723%	40%	----
		xylene, o-	95-47-6	E611A	0.030	mg/kg	3.82	3.98	4.00%	40%	----
Hydrocarbons (QC Lot: 646338)											
CG2212398-001	LC_NNCP_SO_2022-09-1 2_NP1	EPH (C10-C19)	----	E601A	200	mg/kg	570	530	40	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	430	420	4	Diff <2x LOR	----
Hydrocarbons (QC Lot: 646344)											
CG2212398-001	LC_NNCP_SO_2022-09-1 2_NP1	VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	76	86	12.8%	40%	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 646339)											
CG2212398-001	LC_NNCP_SO_2022-09-1 2_NP1	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	0.572	0.527	8.14%	50%	----
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	0.140	0.124	12.0%	50%	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	0.979	0.907	7.65%	50%	----
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	0.0200	0.0150	28.4%	50%	----
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	0.366	0.332	9.67%	50%	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Polycyclic Aromatic Hydrocarbons (QC Lot: 646339) - continued											
CG2212398-001	LC_NNCP_SO_2022-09-12_NP1	benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	0.219	0.198	10.2%	50%	----
		benzo(b+j)fluoranthene	n/a	E641A-L	0.010	mg/kg	0.521	0.509	2.34%	50%	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	0.237	0.223	6.18%	50%	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	0.102	0.065	44.4%	50%	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	1.27	1.18	7.82%	50%	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	0.0968	0.0943	2.59%	50%	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	0.260	0.236	9.54%	50%	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	1.52	1.36	11.1%	50%	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	0.072	0.067	8.57%	50%	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	12.6	11.4	10.6%	50%	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	20.9	18.6	11.6%	50%	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	8.67	7.58	13.4%	50%	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	5.90	5.41	8.66%	50%	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	0.474	0.435	8.65%	50%	----
		quinoline	91-22-5	E641A-L	0.010	mg/kg	0.034	0.029	0.005	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 646340)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 648338)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 648339)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 648339) - continued						
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
TCLP Metals (QCLot: 655888)						
antimony, TCLP	7440-36-0	E444	0.1	mg/L	<0.10	----
arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----
calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----
TCLP Metals (QCLot: 655902)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
Aggregate Organics (QCLot: 649428)						
waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	----
Volatile Organic Compounds (QCLot: 646343)						
benzene	71-43-2	E611A	0.005	mg/kg	<0.0050	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	<0.040	----
styrene	100-42-5	E611A	0.05	mg/kg	<0.050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 646343) - continued						
toluene	108-88-3	E611A	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611A	0.03	mg/kg	<0.030	----
xylene, o-	95-47-6	E611A	0.03	mg/kg	<0.030	----
Hydrocarbons (QCLot: 646338)						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
Hydrocarbons (QCLot: 646344)						
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	<10	----
Polycyclic Aromatic Hydrocarbons (QCLot: 646339)						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
quinoline	91-22-5	E641A-L	0.01	mg/kg	<0.010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 646340)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 647371)									
pH (1:2 soil:water)	----	E108	----	pH units	7 pH units	99.8	97.0	103	----
Physical Tests (QCLot: 647372)									
pH (1:2 soil:water)	----	E108	----	pH units	7 pH units	99.8	97.0	103	----
Metals (QCLot: 648338)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	116	80.0	120	----
Metals (QCLot: 648339)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	106	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	109	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	108	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	97.0	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	100	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	94.3	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	107	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	98.1	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	106	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	# 123	80.0	120	MES
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	105	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	107	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	108	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	106	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	105	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	108	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	115	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	108	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	106	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	98.6	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	113	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 648339) - continued									
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	83.8	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	103	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	106	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	104	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	106	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	107	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	108	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	109	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	105	80.0	120	----
Aggregate Organics (QCLot: 649428)									
waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	4250 mg/kg wwt	101	70.0	130	----
Volatile Organic Compounds (QCLot: 646343)									
benzene	71-43-2	E611A	0.005	mg/kg	2.5 mg/kg	104	70.0	130	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	2.5 mg/kg	103	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	2.5 mg/kg	109	70.0	130	----
styrene	100-42-5	E611A	0.05	mg/kg	2.5 mg/kg	101	70.0	130	----
toluene	108-88-3	E611A	0.05	mg/kg	2.5 mg/kg	96.7	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.03	mg/kg	5 mg/kg	109	70.0	130	----
xylene, o-	95-47-6	E611A	0.03	mg/kg	2.5 mg/kg	109	70.0	130	----
Hydrocarbons (QCLot: 646338)									
EPH (C10-C19)	----	E601A	200	mg/kg	1002.5 mg/kg	119	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	515.625 mg/kg	123	70.0	130	----
Hydrocarbons (QCLot: 646344)									
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	3.438 mg/kg	109	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 646339)									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	105	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	96.1	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	94.0	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	94.4	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	97.9	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	84.8	60.0	130	----
benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	0.5 mg/kg	101	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	85.8	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	105	60.0	130	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 646339) - continued									
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	84.7	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	97.2	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	96.4	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	105	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	116	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	106	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	106	60.0	130	----
quinoline	91-22-5	E641A-L	0.01	mg/kg	0.5 mg/kg	97.2	60.0	130	----

Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 655888)										
CG2212398-001	LC_NNCP_SO_2022-09-12_NP1	antimony, TCLP	7440-36-0	E444	8.88 mg/L	10 mg/L	88.8	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	9.2 mg/L	10 mg/L	92.2	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.6 mg/L	12.5 mg/L	109	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	10.1 mg/L	10 mg/L	101	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.15 mg/L	10 mg/L	91.5	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	8.90 mg/L	10 mg/L	89.0	50.0	140	----
		calcium, TCLP	7440-70-2	E444	ND mg/L	25 mg/L	ND	50.0	140	----
		chromium, TCLP	7440-47-3	E444	8.72 mg/L	10 mg/L	87.2	50.0	140	----
		cobalt, TCLP	7440-48-4	E444	8.82 mg/L	10 mg/L	88.2	50.0	140	----
		copper, TCLP	7440-50-8	E444	8.98 mg/L	10 mg/L	89.8	50.0	140	----
		iron, TCLP	7439-89-6	E444	42.9 mg/L	50 mg/L	85.7	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.16 mg/L	10 mg/L	91.6	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	ND mg/L	25 mg/L	ND	50.0	140	----
		nickel, TCLP	7440-02-0	E444	8.80 mg/L	10 mg/L	88.0	50.0	140	----
		selenium, TCLP	7782-49-2	E444	8.46 mg/L	10 mg/L	84.6	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.101 mg/L	0.1 mg/L	101	50.0	140	----
		thallium, TCLP	7440-28-0	E444	9.2 mg/L	10 mg/L	92.0	50.0	140	----
		uranium, TCLP	7440-61-1	E444	9.45 mg/L	10 mg/L	94.5	50.0	140	----
		vanadium, TCLP	7440-62-2	E444	9.00 mg/L	10 mg/L	90.0	50.0	140	----
		zinc, TCLP	7440-66-6	E444	8.47 mg/L	10 mg/L	84.7	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	8 mg/L	10 mg/L	82.9	50.0	140	----
TCLP Metals (QCLot: 655902)										
CG2212398-001	LC_NNCP_SO_2022-09-12_NP1	mercury, TCLP	7439-97-6	E512	0.0865 mg/L	0.1 mg/L	86.5	50.0	140	----
Volatile Organic Compounds (QCLot: 646343)										
CG2212398-001	LC_NNCP_SO_2022-09-12_NP1	benzene	71-43-2	E611A	10.8 mg/kg	13.75 mg/kg	90.3	60.0	140	----
		ethylbenzene	100-41-4	E611A	10.7 mg/kg	13.75 mg/kg	89.0	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	11.0 mg/kg	13.75 mg/kg	92.2	60.0	140	----
		styrene	100-42-5	E611A	11.1 mg/kg	13.75 mg/kg	92.6	60.0	140	----
		toluene	108-88-3	E611A	11.7 mg/kg	13.75 mg/kg	97.2	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	20.1 mg/kg	27.5 mg/kg	83.8	60.0	140	----
		xylene, o-	95-47-6	E611A	11.7 mg/kg	13.75 mg/kg	97.9	60.0	140	----

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*Concentration*	*Target*	*MS*	*Low*	*High*	*Qualifier*
Hydrocarbons (QCLot: 646338)										
CG2212398-001	LC_NNCP_SO_2022-09-12_NP1	EPH (C10-C19)	----	E601A	900 mg/kg	1002.5 mg/kg	118	60.0	140	----
		EPH (C19-C32)	----	E601A	510 mg/kg	515.625 mg/kg	130	60.0	140	----
Polycyclic Aromatic Hydrocarbons (QCLot: 646339)										
CG2212398-001	LC_NNCP_SO_2022-09-12_NP1	acenaphthene	83-32-9	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		acenaphthylene	208-96-8	E641A-L	0.307 mg/kg	0.5 mg/kg	83.1	50.0	140	----
		acridine	260-94-6	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		anthracene	120-12-7	E641A-L	0.407 mg/kg	0.5 mg/kg	110	50.0	140	----
		benz(a)anthracene	56-55-3	E641A-L	0.295 mg/kg	0.5 mg/kg	80.0	50.0	140	----
		benzo(a)pyrene	50-32-8	E641A-L	0.246 mg/kg	0.5 mg/kg	66.6	50.0	140	----
		benzo(b+j)fluoranthene	n/a	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.212 mg/kg	0.5 mg/kg	57.5	50.0	140	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.258 mg/kg	0.5 mg/kg	69.9	50.0	140	----
		chrysene	218-01-9	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.264 mg/kg	0.5 mg/kg	71.6	50.0	140	----
		fluoranthene	206-44-0	E641A-L	0.325 mg/kg	0.5 mg/kg	87.9	50.0	140	----
		fluorene	86-73-7	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.224 mg/kg	0.5 mg/kg	60.8	50.0	140	----
		methylnaphthalene, 1-	90-12-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		methylnaphthalene, 2-	91-57-6	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		naphthalene	91-20-3	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		phenanthrene	85-01-8	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		pyrene	129-00-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		quinoline	91-22-5	E641A-L	0.304 mg/kg	0.5 mg/kg	82.4	50.0	140	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	High	Qualifier
Physical Tests (QCLot: 647371)									
	RM	pH (1:2 soil:water)	----	E108	8.06 pH units	99.0	96.0	104	----
Physical Tests (QCLot: 647372)									
	RM	pH (1:2 soil:water)	----	E108	8.06 pH units	99.0	96.0	104	----
Metals (QCLot: 648338)									
	RM	mercury	7439-97-6	E510	0.062 mg/kg	102	70.0	130	----
Metals (QCLot: 648339)									
	RM	aluminum	7429-90-5	E440	9817 mg/kg	111	70.0	130	----
	RM	antimony	7440-36-0	E440	3.99 mg/kg	119	70.0	130	----
	RM	arsenic	7440-38-2	E440	3.73 mg/kg	96.5	70.0	130	----
	RM	barium	7440-39-3	E440	105 mg/kg	120	70.0	130	----
	RM	beryllium	7440-41-7	E440	0.349 mg/kg	105	70.0	130	----
	RM	boron	7440-42-8	E440	8.5 mg/kg	124	40.0	160	----
	RM	cadmium	7440-43-9	E440	0.91 mg/kg	108	70.0	130	----
	RM	calcium	7440-70-2	E440	31082 mg/kg	114	70.0	130	----
	RM	chromium	7440-47-3	E440	101 mg/kg	106	70.0	130	----
	RM	cobalt	7440-48-4	E440	6.9 mg/kg	106	70.0	130	----
	RM	copper	7440-50-8	E440	123 mg/kg	112	70.0	130	----
	RM	iron	7439-89-6	E440	23558 mg/kg	106	70.0	130	----
	RM	lead	7439-92-1	E440	267 mg/kg	120	70.0	130	----
	RM	lithium	7439-93-2	E440	9.5 mg/kg	111	70.0	130	----
	RM	magnesium	7439-95-4	E440	5509 mg/kg	111	70.0	130	----
	RM	manganese	7439-96-5	E440	269 mg/kg	112	70.0	130	----
	RM	molybdenum	7439-98-7	E440	1.03 mg/kg	103	70.0	130	----
	RM	nickel	7440-02-0	E440	26.7 mg/kg	108	70.0	130	----
	RM	phosphorus	7723-14-0	E440	752 mg/kg	113	70.0	130	----
	RM	potassium	7440-09-7	E440	1587 mg/kg	99.8	70.0	130	----
	RM	silver	7440-22-4	E440	4.06 mg/kg	91.2	70.0	130	----
	RM	sodium	7440-23-5	E440	797 mg/kg	97.9	70.0	130	----
	RM	strontium	7440-24-6	E440	86.1 mg/kg	112	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 648339) - continued									
	RM	thallium	7440-28-0	E440	0.0786 mg/kg	111	40.0	160	----
	RM	tin	7440-31-5	E440	10.6 mg/kg	105	70.0	130	----
	RM	titanium	7440-32-6	E440	839 mg/kg	99.2	70.0	130	----
	RM	uranium	7440-61-1	E440	0.52 mg/kg	98.8	70.0	130	----
	RM	vanadium	7440-62-2	E440	32.7 mg/kg	108	70.0	130	----
	RM	zinc	7440-66-6	E440	297 mg/kg	107	70.0	130	----
	RM	zirconium	7440-67-7	E440	5.73 mg/kg	104	70.0	130	----

Teck

Environmental Division Calgary
Work Order Reference
CG2212398

COC ID: SBP & NNCP Sept 12 | **TURNAROUND TIME:** 2-4 days | **RUSH:** Priority

PROJECT/CLIENT INFO			
Facility Name / Job#	Line Creek Operation		
Project Manager	Tom Jeffery		
Email	tom.jeffery@teck.com		
Address	Box 2003		
	15km North Hwy 43		
City	Sparwood	Province	BC
Postal Code	V0B 2G0	Country	Canada
Phone Number	250-425-8478		

LABORATORY			
Lab Name	ALS Calgary		
Lab Contact	Lyudmyla Shvets		
Email	Lyudmyla.Shvets@ALSGlobal.com		
Address	2559 29 Street NE		
City	Calgary	Province	AB
Postal Code	T1Y 7B5	Country	Canada
Phone Number	403 407 1794		

OTHER INFO				
Report Format / Distribution		Excel	PDF	ED
Email 1:	tom.jeffery@teck.com	x	x	
Email 2:	teckcoal@equisonline.com			x
Email 3:	drake.tymstra@teck.com	x	x	
Email 4:	tanya.dick@teck.com	x	x	
PO number	VPO00809190			

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Metals	Leachable Metals	LEPH_HEPH	Total Oil	BTEX & VPH (Filt.: N; Preserv.: Methanol)
LC_NNCP_SO_2022-09-12_NP1	LC_NNCP	SO	No	9/12/2022	13:00	G	8	1	1	2	2	2
LC_NNCP_SO_2022-09-12_NP2	LC_NNCP	SO	No	9/12/2022	13:10	G	8	1	1	2	2	2
LC_SBP1_SO_2022-09-12_NP	LC_SBP	SO	No	9/12/2022	12:40	G	8	1	1	2	2	2
LC_SBP2_SO_2022-09-12_NP	LC_SBP	SO	No	9/12/2022	12:30	G	8	1	1	2	2	2
LC_SBP3_SO_2022-09-12_NP1	LC_SBP	SO	No	9/12/2022	12:15	G	8	1	1	2	2	2
LC_SBP3_SO_2022-09-12_NP2	LC_SBP	SO	No	9/12/2022	12:05	G	8	1	1	2	2	2
LC_SBP4_SO_2022-09-12_NP1	LC_SBP	SO	No	9/12/2022	11:45	G	8	1	1	2	2	2
LC_SBP4_SO_2022-09-12_NP2	LC_SBP	SO	No	9/12/2022	11:55	G	8	1	1	2	2	2

Telephone : +1 403 407 1800

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Sample volume: 6 jars, 2 vials

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
T. Dick/ D.Tymstra	12-Sep-22	[signature]	9/13 9:11

SERVICE REQUEST (rush - subject to availability)

Regular (default)	
Priority (2-3 business days) - 50% surcharge	X
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	T. Dick	Mobile #	
Sampler's Signature		Date/Time	September 12, 2022

9c

9.3 Appendix C – 2022 Summary of Spills and Incidents Reported to Emergency Management B.C

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
1	8-Jan-21	Spill	Hydraulic Oil	216.9	Mount Michael (MTM)	Failed front hoist pressure line.	Complete	214131
2	8-Jan-21	Spill	Transmission Oil	145	Burnt Ridge North (BRN)	Failed compressor cooler line.	Complete	214136
3	9-Jan-22	Spill	Hydraulic Oil	227	Mount Michael (MTM)	Failed hydraulic hose O-ring.	Complete	214143
4	19-Jan-22	Spill	Pit Effluent	908 m3	MSX Pit	Acute toxicity returned a result that showed the water sampled in MSX on that day failed rainbow trout acute toxicity test.	Complete	214353
5	25-Jan-22	Spill	Hydraulic Oil	136	Mount Michael (MTM)	Failed hydraulic hose.	Complete	214420
6	5-Feb-22	Spill	Hydraulic Oil	340	Burnt Ridge Extension (BRX)	Failed upper hoist line.	Complete	214569
7	13-Feb-22	Spill	Hydraulic Oil	161	Mount Michael (MTM)	Failed hydraulic hose.	Complete	214683
8	18-Feb-22	Spill	Coolant	260	Truck Dump	Failed heater hose.	Complete	214751
9	21-Feb-22	Spill	Transmission Oil	264.4	Burnt Ridge North (BRN)	Failed compressor hose.	Complete	214792
10	21-Feb-22	Spill	Transmission Oil	218.6	Burnt Ridge North (BRN)	Failed compressor lube hose.	Complete	214793
11	24-Feb-22	Spill	Hydraulic Oil	150	Coarse Coal Rejects Spoil	Failed hydraulic hose.	Complete	214825
12	25-Feb-22	Spill	Hydraulic Oil	165	Mount Michael (MTM)	Failed hydraulic hose.	Complete	214833
13	2-Mar-22	Spill	Hydraulic Oil	663	Mount Michael (MTM)	Failed box hoist hydraulic hose.	Complete	214900
14	4-Mar-22	Spill	Hydraulic Oil	199.3	Burnt Ridge Extension (BRX)	Failed hydraulic hose.	Complete	214919
15	4-Mar-22	Spill	Hydraulic Oil	189.7	Burnt Ridge Extension (BRX)	Hole in the housing of the high-pressure fuel pump resulted in oil lost to ground.	Complete	214939
16	4-Mar-22	Spill	Hydraulic Oil	145	Mount Michael (MTM)	Failed hoist screen hose O-ring.	Complete	214940
17	4-Mar-22	Spill	Hydraulic Oil	131.8	Burnt Ridge North (BRN)	Failed hydraulic hose on left side propel motor.	Complete	214941
18	13-Mar-22	Spill	Hydraulic Oil	1350	Coarse Coal Rejects Spoil	Failed torque hose.	Complete	215052
19	18-Mar-22	Spill	Coolant	197	Mount Michael (MTM)	Failed coolant hose.	Complete	215147

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
20	20-Mar-22	Spill	Hydraulic Oil	254.9	2170 RTC	Failed brake filter hydraulic hose. Spill reported twice - also DGIR # 215180	Complete	215168
21	20-Mar-22	Spill	Hydraulic Oil	254.9	2170 RTC	Failed brake filter hydraulic hose. Spill reported twice - also DGIR # 215168	Complete	215180
22	15-Mar-21	Spill	Coolant	200	Burnt Ridge North (BRN)	Truck collision incident resulting in coolant spill.	Complete	215190
23	26-Mar-22	Spill	Hydraulic Oil	129.9	Mount Michael (MTM)	Failed hydraulic hose.	Complete	215275
24	26-Mar-22	Spill	Hydraulic Oil	297.8	Burnt Ridge North (BRN)	Failed hydraulic hose.	Complete	215276
25	27-Mar-22	Spill	Hydraulic Oil	257.9	Mount Michael (MTM)	Failed hoist screen hose O-ring.	Complete	215289
26	29-Mar-22	Spill	Clarified Water	300	Wash Plant	Power interruption at the plant.	Complete	215319
27	29-Mar-22	Spill	Clarified Water	400	Wash Plant	Power interruption at the plant.	Complete	215334
28	30-Mar-22	Spill	Hydraulic Oil	363	MSA Extension (MSAX)	Failed O-ring on the lift cylinder circuit.	Complete	215323
29	4-Apr-22	Spill	Hydraulic Oil	164	Mount Michael (MTM)	Failed hydraulic hose.	Complete	220057
30	6-Apr-22	Spill	Clarified Water	500	Wash Plant	Power interruption at the plant.	Complete	220081
31	6-Apr-22	Spill	Hydraulic Oil	181	Burnt Ridge North (BRN)	Failed hydraulic hose.	Complete	220139
32	7-Apr-22	Spill	Hydraulic Oil	213.5	Burnt Ridge North (BRN)	Failed hydraulic hose in the steering line.	Complete	220083
33	9-Apr-22	Spill	Clarified Water	12000	Wash Plant	Power interruption at the plant.	Complete	220125
34	14-Apr-22	Spill	Hydraulic Oil	196.6	MSA Extension (MSAX)	Failed pilot line on the front control valve.	Complete	220198
35	19-Apr-22	Spill	Hydraulic Oil	312	Mount Michael (MTM)	Failed hydraulic hose.	Complete	220246
36	20-Apr-22	Spill	Clarified Water	1000	Plant Sample Building	Sump pump not functioning properly.	Complete	220254
37	22-Apr-22	Spill	Clarified Water	10000	Wash Plant	Power interruption at the plant.	Complete	220295
38	25-Apr-22	Spill	Hydraulic Oil	423.6	Mount Michael (MTM)	Failed hydraulic hose.	Complete	220347
39	25-Apr-22	Spill	Pit Effluent	unknown	Burnt Ridge Extension (BRX)	Acute toxicity returned a result that showed the water sampled in BRX on that day failed daphnia magna acute toxicity test.	Complete	220400
40	26-Apr-22	Spill	Hydraulic Oil	516	Burnt Ridge North (BRN)	Failed water pump motor main hose O-ring.	Complete	220349

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
41	28-Apr-22	Spill	Clarified Water	2000	Wash Plant	Power interruption at the plant.	Complete	220383
42	13-May-22	Spill	Clarified Water	2000	Wash Plant	Failed sump pump.	Complete	220557
43	14-May-22	Spill	Hydraulic Oil	159.6	Mount Michael (MTM)	Failed hydraulic hoist filter.	Complete	220566
44	18-May-22	Spill	Hydraulic Oil	462.8	Burnt Ridge Extension (BRX)	Failed hydraulic hose fitting.	Complete	220613
45	23-May-22	Spill	Transmission Oil	180.1	Mount Michael (MTM)	Failed power train hose.	Complete	220677
46	25-May-22	Spill	Sediment	10m3	Dry Creek Tributary	Sedimentation was mobilized into a tributary (T5) of Dry Creek during a heavy rainfall event.	Complete	220703
47	26-May-22	Spill	Fugitive Dust	0.076kg	Grave Lake	During a Grave Lake beach inspection coal dust was observed along the shoreline near the Grave Lake boat launch.	Complete	220719
48	27-May-22	Spill	Hydraulic Oil	459.5	Burnt Ridge North (BRN)	Failed hydraulic hose.	Complete	220746
49	28-May-22	Spill	Clarified Water	2500	Wash Plant	Failed centrifuge effluent line.	Complete	220753
50	7-Jun-22	Spill	Pit Effluent	52000 gal	North Line Creek Extension (NLX)	Acute toxicity returned a result that showed the water sampled from NLX water tree on that day failed daphnia magna acute toxicity test.	Complete	220875
51	4-Jun-22	Spill	Hydraulic Oil	144.1	Mount Michael (MTM)	Failed brake line due to incident involving truck.	Complete	220899
52	8-Jun-22	Spill	Hydraulic Oil	153.1	Station Zero Fuel Island	Failed starter motor fitting.	Complete	220898
53	9-Jun-22	Spill	Clarified Water	500	Wash Plant	Failed sump pump.	Complete	220920
54	10-Jun-22	Spill	Clarified Water	1500	Wash Plant	Failed sump pump.	Complete	220928
55	10-Jun-22	Spill	Hydraulic Oil	508.7	Station Zero Fuel Island	Failed hydraulic line.	Complete	220998
56	11-Jun-22	Spill	Hydraulic Oil	106.6	Northline Creek Access Road	Failed hydraulic hose fittings.	Complete	221000
57	11-Jun-22	Spill	Hydraulic Oil	585.9	Burnt Ridge North (BRN)	Failed brake oil tank fill hose.	Complete	220999
58	13-Jun-22	Spill	Hydraulic Oil	763	Mount Michael (MTM)	Failed hoist hose.	Complete	220976
59	14-Jun-22	Spill	Hydraulic Oil	711	Mount Michael (MTM)	Failed hydraulic line O-ring.	Complete	220988

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
60	14-Jun-22	Spill	Coarse Coal Refuse Material	257 m3	Coarse Coal Rejects Spoil	Material that appeared to be CCR was discovered at the base of a drainage outside of the C-129 mine permit boundary during a rainfall event driven inspection.	Complete	221003
61	15-Jun-22	Spill	Hydraulic Oil	154	Mount Michael (MTM)	Failed hydraulic pump O-ring.	Complete	220994
62	17-Jun-22	Spill	Sediment	20 m3	Dry Creek	T5 tributary to Dry Creek had been significantly eroded due to very high flow rates in the T5 channel.	Complete	221036
63	18-Jun-22	Spill	Hydraulic Oil	188	Mount Michael (MTM)	Failed LH rear wheel seal.	Complete	221046
64	19-Jun-22	Spill	Hydraulic Oil	200	Mount Michael (MTM)	Failed hydraulic line O-ring.	Complete	221055
65	21-Jun-22	Spill	Engine Oil	150	Coarse Coal Rejects Spoil	Failed engine oil line.	Complete	221102
66	22-Jun-22	Spill	Hydraulic Oil	152.7	Mount Michael (MTM)	Failed hydraulic hose fitting.	Complete	221108
67	26-Jun-22	Spill	Hydraulic Oil	200	Mount Michael (MTM)	Failed front valve hydraulic hose.	Complete	221142
68	26-Jun-22	Spill	Coolant	304.7	Mount Michael (MTM)	Failed coolant hose.	Complete	221144
69	29-Jun-22	Spill	Hydraulic Oil	540	Mount Michael (MTM)	Failed drain plug.	Complete	221200
70	2-Jul-22	Spill	Transmission Oil	227.5	Burnt Ridge Access Road	Failed fuel filling nozzle.	Complete	221226
71	3-Jul-22	Spill	Hydraulic Oil	150.8	Mount Michael (MTM)	Failed leveling jack control valve.	Complete	221234
72	5-Jul-22	Spill	Hydraulic Oil	900	Mount Michael (MTM)	Hydraulic spill due to equipment damage.	Complete	221257
73	6-Jul-22	Spill	Hydraulic Oil	237	Mount Michael (MTM)	Failed steering line.	Complete	221292
74	8-Jul-22	Spill	Hydraulic Oil	300	Mount Michael (MTM)	Failed left rear jack.	Complete	221294
75	9-Jul-22	Spill	Clarified Water	3000	Wash Plant	Failed sump pump.	Complete	221313
76	10-Jul-22	Spill	Hydraulic Oil	523	Mount Michael (MTM)	Failed lower LH hoist cylinder line.	Complete	221330
77	11-Jul-22	Spill	Hydraulic Oil	165	Burnt Ridge North (BRN)	Failed steering line.	Complete	221354

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
78	14-Jul-22	Spill	Hydraulic Oil	152	Mount Michael (MTM)	Leak from drill bulkhead during operation.	Complete	221406
79	14-Jul-22	Spill	Hydraulic Oil	150	Burnt Ridge North (BRN)	Failed hydraulic propel hoses.	Complete	221413
80	17-Jul-22	Spill	Hydraulic Oil	107	Burnt Ridge North (BRN)	Failed hydraulic hose.	Complete	221435
81	17-Jul-22	Spill	Hydraulic Oil	237	Burnt Ridge North (BRN)	Failed hydraulic hose.	Complete	221437
82	19-Jul-22	Spill	Pit Effluent	unknown	MSA West (MSAW)	Ongoing acute toxicity returned a result that showed the water sampled in MSX on that day failed rainbow trout acute toxicity test.	Complete	221470
83	21-Jul-22	Spill	Hydraulic Oil	200	Burnt Ridge North (BRN)	Hydraulic oil barrel overturned.	Complete	221497
84	21-Jul-22	Spill	Hydraulic Oil	129	Spoils	Failed RH steering cylinder line.	Complete	221501
85	22-Jul-22	Spill	Clarified Water	19000	Spoils	Power interruption at the plant.	Complete	221511
86	25-Jul-22	Spill	Pit Effluent	unknown	MSAW Pit Well	Precautionary spill report of effluent showing acute toxicity to Daphnia magna in lab testing from the Mine Services Area West (MSAW) Pit well (LC_MSAW6).	Complete	221548
87	28-Jul-22	Spill	Hydraulic Oil	339	Burnt Ridge North (BRN)	Failed lift cylinder.	Complete	221600
88	31-Jul-22	Spill	Hydraulic Oil	701.6	Mount Michael (MTM)	Spill due to damage to equipment.	Complete	221634
89	8-Aug-22	Spill	Hydraulic Oil	200	Mount Michael (MTM)	Leak from drill bulkhead fitting during operation.	Complete	221746
90	11-Aug-22	Spill	Coolant	1074	Mount Michael (MTM)	Failed coolant hose.	Complete	221803
91	12-Aug-22	Spill	Hydraulic Oil	137	Mount Michael (MTM)	Failed hydraulic hose.	Complete	221817
92	17-Aug-22	Spill	Hydraulic Oil	280	Mount Michael (MTM)	Failed transmission filter housing.	Complete	221891
93	19-Aug-22	Spill	Pit Effluent	unknown	Burnt Ridge Extension (BRX)	Lab results were received from the LC_BRX pit sumps, which showed an acute toxicity failure in water being pumped from this pit.	Complete	221915
94	20-Aug-22	Spill	Hydraulic Oil	484.4	Spoils	Failed hydraulic main hoist pump O-ring.	Complete	221932
95	22-Aug-22	Spill	Hydraulic Oil	396	MSX Pit	Failed hoist screen hose.	Complete	221960

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
96	27-Aug-22	Spill	Hydraulic Oil	529	Mount Michael (MTM)	Failed hoist screen hose O-ring.	Complete	222041
97	28-Aug-22	Spill	Hydraulic Oil	100.9	Burnt Ridge North (BRN)	Damage to truck hydraulic sight glass.	Complete	222053
98	29-Aug-22	Spill	Sediment	unknown	Dry Creek	A flash rain event monitoring at the Dry Creek C&S site resulted in a reading at Dry Creek Bridge of NTU at 53.23.	Complete	222065
99	30-Aug-22	Spill	Clarified Water	22000	Wash Plant	Equipment failure resulted in tank overflow.	Complete	222088
100	31-Aug-22	Spill	Fugitive Dust	0.000721 kg	Line Creek	Coal dust on Grave Lake reported to field technician during site inspection by community member.	Complete	222103
101	5-Sep-22	Spill	Hydraulic Oil	200	Burnt Ridge Extension (BRX)	Barrel of hydraulic oil fell out of mechanic truck bed.	Complete	222192
102	7-Sep-22	Spill	Hydraulic Oil	197	Burnt Ridge North (BRN)	Failed motor propel line.	Complete	222195
103	7-Sep-22	Spill	Hydraulic Oil	120	Mount Michael (MTM)	Failed fan return filter O-ring.	Complete	222219
104	7-Sep-22	Spill	Diesel	400-500	In - Pit Fuel Islands	Diesel fuel spill at 2170 fuel station.	Complete	222220
105	7-Sep-22	Spill	Pit Effluent	unknown	MSA Extension (MSAX)	Acute toxicity returned a result that showed the water sampled in MSX on that day failed rainbow trout acute toxicity test.	Complete	222284
106	7-Sep-22	Spill	Pit Effluent	unknown	Burnt Ridge Extension (BRX)	Lab results were received from the LC_BRX pit sumps, which showed an acute toxicity failure to Rainbow trout in a pH stabilized test.	Complete	222285
107	13-Sep-22	Spill	Hydraulic Oil	162	Coarse Coal Reject	Failed hydraulic pump.	Complete	222312
108	30-Sep-22	Spill	Hydraulic Oil	239	Mount Michael (MTM)	Spill due to damage to equipment.	Complete	222525
109	3-Oct-22	Spill	Engine Oil	109	Mount Michael (MTM)	Loose engine oil filter.	Complete	222543
110	4-Oct-22	Spill	Hydraulic Oil	113.4	Burnt Ridge North (BRN)	Loose steering filter.	Complete	222562
111	7-Oct-22	Spill	Clarified Water	10000	Wash Plant	Power interruption at the plant.	Complete	222610
112	10-Oct-22	Spill	Clarified Water	3000	Wash Plant	Power interruption at the plant.	Complete	222648
113	12-Oct-22	Spill	Hydraulic Oil	130.2	Mount Michael (MTM)	Substantial leaks identified in cooling system.	Complete	222668

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
114	17-Oct-22	Spill	Hydraulic Oil	307L	Mount Michael (MTM)	Failed valve O-ring.	Complete	222710
115	19-Oct-22	Spill	Pit Effluent	unknown	Burnt Ridge Extension (BRX)	Lab results were received from the LC_BRX pit sumps, which showed an acute toxicity failure in water being pumped from this pit.	Complete	222865
116	20-Oct-22	Spill	Hydraulic Oil	150L	Burnt Ridge North (BRN)	Equipment failure resulted in hydraulic spill.	Complete	222778
117	21-Oct-22	Spill	Clarified Water	2000L	Wash Plant	Power interruption at the plant.	Complete	222792
118	26-Oct-22	Spill	Hydraulic Oil	137	Mount Michael (MTM)	Failed hydraulic hose.	Complete	222853
119	2-Nov-22	Spill	Hydraulic Oil	160	Station Zero Fuel Island	Failed hydraulic cooler line.	Complete	222947
120	2-Nov-22	Spill	Hydraulic Oil	194.6	Mount Michael (MTM)	Failing transmission line O-ring.	Complete	222948
121	2-Nov-22	Spill	Pit Effluent	unknown	MSAW Pit Well	Precautionary spill report of effluent showing acute toxicity to Daphnia magna in lab testing from the Mine Services Area West (MSAW) Pit well (LC_MSAW6).	Complete	223081
122	3-Nov-22	Spill	Clarified Water	3000	Wash Plant	Equipment failure causing tank overflow.	Complete	222952
123	6-Nov-22	Spill	Hydraulic Oil	113.4	Mount Michael (MTM)	Failed front cylinder hoist.	Complete	223025
124	8-Nov-22	Spill	Process Water	5000	Wash Plant	Power interruption at the plant.	Complete	223057
125	8-Nov-22	Spill	Hydraulic Oil	115	Mount Michael (MTM)	Failed pipe on main air compressor.	Complete	223060
126	11-Nov-22	Spill	Hydraulic Oil	153	Burnt Ridge Extension (BRX)	Failed drain plug.	Complete	223096
127	14-Nov-22	Spill	Hydraulic Oil	183	Burnt Ridge Extension (BRX)	Failed hoist screen O-ring.	Complete	223131
128	16-Nov-22	Spill	Engine Oil	300	Burnt Ridge Access Road	Truck collision incident resulting in engine oil spill.	Complete	223161
129	16-Nov-22	Spill	Coolant	1000	Burnt Ridge Access Road	Truck collision incident resulting in coolant spill.	Complete	223162

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
130	17-Nov-22	Spill	Pit Effluent	unknown	MSX Pit	MSX sample results for November 17, 2022 showed 70% mortality to rainbow trout through a pH controlled acute toxicity test after 96 hours, as analyzed by Nautilus Environmental, a third-party laboratory	Ongoing – 30 days updates provided as required.	223310
131	18-Nov-22	Spill	Engine Oil	200	MSA Extension (MSAX)	Truck collision incident resulting in engine oil spill.	Complete	223204
132	18-Nov-22	Spill	Diesel	200	MSA Extension (MSAX)	Truck collision incident resulting in diesel fuel spill.	Complete	223204
133	18-Nov-22	Spill	Coolant	200	MSA Extension (MSAX)	Truck collision incident resulting in coolant spill.	Complete	223204
134	21-Nov-22	Spill	Hydraulic Oil	300	Mount Michael (MTM)	Failed duo cone seal.	Complete	223215
135	22-Nov-22	Spill	Clarified Water	2000	Wash Plant	Equipment failure resulting in tank overflow.	Complete	223239
136	26-Nov-22	Spill	Hydraulic Oil	857	Burnt Ridge North (BRN)	Damage to truck resulting in hydraulic oil spill.	Complete	223289
137	28-Nov-22	Spill	Clarified Water	3000	Wash Plant	Power interruption at the plant.	Complete	223316
138	29-Nov-22	Spill	Coolant	200	Mount Michael (MTM)	Failed coolant hose.	Complete	223331
139	29-Nov-22	Spill	Clarified Water	2000	Wash Plant	Power interruption at the plant.	Complete	223343
140	29-Nov-22	Spill	Transmission Oil	200	Mount Michael (MTM)	Failed compressor motor O-ring.	Complete	223344
141	1-Dec-22	Spill	Hydraulic Oil	500	Burnt Ridge Extension (BRX)	Failed frame resulting in hydraulic oil spill.	Complete	223377
142	2-Dec-22	Spill	Hydraulic Oil	513	Burnt Ridge North (BRN)	Failed brake line.	Complete	223391
143	3-Dec-22	Spill	Hydraulic Oil	200	Burnt Ridge Extension (BRX)	Failed RH frame jack.	Complete	223396
144	5-Dec-22	Spill	Hydraulic Oil	400	North Line Creek (NLC)	Failed brake cooling pump coupling.	Complete	223443
145	7-Dec-22	Spill	Clarified Water	1000	Wash Plant	Equipment failure resulting in tank overflow.	Complete	223432
146	7-Dec-22	Spill	Clarified Water	1000	Wash Plant	Power interruption at the plant.	Complete	223445
147	9-Dec-22	Spill	Hydraulic Oil	185	Burnt Ridge North (BRN)	Failed hydraulic hose.	Complete	223482
148	10-Dec-22	Spill	Hydraulic Oil	209	Mount Michael (MTM)	Failing hydraulic line O-ring.	Complete	223499

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
149	14-Dec-22	Spill	Hydraulic Oil	500	Burnt Ridge North (BRN)	Damage to truck resulting in hydraulic oil spill.	Complete	223548
150	15-Dec-22	Spill	Diesel	300	In - Pit Fuel Islands	Cam-lock fitting failed while refilling diesel storage tanks at the fuel island.	Complete	223554
151	18-Dec-22	Spill	Hydraulic Oil	156.7	North Line Creek (NLC)	Loose starter motors.	Complete	223583
152	19-Dec-22	Spill	Hydraulic Oil	110.6	Mine Access Road	Failed hydraulic hose.	Complete	223584
153	19-Dec-22	Spill	Hydraulic Oil	301	Mine Access Road	Failed hydraulic hose.	Complete	223589
154	21-Dec-22	Spill	Hydraulic Oil	1000	Mount Michael (MTM)	Failed frame resulting in hydraulic oil spill.	Complete	223614
155	29-Dec-22	Spill	Hydraulic Oil	435	Burnt Ridge North (BRN)	Damage to truck resulting in hydraulic oil spill.	Complete	225465
156	30-Dec-22	Spill	Coolant	345.8	Burnt Ridge North (BRN)	Failed coolant hose.	Complete	225466

9.4 Appendix D – Summary of LCO Coal Production Plant Unauthorized Discharges throughout 2022

Summary of LCO Coal Production Plant Unauthorized Discharges throughout 2022

Date of Non-compliance	DGIR #	Date Reported	Type of Material Spilled	Volume (L)	Location	Cause	Corrective Actions
29-Mar-22	215319	7-Apr-22	Process water	300	Coal Preparation Plant – Processing Plant	Belt failed on the deslime screen exciter, causing coarse coal to block grading of fine coal tank that resulted in build-up of water on plant floor.	*Installed low current alarm on deslime screen that shut off the feed to the screen and notifies plant personnel if there is no torque on the screens.*
30-Mar-22	215334	7-Apr-22	Process water	400	Coal Preparation Plant – Processing Plant	A screen panel failed on the deslime screen, causing coarse coal to block grading of fine coal tank that resulted in build-up of water on plant floor.	*1. Removed sediment from floor of processing plant.* *2. A new sump will be installed on processing plant floor to provide additional storage capacity to manage process fluids.*
6-Apr-22	220081	7-Apr-22	Clarified Water	500	Coal Preparation Plant – Processing Plant	When the plant shut down, the process pumps also shut down. As a result, some process fluids, along with pump piping backflow, caused the tank to overflow.	*Programming logic changes have been made to lower the level in the tanks after shutdown (i.e., allow the pumps to run longer) to minimize the chance of overflowing the tanks. The logic is currently being tested and monitored to ensure tank overflowing is minimized.*
9-Apr-22	220125	9-Apr-22	Clarified Water	12,000	Coal Preparation Plant – Processing Plant	Leaks of sediment-laden water from worn pipes leads to build up of sediment on plant floor and sumps.	*A review of the benefits of installing longer wear resistant piping(e.g. lined pipe) was done in 2022. At-sections of pipe that are at risk will be replaced as identified through inspections and operational needs.*
20-Apr-22	220254	20-Apr-22	Process Water	1,000	Coal Preparation Plant – Thermal Sample Tower	During washing of the conveyor belt within the thermal sample tower, the contractor failed to confirm the pump in the floor sump was turned on. Root cause was failure to follow procedure.	*Task has been created within Line Creek's SiteLine system that requires Processing Supervisors to confirm that workers are trained in cleanup and operational procedures (i.e. ensuring operational knowledge of sump pumps).*

Summary of LCO Coal Production Plant Unauthorized Discharges throughout 2022

Date of Non-compliance	DGIR #	Date Reported	Type of Material Spilled	Volume (L)	Location	Cause	Corrective Actions
22-Apr-22	220295	22-Apr-22	Clarified Water	10,000	Coal Preparation Plant – Processing Plant	During a period when the coal preparation plant shut-down, plant personnel lost the ability to operate pumps and valves, resulting in an overflow of water. This resulted due to failure of an antiquated Programmable Logic Controller (PLC).	*Initial corrective action was to re-boot failed PLC. A systematic phased upgrade of plant control system is currently underway. Work on PLC system improvements was ongoing throughout 2022. Continuous improvements of the PLC system will continue to be reoccurring throughout the operation of the Coal Preparation Plant.*
29-Apr-22	220383	29-Apr-22	Clarified Water	2,000	Coal Preparation Plant – Processing Plant	During a period when the coal preparation plan shut-down due to power failure, plant personnel lost the ability to manually operate sump pumps for a short term when power was restored, resulting in an overflow of water. This is believed to have occurred due to failure of an antiquated Programmable Logic Controller (PLC)	*A systematic phased upgrade of plant control system is currently underway. Work on PLC system improvements was ongoing throughout 2022. Continuous improvements of the PLC system will continue to be reoccurring throughout the operation of the Coal Preparation Plant..*
13-May-22	220557	14-May-22	Clarified Water	2,000	Coal Preparation Plant – Processing Plant	The belt failed on the centrifuge effluent pump due to general mechanical wear and tear.	*Reviewed incident with Coal Preparation Plant operational staff and communicated the requirement to confirm that work orders resulting from pump inspections are present with AX (Teck's work order tracking system) to ensure preventative maintenance on identified issues are conducted in a timely manner.*

Summary of LCO Coal Production Plant Unauthorized Discharges throughout 2022

Date of Non-compliance	DGIR #	Date Reported	Type of Material Spilled	Volume (L)	Location	Cause	Corrective Actions
28-May-22	220753	30-May-22	Clarified Water	2,500	Coal Preparation Plant – Processing Plant	During the normal maintenance (replacement) of the piping for the centrifuge effluent tank, the support hangers for the piping were not installed. Root cause was insufficient follow-up by the contract supervisor to confirm work was completed correctly.	A system of improved communication between coal preparation plant operators and plant maintenance group is now in place to identify and prioritize issues. In addition, more detailed information regarding the "states of completion" are provided at the daily shutdown maintenance meetings. This will ensure work is being completed as per scope and identify situations where work is not.
9-Jun-22	220920	10-Jun-22	Clarified Water	500	Coal Preparation Plant – Processing Plant	Clean coal clarified tank had to be taken offline for repairs/maintenance. When this was taken off, the sump pump was also turned off due to minor leak from the pump. When this pump was taken off line, the water built up and discharged out the door	Reviewed the required coal preparation plan maintenance schedule to confirm that all equipment is functioning prior to initiating repairs. Evaluated the use of back up pumps when errors are found in the existing ones and maintenance is required.
10-Jun-22	220928	10-Jun-22	Clarified Water	2,500	Coal Preparation Plant – Processing Plant	The pumps were running, and the make-up water valve failed to close due to instrumentation error.	The valves that were incorrectly connected have been adjusted. Continue to build awareness and communication with the team around importance of functioning pump equipment within the Coal Preparation Plant.

Summary of LCO Coal Production Plant Unauthorized Discharges throughout 2022

Date of Non-compliance	DGIR #	Date Reported	Type of Material Spilled	Volume (L)	Location	Cause	Corrective Actions
09-Jul-22	221313	10-Jul-22	Clarified Water	3,000	Coal Preparation Plant – Processing Plant	A plugged sump pump in the LCO Coal Preparation Plant led to a release of clarified water.	*Continue to build awareness and communication within the operations team through training of the risks that occur from malfunctioning pump equipment within the Coal Preparation Plant.* *Additional training continues to be shared with plant operations staff on the corrective actions that are required to work around blocked/plugged sump pumps.*
22-Jul-22	221511	23-Jul-22	Clarified Water	11,000	Coal Preparation Plant – Processing Plant	Power interruption to the sump pumps at the LCO Coal Preparation Plant led to a release.	*Corrective actions to external power failures are limited, as there is an existing back-up power source for LCO Coal Preparation Plant, however it has limited output. The priorities of this existing backup power supply is aligned for workplace safety. This includes, but is not limited to: back up lighting to support employee egress, and providing power to processing equipment to reduce risk to process plant workers).*
30-Aug-22	222088	30-Aug-22	Clarified Water	20,000	Coal Preparation Plant – Processing Plant	The sieve bend tank within the LCO Coal Process Plant had become buried in process material which led to an overflow of clarified water.	*Continue to build awareness and communication within the operations team through training of the risks that occur from malfunctioning pump equipment within the Coal Preparation Plant.* *Additional investigation was undertaken on the life of the screen panels, to ensure inspections and change over are occurring at a frequent basis to reduce risk of failure.*

Summary of LCO Coal Production Plant Unauthorized Discharges throughout 2022

Date of Non-compliance	DGIR #	Date Reported	Type of Material Spilled	Volume (L)	Location	Cause	Corrective Actions
7-Oct-22	222610	7-Oct-22	Clarified Water	10,000	Coal Preparation Plant – Processing Plant	Power outage caused a shutdown to the sump pumps at the LCO Coal Preparation Plant which led to a release.	*Corrective actions to external power failures are limited, as there is an existing back-up power source for LCO Coal Preparation Plant, however it has limited output. The priorities of this existing backup power supply is aligned for workplace safety. This includes, but is not limited to: back up lighting to support employee egress, and providing power to processing equipment to reduce risk to process plant workers).*
10-Oct-22	222648	11-Oct-22	Clarified Water	3,000	Coal Preparation Plant – Processing Plant	Thickener issue caused a shutdown to the sump pumps at the LCO Coal Preparation Plant which led to a release.	*Continue to build awareness and communication within the operations team through training of the risks that occur from malfunctioning pump equipment within the Coal Preparation Plant.* *Additional training has been shared with plant operations staff on the corrective actions that are related to thickener issues within the coal preparation plant*

Summary of LCO Coal Production Plant Unauthorized Discharges throughout 2022

Date of Non-compliance	DGIR #	Date Reported	Type of Material Spilled	Volume (L)	Location	Cause	Corrective Actions
21-Oct-22	222792	21-Oct-22	Clarified Water	2,000	Coal Preparation Plant – Processing Plant	Power outage caused a shutdown to the sump pumps at the LCO Coal Preparation Plant which led to a release.	*Corrective actions to external power failures are limited, as there is an existing back-up power source for LCO Coal Preparation Plant, however it has limited output. The priorities of this existing backup power supply is aligned for workplace safety. This includes, but is not limited to: back up lighting to support employee egress, and providing power to processing equipment to reduce risk to process plant workers).*
3-Nov-22	222952	3-Nov-22	Clarified Water	2,000	Coal Preparation Plant – Processing Plant	Power interruption to the sump pumps at the LCO Coal Preparation Plant led to a release.	*Corrective actions to external power failures are limited, as there is an existing back-up power source for LCO Coal Preparation Plant, however it has limited output. The priorities of this existing backup power supply is aligned for workplace safety. This includes, but is not limited to: back up lighting to support employee egress, and providing power to processing equipment to reduce risk to process plant workers).*

Summary of LCO Coal Production Plant Unauthorized Discharges throughout 2022

Date of Non-compliance	DGIR #	Date Reported	Type of Material Spilled	Volume (L)	Location	Cause	Corrective Actions
8-Nov-22	222952	8-Nov-22	Clarified Water	5,000	Coal Preparation Plant – Processing Plant	Power interruption to the sump pumps at the LCO Coal Preparation Plant led to a release.	*Corrective actions to external power failures are limited, as there is an existing back-up power source for LCO Coal Preparation Plant, however it has limited output. The priorities of this existing backup power supply is aligned for workplace safety. This includes, but is not limited to: back up lighting to support employee egress, and providing power to processing equipment to reduce risk to process plant workers).*
22-Nov-22	223239	22-Nov-22	Clarified Water	3,000	Coal Preparation Plant – Processing Plant	Improper programming logic controls (PLC) in place for secondary pump operation when power is interrupted	*Corrective actions to improper PLC involved an engineering review of the system related to the fines pumps within the Processing Plant and ongoing corrections to ensure efficient function of the pumps.*
28-Nov-22	223316	29-Nov-22	Clarified Water	3,000	Coal Preparation Plant – Processing Plant	Improper programming logic in place for secondary pump operation when power is interrupted	*Corrective actions to improper PLC involved an engineering review of the system related to the fines pumps within the Processing Plant and ongoing corrections to ensure efficient function of the pumps.*

Summary of LCO Coal Production Plant Unauthorized Discharges throughout 2022

Date of Non-compliance	DGIR #	Date Reported	Type of Material Spilled	Volume (L)	Location	Cause	Corrective Actions
29-Nov-22	223343	30-Nov-22	Clarified Water	2,000	Coal Preparation Plant – Processing Plant	Improper programming logic in place for secondary pump operation when power is interrupted	*Corrective actions to improper PLC involved an engineering review of the system related to the fines pumps within the Processing Plant and ongoing corrections to ensure efficient function of the pumps.*
7-Dec-22	223432	7-Dec-22	Clarified Water	1,000	Coal Preparation Plant – Processing Plant	Primary sump pump shut off due to electrical trip, backup pump was offline due to mechanical issue	*Corrective Actions included repairs being made to the backup pump, and as a secondary backup; a portable temporary pump has been procured for emergency use.*
7-Dec-22	223445	7-Dec-22	Clarified Water	1,000	Coal Preparation Plant – Processing Plant	Tank overflow due to sensor failure	*Corrective actions to improper PLC involved an engineering review of the system related to the fines pumps within the Processing Plant and ongoing corrections to ensure efficient function of the pumps.*

9.5 Appendix E – 2022 Field Duplicates

2022 LCO Field Duplicates

			Location:	LC_LC1	LC_LC1		
			Sample ID:	LC_LC1_MNT_2022-05-03_N	LC_CC1_MNT_2022-05-03_N		
			Date Sampled:	5/2/2022	5/2/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	4.2	123.08%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.12	0.65	**137.66%**	Fail

			Location:	LC_LC1	LC_LC1		
			Sample ID:	LC_LC1_MNT_2022-06-07_N	LC_CC2_MNT_2022-06-07_N		
			Date Sampled:	6/6/2022	6/6/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.4	<1	33.33%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	1.20	1.25	4.08%	Pass

			Location:	LC_LC1	LC_LC1		
			Sample ID:	LC_LC1_MNT_2022-09-06_N	LC_CC2_MNT_2022-09-06_N		
			Date Sampled:	9/12/2022	9/12/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	0.15	40.00%	Pass-1

			Location:	LC_LC1	LC_LC1		
			Sample ID:	LC_LC1_WS_Q3-2022_N	LC_CC2_WS_Q3-2022_N		
			Date Sampled:	7/5/2022	7/5/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	3.0	3.2	6.45%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	2.13	52.4	**184.38%**	Fail

			Location:	LC_LC1	LC_LC1		
			Sample ID:	LC_LC1_WS_Q4-2022_N	LC_CC1_WS_Q4-2022_N		
			Date Sampled:	10/3/2022	10/3/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.10	0.14	33.33%	Pass-1

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_MNT_2021-02-08_N	LC_CC1_MNT_2021-02-08_N		
			Date Sampled:	2/8/2022	2/8/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	2.1	70.97%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.20	0.17	16.22%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_MNT_2021-03-07_N	LC_CC2_MNT_2021-03-07_N		
			Date Sampled:	3/8/2022	3/8/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.21	0.31	38.46%	Pass-1

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_MNT_2022-06-07_N	LC_CC1_MNT_2022-06-07_N		
			Date Sampled:	6/6/2022	6/6/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	3.2	104.76%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.50	0.52	3.92%	Pass

2022 LCO Field Duplicates

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_MNT_2022-12-05_N	LC_CC1_MNT_2022-12-05_N		
			Date Sampled:	12/5/2022	12/5/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.2	1.1	66.67%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.24	0.24	0.00%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2022-03-28_N	LC_CC1_WS_2022-03-28_N		
			Date Sampled:	3/28/2022	3/28/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	3.3	3.1	6.25%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	1.71	1.75	2.31%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2022-04-11_N	LC_CC1_WS_2022-04-11_N		
			Date Sampled:	4/11/2022	4/11/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.3	<1	26.09%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.40	0.37	7.79%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2022-08-08_N	LC_CC1_WS_2022-08-08_N		
			Date Sampled:	8/8/2022	8/8/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.2	1.4	15.38%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	1.51	0.26	**141.24%**	Fail

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2022-08-29_N	LC_CC1_WS_2022-08-29_N		
			Date Sampled:	8/30/2022	8/30/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	2	66.67%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.21	0.28	28.57%	Pass-1

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2022-10-17_N	LC_CC1_WS_2022-10-17_N		
			Date Sampled:	10/18/2022	10/18/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.14	0.14	0.00%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2022-12-12_N	LC_CC1_WS_2022-12-12_N		
			Date Sampled:	12/12/2022	12/12/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.34	0.5	38.10%	Pass-1

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_MNT_2021-02-08_N	LC_CC2_MNT_2021-02-08_N		
			Date Sampled:	2/8/2022	2/8/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	0.11	9.52%	Pass

2022 LCO Field Duplicates

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_MNT_2021-03-07_N	LC_CC1_MNT_2021-03-07_N		
			Date Sampled:	3/8/2022	3/8/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	<0.1	0.00%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_MNT_2022-09-06_N	LC_CC1_MNT_2022-09-06_N		
			Date Sampled:	9/6/2022	9/6/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.3	1.4	7.41%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.20	0.22	9.52%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_MNT_2022-11-08_N	LC_CC1_MNT_2022-11-08_N		
			Date Sampled:	11/7/2022	11/7/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	1.4	33.33%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	<0.1	0.00%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_022-08-15_N	LC_CC1_WS_2022-08-15_N		
			Date Sampled:	8/15/2022	8/15/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.0	2.2	9.52%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.18	0.18	0.00%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2022-01-10_N	LC_CC1_WS_2022-01-10_N		
			Date Sampled:	1/10/2022	1/10/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.4	1.3	7.41%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.11	0.16	37.04%	Pass-1

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2022-01-31_N	LC_CC1_WS_2022-01-31_N		
			Date Sampled:	1/31/2022	1/31/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.18	0.16	11.76%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2022-02-21_N	LC_CC1_WS_2022-02-21_N		
			Date Sampled:	2/23/2022	2/23/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.14	0.16	13.33%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2022-05-09_N	LC_CC1_WS_2022-05-09_N		
			Date Sampled:	5/9/2022	5/9/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	3.1	<1	102.44%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	1.27	1.13	11.67%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2022-05-16_N	LC_CC1_WS_2022-05-16_N		
			Date Sampled:	5/16/2022	5/16/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.2	1.7	25.64%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.41	0.44	7.06%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2022-07-18_N	LC_CC1_WS_2022-07-18_N		
			Date Sampled:	7/19/2022	7/19/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.3	<1	26.09%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.21	0.22	4.65%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2022-07-25_N	LC_CC1_WS_2022-07-25_N		
			Date Sampled:	7/26/2022	7/26/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	1.2	18.18%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.21	0.25	17.39%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2022-09-12_N	LC_CC1_WS_2022-09-12_N		
			Date Sampled:	9/13/2022	9/13/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.1	1.1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.19	0.16	17.14%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2022-10-31_N	LC_CC1_WS_2022-10-31_N		
			Date Sampled:	10/31/2022	10/31/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	4.3	4.6	6.74%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	2.62	3.11	17.10%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2022-11-28_N	LC_CC1_WS_2022-11-28_N		
			Date Sampled:	11/28/2022	11/28/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	1.7	51.85%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.36	0.14	88.00%	Pass-1

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2022-12-26_N	LC_CC1_WS_2022-12-26_N		
			Date Sampled:	12/28/2022	12/28/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.4	1.8	25.00%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	0.26	88.89%	Pass-1

			Location:	LC_LC5	LC_LC5		
			Sample ID:	LC_LC5_WS_2022-03-21_N	LC_CC1_WS_2022-03-21_N		
			Date Sampled:	3/22/2022	3/22/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.59	0.37	45.83%	Pass-2

2022 LCO Field Duplicates

			Location:	LC_LC5	LC_LC5		
			Sample ID:	LC_LC5_WS_2022-06-27_N	LC_CC1_WS_2022-06-27_N		
			Date Sampled:	6/27/2022	6/27/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	13.5	19.9	38.32%	Pass-2
TURBIDITY, LAB	0.1	0.1	ntu	4.57	6.01	27.22%	Pass-2

			Location:	LC_LC5	LC_LC5		
			Sample ID:	LC_LC5_WS_Q2-2022_N	LC_CC2_WS_Q2-2022_N		
			Date Sampled:	4/5/2022	4/5/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.5	5.3	**71.79%**	Fail
TURBIDITY, LAB	0.1	0.1	ntu	1.12	1.39	21.51%	Pass-2

			Location:	LC_LCDSSLCC	LC_LCDSSLCC		
			Sample ID:	LC_LCDSSLCC_WS_2022-02-28_N	LC_CC1_WS_2022-02-28_N		
			Date Sampled:	3/1/2022	3/1/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	0.15	40.00%	Pass-1

			Location:	LC_LCDSSLCC	LC_LCDSSLCC		
			Sample ID:	LC_LCDSSLCC_WS_2022-08-22_N	LC_CC1_WS_2022-08-22_N		
			Date Sampled:	8/23/2022	8/23/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	1.4	33.33%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	0.13	26.09%	Pass-1

			Location:	LC_LCDSSLCC	LC_LCDSSLCC		
			Sample ID:	LC_LCDSSLCC_WS_2022-09-19_N	LC_CC1_WS_2022-09-19_N		
			Date Sampled:	9/19/2022	9/19/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	3.2	<1	104.76%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.22	0.12	58.82%	Pass-1

			Location:	LC_LCDSSLCC	LC_LCDSSLCC		
			Sample ID:	LC_LCDSSLCC_WS_2022-10-10_N	LC_CC1_WS_2022-10-10_N		
			Date Sampled:	10/11/2022	10/11/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	2.1	70.97%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.15	0.2	28.57%	Pass-1

			Location:	LC_LCDSSLCC	LC_LCDSSLCC		
			Sample ID:	LC_LCDSSLCC_WS_2022-11-21_N	LC_CC1_WS_2022-11-21_N		
			Date Sampled:	11/21/2022	11/21/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.17	0.19	11.11%	Pass

			Location:	LC_LCDSSLCC	LC_LCDSSLCC		
			Sample ID:	LC_LCDSSLCC_WS_2022-12-19_N	LC_CC1_WS_2022-12-19_N		
			Date Sampled:	12/19/2022	12/19/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	1.7	51.85%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.20	0.28	33.33%	Pass-1

2022 LCO Field Duplicates

			Location:	LC_LCDSSLCC	LC_LCDSSLCC		
			Sample ID:	LC_LCDSSLCC_WS_Q4-2022_N	LC_CC2_WS_Q4-2022_N		
			Date Sampled:	10/3/2022	10/3/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.13	0.17	26.67%	Pass-1

			Location:	LC_LCUSWLC	LC_LCUSWLC		
			Sample ID:	LC_LCUSWLC_MNT_2022-11-08_N	LC_CC2_MNT_2022-11-08_N		
			Date Sampled:	11/9/2022	11/9/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.3	<1	26.09%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.15	0.22	37.84%	Pass-1

			Location:	LC_LCUSWLC	LC_LCUSWLC		
			Sample ID:	LC_LCUSWLC_WS_2022-01-24_NP	LC_CC1_WS_2022-01-24_N		
			Date Sampled:	1/25/2022	1/25/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	1.2	18.18%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.18	0.2	10.53%	Pass

			Location:	LC_LCUSWLC	LC_LCUSWLC		
			Sample ID:	LC_LCUSWLC_WS_2022-06-20_N	LC_CC1_WS_2022-06-20_N		
			Date Sampled:	6/22/2022	6/22/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	1.3	26.09%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.78	0.72	8.00%	Pass

			Location:	LC_SLC	LC_SLC		
			Sample ID:	LC_SLC_MNT_2022-12-05_N	LC_CC2_MNT_2022-12-05_N		
			Date Sampled:	12/5/2022	12/5/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.2	<1	18.18%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	<0.1	0.00%	Pass

			Location:	LC_SLC	LC_SLC		
			Sample ID:	LC_SLC_WS_2022-05-23_N	LC_CC1_WS_2022-05-23_N		
			Date Sampled:	5/24/2022	5/24/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.29	0.39	29.41%	Pass-1

			Location:	LC_SPDC	LC_SPDC		
			Sample ID:	LC_SPDC_WS_2022-01-10_N	LC_CC2_WS_2022-01-10_N		
			Date Sampled:	1/12/2022	1/12/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	1.8	57.14%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.39	0.45	14.29%	Pass

			Location:	LC_SPDC	LC_SPDC		
			Sample ID:	LC_SPDC_WS_2022-01-17_N	LC_CC2_WS_2022-01-17_N		
			Date Sampled:	1/19/2022	1/19/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.1	2.3	9.09%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.36	0.37	2.74%	Pass

2022 LCO Field Duplicates

			Location:	LC_SPDC	LC_SPDC		
			Sample ID:	LC_SPDC_WS_2022-02-28_N	LC_CC2_WS_2022-02-28_N		
			Date Sampled:	3/2/2022	3/2/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	1.9	62.07%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.20	0.24	18.18%	Pass

			Location:	LC_SPDC	LC_SPDC		
			Sample ID:	LC_SPDC_WS_2022-03-28_N	LC_CC3_WS_2022-03-28_N		
			Date Sampled:	3/30/2022	3/30/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.1	2.4	13.33%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	1.82	1.95	6.90%	Pass

			Location:	LC_SPDC	LC_SPDC		
			Sample ID:	LC_SPDC_WS_2022-11-21_N	LC_CC3_WS_2022-11-21_N		
			Date Sampled:	11/22/2022	11/22/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	2.6	88.89%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.22	0.34	42.86%	Pass-1

			Location:	LC_WLC	LC_WLC		
			Sample ID:	LC_WLC_WS_2022-01-17_N	LC_CC1_WS_2022-01-17_N		
			Date Sampled:	1/17/2022	1/17/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.0	1.2	18.18%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	0.23	78.79%	Pass-1

			Location:	LC_WLC	LC_WLC		
			Sample ID:	LC_WLC_WS_2022-02-14_N	LC_CC1_WS_2022-02-14_N		
			Date Sampled:	2/14/2022	2/14/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	2	66.67%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	<0.1	0.00%	Pass

			Location:	LC_WLC	LC_WLC		
			Sample ID:	LC_WLC_WS_2022-04-18_N	LC_CC1_WS_2022-04-18_N		
			Date Sampled:	4/18/2022	4/18/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.6	1.8	11.76%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	<0.1	0.00%	Pass

			Location:	LC_WLC	LC_WLC		
			Sample ID:	LC_WLC_WS_2022-04-25_N	LC_CC1_WS_2022-04-25_N		
			Date Sampled:	4/25/2022	4/25/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.2	4.5	115.79%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	<0.1	0.00%	Pass

			Location:	LC_WLC	LC_WLC		
			Sample ID:	LC_WLC_WS_2022-06-13_N	LC_CC1_WS_2022-06-13_N		
			Date Sampled:	6/13/2022	6/13/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.11	<0.1	9.52%	Pass

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			Location:	LC_WLC	LC_WLC		
			Sample ID:	LC_WLC_WS_2022-07-11_N	LC_CC1_WS_2022-07-11_N		
			Date Sampled:	7/11/2022	7/11/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.0	<1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.11	0.12	8.70%	Pass

			Location:	LC_WLC	LC_WLC		
			Sample ID:	LC_WLC_WS_2022-10-24_N	LC_CC1_WS_2022-10-24_N		
			Date Sampled:	10/24/2022	10/24/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.8	1.9	5.41%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	<0.1	0.00%	Pass

			Location:	LC_HSP	LC_HSP		
			Sample ID:	LC_HSP_MNT_2022-08-02_N	LC_CC1_MNT_2022-08-02_N		
			Date Sampled:	8/3/2022	8/3/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.9	1.7	11.11%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	1.74	1.87	7.20%	Pass

			Location:	LC_HSP	LC_HSP		
			Sample ID:	LC_HSP_WS_2022-11-14_N	LC_CC1_WS_2022-11-14_N		
			Date Sampled:	11/14/2022	11/14/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<1.0	1.2	18.18%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.10	<0.1	0.00%	Pass

			Location:	RG_CH1	RG_CH1		
			Sample ID:	RG_CH1_MON_2022-05-02_NP	FR_DC1_MON_2022-05-02_NP		
			Date Sampled:	5/13/2022	5/13/2022		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.8	1.8	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.22	0.31	33.96%	Pass-1

RPD Control Limits
Pass - RPD ≤ 20%
Pass-1 - RPD > 20%, Analysis results < 5 times Detection Limit
Pass-2 - RPD > 20% and RPD ≤ 50%, Analysis results ≥ 5 times Detection Limit and < 999 times Detection Limit
Exceeds RPD Control Limits

9.6 Appendix F – 2022 Field Blanks and Trip Blanks

2022 LCO Field Blanks			TOTAL SUSPENDED SOLIDS, LAB		TURBIDITY, LAB	TURBIDITY, LAB
			N		N	N
			mg/l		ntu	
SYS_LOC_CODE	EMS ID	Date	Result	MDL	Result	MDL
LC_LC3	200337	1/10/2022	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	1/12/2022	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	1/17/2022	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	1/19/2022	< 1.0	1.0	< 0.10	0.10
LC_LCUSWLC	E293369	1/25/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	1/31/2022	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	2/8/2022	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	2/8/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	2/14/2022	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	2/23/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	3/1/2022	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	3/7/2022	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	3/8/2022	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	3/8/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	3/14/2022	< 1.0	1.0	< 0.10	0.10
LC_LC5	200028	3/22/2022	< 1.4	1.4	< 0.10	0.10
LC_LC2	200335	3/28/2022	< 1.0	1.0	< 0.10	0.10
LC_LC2	200335	4/5/2022	< 1.0	1.0	< 0.10	0.10
LC_LC5	200028	4/5/2022	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	4/12/2022	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	4/19/2022	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	4/25/2022	< 1.0	1.0	< 0.10	0.10
LC_LC5	200028	5/9/2022	< 1.0	1.0	< 0.10	0.10
LC_LC5	200028	5/17/2022	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	5/24/2022	< 1.0	1.0	< 0.10	0.10
LC_SLC	E282149	5/24/2022	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	5/30/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	6/6/2022	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	6/6/2022	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	6/14/2022	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	6/21/2022	< 1.0	1.0	< 0.10	0.10
LC_LCUSWLC	E293369	6/22/2022	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	6/27/2022	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	6/28/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	7/5/2022	< 1.0	1.0	< 0.10	0.10
LC_LC2	200335	7/5/2022	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	7/19/2022	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	7/26/2022	< 1.0	1.0	< 0.10	0.10
LC_LC2	200335	8/3/2022	< 1.0	1.0	< 0.10	0.10
LC_LC1	E216142	8/3/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	8/8/2022	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	8/9/2022	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	8/15/2022	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	8/23/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	8/29/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	9/6/2022	< 1.0	1.0	< 0.10	0.10
LC_LC1	E216142	9/12/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	9/13/2022	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	9/19/2022	< 1.0	1.0	< 0.10	0.10
LC_LC1	E216142	10/3/2022	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	10/3/2022	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	10/11/2022	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	10/12/2022	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	10/18/2022	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	10/24/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	10/31/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	11/7/2022	< 1.0	1.0	< 0.10	0.10
LC_LCUSWLC	E293369	11/9/2022	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	11/14/2022	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	11/21/2022	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	11/22/2022	< 1.5	1.5	< 0.10	0.10
LC_LC4	200044	11/28/2022	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	12/5/2022	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	12/5/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	12/12/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	12/19/2022	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	12/28/2022	< 1.0	1.0	< 0.10	0.10

2022 LCO Trip Blanks

Sample ID	Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l		TURBIDITY, LAB N ntu	
		Result	MDL	Result	MDL
LC_RD2_WS_Q1-2022_N	1/4/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_Q1-2022_N	1/5/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-01-10_N	1/12/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-01-17_N	1/19/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-01-24_N	1/26/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-01-31_N	2/2/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_MNT_2021-02-08_N	2/9/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_MNT_2022-02-08_N	2/9/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-02-14_N	2/15/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-02-21_N	2/22/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-02-28_N	3/3/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-03-14_N	3/15/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-03-21_N	3/22/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-03-21_N	3/24/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-03-28_N	3/28/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-03-28_N	3/30/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_Q2-2022_N	4/5/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_Q2-2022_N	4/6/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-04-11_N	4/11/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-04-11_N	4/12/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-04-18_N	4/17/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-04-18_N	4/19/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-04-25_N	4/25/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-04-25_N	4/25/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_MNT_2022-05-03_N	5/5/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-05-09_N	5/9/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-05-09_N	5/11/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-05-16_N	5/17/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-05-16_N	5/17/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-05-23_N	5/24/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-05-23_N	5/24/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-05-30_N	5/30/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-05-30_N	5/31/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_MNT_2022-06-07_N	6/6/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_MNT_2022-06-07_N	6/7/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-06-13_N	6/13/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-06-13_N	6/14/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-06-20_N	6/21/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-06-20_N	6/22/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-06-27_N	6/27/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-06-27_N	6/28/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_Q3-2022_N	7/5/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_Q3-2022_N	7/6/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-07-11_N	7/11/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-07-11_N	7/12/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-07-18_N	7/18/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-07-18_N	7/19/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-07-25_N	7/25/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-07-25_N	7/26/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_MNT_2022-08-02_N	8/2/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-08-08_N	8/8/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-08-08_N	8/9/2022	< 1.0	1.0	< 0.10	0.10

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		TOTAL SUSPENDED SOLIDS, LAB		TURBIDITY, LAB	
		N		N	
		mg/l		ntu	
Sample ID	Date	Result	MDL	Result	MDL
LC_RD1_WS_2022-08-15_N	8/15/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-08-15_N	8/16/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-08-22_N	8/22/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-08-22_N	8/23/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-08-29_N	8/30/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-08-29_N	8/30/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_MNT_2022-09-06_N	9/8/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_MNT_2022-09-06_N	9/12/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-09-12_N	9/13/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-09-12_N	9/13/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-09-19_N	9/19/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-09-19_N	9/20/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_Q4-2022_N	10/3/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_Q4-2022_N	10/3/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-10-10_N	10/11/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-10-10_N	10/12/2022	< 1.0	1.0	< 0.10	0.10
LC_RD3_WS_2022-10-17_N	10/18/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-10-24_N	10/24/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-10-24_N	10/25/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-10-31_N	10/31/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-10-31_N	11/1/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_MNT_2022-11-08_N	11/7/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_MNT_2022-11-08_N	11/8/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-11-14_N	11/14/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-11-14_N	11/15/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-11-21_N	11/21/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-11-21_N	11/22/2022	< 1.5	1.5	< 0.10	0.10
LC_RD1_WS_2022-11-28_N	11/28/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-11-28_N	11/29/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_MNT_2022-12-05_N	12/5/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_MNT_2022-12-05_N	12/7/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-12-12_N	12/12/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-12-12_N	12/13/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-12-19_N	12/19/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-12-19_N	12/21/2022	< 1.0	1.0	< 0.10	0.10
LC_RD1_WS_2022-12-26_N	12/28/2022	< 1.0	1.0	< 0.10	0.10
LC_RD2_WS_2022-12-26_N	12/29/2022	< 1.0	1.0	< 0.10	0.10

9.7 Appendix G – Sample Detection Limits

Parameter	Fraction	Unit	Analytic Method	Detect Limit
48-h Static acute lethality test using Daphnia ma	N	%	EPS1RM14	
96-Hr 100% Conc. Acute lethality test for R. Trout	N	%	EPS1RM13	
ALKALINITY, TOTAL (As CaCO3)	N	mg/l	SM2320B	1
ALUMINUM	D	mg/l	SW6020A	0.003
ALUMINUM	T	mg/l	EPA 200.2/6020A	0.003
ANTIMONY	D	mg/l	SW6020A	0.0001
ANTIMONY	T	mg/l	EPA 200.2/6020A	0.0001
ARSENIC	D	mg/l	SW6020A	0.0001
ARSENIC	T	mg/l	EPA 200.2/6020A	0.0001
BARIUM	D	mg/l	SW6020A	0.0001
BARIUM	T	mg/l	EPA 200.2/6020A	0.0001
BERYLLIUM	D	mg/l	SW6020A	0.00002
BERYLLIUM	T	mg/l	EPA 200.2/6020A	0.00002
BIOCHEMICAL OXYGEN DEMAND, FIVE DAY	N	mg/l	SM5210B	2
BISMUTH	D	mg/l	SW6020A	0.00005
BISMUTH	T	mg/l	EPA 200.2/6020A	0.00005
BORON	D	mg/l	SW6020A	0.01
BORON	T	mg/l	EPA 200.2/6020A	0.01
BROMIDE	D	mg/l	EPA300.1 (mod)	0.05
CADMIUM	D	mg/l	SW6020A	0.000005
CADMIUM	T	mg/l	EPA 200.2/6020A	0.000005
CALCIUM	T	mg/l	EPA 200.2/6020A	0.05
CARBON, DISSOLVED ORGANIC	D	mg/l	APHA 5310B	0.5
CHLORIDE	D	mg/l	EPA300.1 (mod)	0.5
Chlorophyll-a	N	mg/L	EPA 445.0	0.01
CHROMIUM	D	mg/l	SW6020A	0.0001
CHROMIUM	T	mg/l	EPA 200.2/6020A	0.0001
COBALT	D	mg/l	SW6020A	0.0001
COBALT	T	mg/l	EPA 200.2/6020A	0.0001
CONDUCTIVITY, FIELD	N	us/cm	FIELD MEASURE	
CONDUCTIVITY, LAB	N	us/cm	APHA 2510	2
COPPER	D	mg/l	SW6020A	0.0005
COPPER	T	mg/l	EPA 200.2/6020A	0.0005
DISSOLVED OXYGEN, FIELD	N	mg/l	FIELD MEASURE	
Extractable Petroleum Hydrocarbons C10-C19	N	mg/l	EPH by GCFID	0.25
Extractable Petroleum Hydrocarbons C19-C32	N	mg/l	EPH by GCFID	0.25
FLUORIDE	D	mg/l	EPA300.1 (mod)	0.02
Hardness, Total or Dissolved CaCO3	N	mg/l	SM2340B	0.5
IRON	D	mg/l	SW6020A	0.01
IRON	T	mg/l	EPA 200.2/6020A	0.01
LEAD	D	mg/l	SW6020A	0.00005
LEAD	T	mg/l	EPA 200.2/6020A	0.00005
LITHIUM	D	mg/l	SW6020A	0.001
LITHIUM	T	mg/l	EPA 200.2/6020A	0.001
MAGNESIUM	T	mg/l	EPA 200.2/6020A	0.1
MANGANESE	D	mg/l	SW6020A	0.0001
MANGANESE	T	mg/l	EPA 200.2/6020A	0.0001
MERCURY	D	ug/l	A3030B/EPA1631 REV-E	0.0005
MERCURY	T	ug/l	EPA 1631 REV-E	0.0005
MOLYBDENUM	D	mg/l	SW6020A	0.00005
MOLYBDENUM	T	mg/l	EPA 200.2/6020A	0.00005
NICKEL	D	mg/l	SW6020A	0.0005
NICKEL	T	mg/l	EPA 200.2/6020A	0.0005
NITRATE NITROGEN (NO3), AS N	N	mg/l	EPA300.1 (mod)	0.005
NITRITE NITROGEN (NO2), AS N	N	mg/l	EPA300.1 (mod)	0.001
NITROGEN, AMMONIA (AS N)	N	mg/l	JENVMON	0.005
ORTHO-PHOSPHATE	N	mg/l	A4500P	0.001
pH, Field	N	pH units	FIELD MEASURE	
pH, LAB	N	pH units	APHA 4500-H	0.1
PHOSPHORUS	N	mg/l	A4500P	0.002
POTASSIUM	T	mg/l	EPA 200.2/6020A	0.05
SELENIUM	D	ug/l	E1638M	0.053
SELENIUM	D	ug/l	SW6020A	0.05
SELENIUM	T	ug/l	E1638M	0.053
SELENIUM	T	ug/l	EPA 200.2/6020A	0.05
SILVER	D	mg/l	SW6020A	0.00001
SILVER	T	mg/l	EPA 200.2/6020A	0.00001
SODIUM	T	mg/l	EPA 200.2/6020A	0.05
STRONTIUM	D	mg/l	SW6020A	0.0002
STRONTIUM	T	mg/l	EPA 200.2/6020A	0.0002
SULFATE (AS SO4)	D	mg/l	EPA300.1 (mod)	0.3
SULFIDE	T	mg/l	A4500SE	0.0015
SULFIDE	T	mg/L	SM4500S2D	0.002
TEMPERATURE, FIELD	N	°C	FIELD MEASURE	
THALLIUM	D	mg/l	SW6020A	0.00001
THALLIUM	T	mg/l	EPA 200.2/6020A	0.00001
The sum of extractable petroleum hydrocarbons C10-C19 and C19-C32.	N	mg/l	EPH_CALC	0.5
TIN	D	mg/l	SW6020A	0.0001
TIN	T	mg/l	EPA 200.2/6020A	0.0001
TITANIUM	D	mg/l	SW6020A	0.01
TITANIUM	T	mg/l	EPA 200.2/6020A	0.01
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	N	mg/l	SM2540C	20
TOTAL KJELDAHL NITROGEN	N	mg/l	APHA 4500-NORG	0.05
TOTAL KJELDAHL NITROGEN	N	mg/l	FIELD MEASURE	0.05
TOTAL ORGANIC CARBON	T	mg/l	APHA 5310B	0.5
TOTAL SUSPENDED SOLIDS, LAB	N	mg/l	SM2540D	1
TURBIDITY, LAB	N	NTU	E180.1	0.1
URANIUM	D	mg/l	SW6020A	0.00001
URANIUM	T	mg/l	EPA 200.2/6020A	0.00001
VANADIUM	D	mg/l	SW6020A	0.0005
VANADIUM	T	mg/l	EPA 200.2/6020A	0.0005
ZINC	D	mg/l	SW6020A	0.001
ZINC	T	mg/l	EPA 200.2/6020A	0.003

T – Total, D – Dissolved, N – No fraction/not applicable

9.8 Appendix H – 2022 Monitoring Data

Teck Location Code	Sample Date	Flow Remark	Method	Flow m3/s
				Result
LC_DC1	1/5/2022		rating curve	0.1314
LC_DC1	1/12/2022		rating curve	0.0918
LC_DC1	1/19/2022		rating curve	0.0674
LC_DC1	1/26/2022		rating curve	0.0832
LC_DC1	2/2/2022		rating curve	0.0832
LC_DC1	2/9/2022		rating curve	0.0790
LC_DC1	2/15/2022		rating curve	0.0832
LC_DC1	2/22/2022		rating curve	0.0832
LC_DC1	3/2/2022		rating curve	0.0638
LC_DC1	3/7/2022		rating curve	0.0638
LC_DC1	3/15/2022		rating curve	0.0638
LC_DC1	3/23/2022		rating curve	0.0832
LC_DC1	3/30/2022		rating curve	0.2693
LC_DC1	4/6/2022		rating curve	0.2293
LC_DC1	4/12/2022		rating curve	1.6131
LC_DC1	4/19/2022		rating curve	0.2293
LC_DC1	4/24/2022		rating curve	0.1455
LC_DC1	5/3/2022		rating curve	0.4685
LC_DC1	5/13/2022		rating curve	0.4125
LC_DC1	5/17/2022		rating curve	0.7355
LC_DC1	5/24/2022		rating curve	0.5931
LC_DC1	5/31/2022		rating curve	0.8962
LC_DC1	6/7/2022		rating curve	1.1733
LC_DC1	6/14/2022		rating curve	0.8962
LC_DC1	6/21/2022		rating curve	1.7362
LC_DC1	6/28/2022		rating curve	1.0760
LC_DC1	7/7/2022		rating curve	0.8962
LC_DC1	7/12/2022		rating curve	0.8962
LC_DC1	7/18/2022		rating curve	0.8135
LC_DC1	7/28/2022		rating curve	0.6620
LC_DC1	8/2/2022		rating curve	0.6388
LC_DC1	8/9/2022		rating curve	0.4442
LC_DC1	8/18/2022		rating curve	0.4685
LC_DC1	8/23/2022		rating curve	0.3859
LC_DC1	8/30/2022		rating curve	0.5059
LC_DC1	9/8/2022		rating curve	0.4442
LC_DC1	9/13/2022		rating curve	0.3309
LC_DC1	9/20/2022		rating curve	0.3859
LC_DC1	9/27/2022		rating curve	0.4442
LC_DC1	10/4/2022		rating curve	0.4442
LC_DC1	10/12/2022		rating curve	0.3859
LC_DC1	10/18/2022		rating curve	0.5059
LC_DC1	10/25/2022		rating curve	0.3859
LC_DC1	11/1/2022		rating curve	0.4442
LC_DC1	11/8/2022	Staff gauge frozen	rating curve	0.0
LC_DC1	11/15/2022	Staff gauge frozen	rating curve	0.0
LC_DC1	11/21/2022	Staff gauge frozen	rating curve	0.0
LC_DC1	11/22/2022	Staff gauge frozen	rating curve	0.0
LC_DC1	11/29/2022	Staff gauge frozen	rating curve	0.0
LC_DC1	12/7/2022	Staff gauge frozen	rating curve	0.0
LC_DC1	12/13/2022	Staff gauge frozen	rating curve	0.0
LC_DC1	12/20/2022	Staff gauge frozen	rating curve	0.0
LC_DC1	12/29/2022	Staff gauge frozen	rating curve	0.0
LC_DC3	1/5/2022		rating curve	0.2382
LC_DC3	1/12/2022		rating curve	0.1193
LC_DC3	1/19/2022		rating curve	0.2680
LC_DC3	1/24/2022		rating curve	0.1170
LC_DC3	2/2/2022	Staff gauge frozen	rating curve	0.0000
LC_DC3	2/9/2022		rating curve	0.1689
LC_DC3	2/15/2022		rating curve	0.1216
LC_DC3	2/22/2022	Staff gauge frozen	rating curve	0.0000
LC_DC3	3/2/2022		rating curve	0.1568

Teck Location Code	Sample Date	Flow Remark	Method	Flow m3/s Result
LC_DC3	3/8/2022	Staff gauge frozen	rating curve	0.0
LC_DC3	3/15/2022		rating curve	0.0993
LC_DC3	3/23/2022	Staff gauge frozen	rating curve	0.0000
LC_DC3	3/30/2022		rating curve	0.3415
LC_DC3	4/6/2022		rating curve	0.2463
LC_DC3	4/12/2022		rating curve	0.2625
LC_DC3	4/17/2022		rating curve	0.1689
LC_DC3	4/24/2022		rating curve	0.2598
LC_DC3	5/3/2022		rating curve	0.3299
LC_DC3	5/11/2022		rating curve	0.3887
LC_DC3	5/17/2022		rating curve	0.3947
LC_DC3	5/24/2022		rating curve	0.3299
LC_DC3	5/31/2022		rating curve	0.4189
LC_DC3	6/7/2022		rating curve	0.4189
LC_DC3	6/14/2022		rating curve	0.3887
LC_DC3	6/21/2022		rating curve	0.6240
LC_DC3	6/28/2022		rating curve	0.4128
LC_DC3	7/7/2022		rating curve	0.3299
LC_DC3	7/12/2022		rating curve	0.3014
LC_DC3	7/18/2022		rating curve	0.3014
LC_DC3	7/25/2022		rating curve	0.2463
LC_DC3	8/2/2022		rating curve	0.2356
LC_DC3	8/9/2022		rating curve	0.2463
LC_DC3	8/16/2022		rating curve	0.1940
LC_DC3	8/23/2022		rating curve	0.0689
LC_DC3	8/30/2022		rating curve	0.0675
LC_DC3	9/6/2022		rating curve	0.0622
LC_DC3	9/13/2022		rating curve	0.0558
LC_DC3	9/20/2022		rating curve	0.0558
LC_DC3	9/27/2022		rating curve	0.0390
LC_DC3	10/4/2022		rating curve	0.0442
LC_DC3	10/12/2022		rating curve	0.0390
LC_DC3	10/18/2022		rating curve	0.0390
LC_DC3	10/25/2022		rating curve	0.0390
LC_DC3	11/1/2022		rating curve	0.0390
LC_DC3	11/8/2022		rating curve	0.1089
LC_DC3	11/15/2022		rating curve	0.0510
LC_DC3	11/21/2022		rating curve	0.0475
LC_DC3	11/22/2022		rating curve	0.0475
LC_DC3	11/29/2022		rating curve	0.3813
LC_DC3	12/7/2022		rating curve	0.0380
LC_DC3	12/13/2022		rating curve	0.0390
LC_DC3	12/20/2022	Staff gauge frozen	rating curve	0.0
LC_DC3	12/29/2022	Staff gauge frozen	rating curve	0.0
LC_DCDS	1/5/2022		rating curve	0.1235
LC_DCDS	1/12/2022		rating curve	0.1029
LC_DCDS	1/19/2022		rating curve	0.0991
LC_DCDS	1/26/2022		rating curve	0.1109
LC_DCDS	2/1/2022		rating curve	0.1235
LC_DCDS	2/9/2022		rating curve	0.0934
LC_DCDS	2/15/2022		rating curve	0.1029
LC_DCDS	2/22/2022		rating curve	0.1235
LC_DCDS	3/1/2022		rating curve	0.1029
LC_DCDS	3/8/2022		rating curve	0.1029
LC_DCDS	3/15/2022		rating curve	0.0741
LC_DCDS	3/23/2022		rating curve	0.1029
LC_DCDS	3/30/2022		rating curve	0.4104
LC_DCDS	4/6/2022		rating curve	0.2902
LC_DCDS	4/12/2022		rating curve	0.2902
LC_DCDS	4/17/2022		rating curve	0.1975
LC_DCDS	4/24/2022		rating curve	0.2902
LC_DCDS	5/3/2022		rating curve	0.4439

Teck Location Code	Sample Date	Flow Remark	Method	Flow m3/s
				Result
LC_DCDS	5/11/2022		rating curve	0.2116
LC_DCDS	5/17/2022		rating curve	0.5339
LC_DCDS	5/24/2022		rating curve	0.4878
LC_DCDS	5/31/2022		rating curve	0.8581
LC_DCDS	6/7/2022		rating curve	1.1203
LC_DCDS	6/14/2022		rating curve	0.6329
LC_DCDS	6/21/2022		rating curve	1.9418
LC_DCDS	6/28/2022		rating curve	0.6858
LC_DCDS	7/7/2022		rating curve	0.4878
LC_DCDS	7/12/2022		rating curve	0.4439
LC_DCDS	7/18/2022		rating curve	0.4439
LC_DCDS	7/25/2022		rating curve	0.4439
LC_DCDS	8/2/2022		rating curve	0.2572
LC_DCDS	8/9/2022		rating curve	0.1708
LC_DCDS	8/16/2022		rating curve	0.1708
LC_DCDS	8/23/2022		rating curve	0.0767
LC_DCDS	8/30/2022		rating curve	0.0891
LC_DCDS	9/6/2022		rating curve	0.0654
LC_DCDS	9/13/2022		rating curve	0.0654
LC_DCDS	9/20/2022		rating curve	0.0767
LC_DCDS	9/27/2022		rating curve	0.0654
LC_DCDS	10/4/2022		rating curve	0.0553
LC_DCDS	10/11/2022		rating curve	0.0654
LC_DCDS	10/18/2022		rating curve	0.0553
LC_DCDS	10/25/2022		rating curve	0.0654
LC_DCDS	11/1/2022		rating curve	0.0553
LC_DCDS	11/8/2022		rating curve	0.0553
LC_DCDS	11/15/2022		rating curve	0.0602
LC_DCDS	11/21/2022		rating curve	0.0462
LC_DCDS	11/22/2022		rating curve	0.0462
LC_DCDS	11/29/2022		rating curve	0.0654
LC_DCDS	12/7/2022		rating curve	0.0506
LC_DCDS	12/13/2022		rating curve	0.0553
LC_DCDS	12/20/2022	Ice impacting staff gauge and water level	rating curve	0.1335
LC_DCDS	12/29/2022		rating curve	0.0654
LC_DCEF	1/5/2022		rating curve	0.0033
LC_DCEF	2/9/2022		rating curve	0.0010
LC_DCEF	3/7/2022		rating curve	0.0019
LC_DCEF	4/6/2022		rating curve	0.0338
LC_DCEF	5/3/2022		rating curve	0.0637
LC_DCEF	6/21/2022		rating curve	1.0500
LC_DCEF	7/7/2022		rating curve	0.0420
LC_DCEF	8/2/2022		rating curve	0.0033
LC_DCEF	9/6/2022		rating curve	0.0010
LC_DCEF	10/18/2022		rating curve	0.0063
LC_DCEF	11/15/2022		rating curve	0.0095
LC_DCEF	12/7/2022		rating curve	0.0021
LC_GRCK	4/28/2022		rating curve	0.0372
LC_GRCK	4/28/2022	RISC Grade=A; EDP calculated instant_flow = 0.037 m3/s; EDP calculated velocity = 0.173 m/s	open channel	0.0371
LC_GRCK	5/11/2022		rating curve	1.3826
LC_GRCK	6/23/2022		rating curve	0.4060
LC_GRCK	7/6/2022		rating curve	0.2290
LC_GRCK	8/9/2022		rating curve	0.0853
LC_GRCK	8/9/2022	RISC Grade=C; EDP calculated instant_flow = 0.073 m3/s; EDP calculated velocity = 0.216 m/s	open channel	0.0726
LC_GRCK	9/8/2022		rating curve	0.0450

Teck Location Code	Sample Date	Flow Remark	Method	Flow m3/s
				Result
LC_GRCK	10/27/2022	RISC Grade=C; EDP calculated instant_flow = 0.048 m3/s; EDP calculated velocity = 0.249 m/s	open channel	0.0479
LC_GRCK	11/16/2022	Staff gauge frozen	rating curve	
LC_GRCK	11/17/2022		rating curve	0.0200
LC_GRCK	11/30/2022	Staff gauge frozen	rating curve	
LC_GRCK	12/21/2022	Staff gauge frozen	rating curve	
LC_LC11	1/31/2022	Not discharging pending upgrades. Material taken off site	rating curve	0.0
LC_LC11	2/28/2022	Not discharging pending upgrades. Material taken off site	rating curve	0.0
LC_LC11	3/31/2022	Not discharging pending upgrades. Material taken off site	rating curve	0.0
LC_LC11	4/30/2022	Not discharging pending upgrades. Material taken off site	rating curve	0.0
LC_LC11	5/31/2022	Not discharging pending upgrades. Material taken off site	rating curve	0.0
LC_LC11	6/30/2022	Not discharging pending upgrades. Material taken off site	rating curve	0.0
LC_LC11	7/29/2022	Not discharging pending upgrades. Material taken off site	rating curve	0.0
LC_LC11	8/31/2022	Not discharging pending upgrades. Material taken off site	rating curve	0.0
LC_LC11	9/30/2022	Not discharging pending upgrades. Material taken off site	rating curve	0.0
LC_LC11	10/31/2022	Not discharging pending upgrades. Material taken off site	rating curve	0.0
LC_LC11	11/30/2022	Not discharging pending upgrades. Material taken off site	rating curve	0.0
LC_LC11	12/31/2022	Not discharging pending upgrades. Material taken off site	rating curve	0.0
LC_LC7	1/4/2022		rating curve	0.0797
LC_LC7	2/8/2022		rating curve	0.0539
LC_LC7	3/8/2022		rating curve	1.6116
LC_LC7	3/14/2022		rating curve	0.0410
LC_LC7	3/22/2022		rating curve	0.0410
LC_LC7	3/28/2022		rating curve	0.0987
LC_LC7	4/5/2022		rating curve	0.1331
LC_LC7	4/13/2022		rating curve	0.1905
LC_LC7	4/18/2022		rating curve	0.1155
LC_LC7	4/24/2022		rating curve	0.1515
LC_LC7	5/2/2022		rating curve	0.1706
LC_LC7	5/9/2022		rating curve	0.1905
LC_LC7	5/13/2022	RISC Grade=C; EDP calculated instant_flow = 0.137 m3/s; EDP calculated velocity = 0.343 m/s	open channel	0.1367
LC_LC7	5/16/2022		rating curve	0.1905
LC_LC7	5/24/2022	Debris in fish fence above staff gauge	rating curve	0.1706
LC_LC7	5/30/2022		rating curve	0.1905
LC_LC7	6/8/2022		rating curve	0.1905
LC_LC7	6/14/2022		rating curve	0.2111
LC_LC7	6/20/2022		rating curve	0.1905
LC_LC7	6/27/2022		rating curve	0.1706
LC_LC7	7/5/2022		rating curve	0.1706
LC_LC7	7/11/2022		rating curve	0.1905
LC_LC7	8/3/2022		rating curve	0.1515
LC_LC7	9/6/2022		rating curve	0.1706
LC_LC7	9/19/2022		rating curve	0.1331
LC_LC7	10/3/2022		rating curve	0.1515
LC_LC7	11/8/2022		rating curve	0.0797
LC_LC7	12/5/2022		rating curve	0.0

Teck Location Code	Sample Date	Flow Remark	Method	Flow m3/s
				Result
LC_LC8	1/31/2022	Not discharging	rating curve	0.0
LC_LC8	2/28/2022	Not discharging	rating curve	0.0
LC_LC8	3/31/2022	Not discharging	rating curve	0.0
LC_LC8	4/30/2022	Not discharging	rating curve	0.0
LC_LC8	5/31/2022	Not discharging	rating curve	0.0
LC_LC8	6/30/2022	Not discharging	rating curve	0.0
LC_LC8	7/29/2022	Not discharging	rating curve	0.0
LC_LC8	8/31/2022	Not discharging	rating curve	0.0
LC_LC8	9/30/2022	Not discharging	rating curve	0.0
LC_LC8	10/31/2022	Not discharging	rating curve	0.0
LC_LC8	11/30/2022	Not discharging	rating curve	0.0
LC_LC8	12/31/2022	Not discharging	rating curve	0.0
LC_LC9	1/31/2022	Not discharging	rating curve	0.0
LC_LC9	2/28/2022	Not discharging	rating curve	0.0
LC_LC9	3/31/2022	Not discharging	rating curve	0.0
LC_LC9	4/30/2022	Not discharging	rating curve	0.0
LC_LC9	5/31/2022	Not discharging	rating curve	0.0
LC_LC9	6/30/2022	Not discharging	rating curve	0.0
LC_LC9	7/29/2022	Not discharging	rating curve	0.0
LC_LC9	8/31/2022	Not discharging	rating curve	0.0
LC_LC9	9/30/2022	Not discharging	rating curve	0.0
LC_LC9	10/31/2022	Not discharging	rating curve	0.0
LC_LC9	11/30/2022	Not discharging	rating curve	0.0
LC_LC9	12/31/2022	Not discharging	rating curve	0.0
LC_SBPIN	1/20/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	2/10/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	2/14/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	2/24/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	3/3/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	3/10/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	3/17/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	4/27/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	5/17/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	6/30/2022	No sample in June due to upgrades. Installing filters. Material taken off site.	rating curve	
LC_SBPIN	7/29/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	8/31/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	9/30/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	10/31/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	11/30/2022	Max volume capacity of steam bay	volumetric	67.5
LC_SBPIN	12/31/2022	Max volume capacity of steam bay	volumetric	67.5
LC_UC	1/18/2022	EDP calculated instant_flow = 0.344 l	volumetric	0.0010
LC_UC	2/16/2022	EDP calculated instant_flow = 0.496 l	volumetric	0.0015
LC_UC	3/30/2022	EDP calculated instant_flow = 0.45 l	volumetric	0.0005
LC_UC	4/29/2022		volumetric	0.0031
LC_UC	5/11/2022	EDP calculated instant_flow = 0.97 l	volumetric	0.0029
LC_UC	6/23/2022	EDP calculated instant_flow = 3.837 l	rating curve	0.0
LC_UC	7/6/2022		volumetric	0.0350
LC_UC	8/9/2022	EDP calculated instant_flow = 1.24 l	volumetric	0.0037
LC_UC	9/8/2022	EDP calculated instant_flow = 0.693 l	volumetric	0.0021
LC_UC	10/27/2022	Bucket test	volumetric	0.0006
LC_UC	11/17/2022	EDP calculated instant_flow = 0.588 l	volumetric	0.0024
LC_UC	12/21/2022	Partly frozen, Trickle for bucket test	volumetric	0.0001

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_LC1	1/25/2022	< 1.0	< 0.10
LC_LC1	2/10/2022	< 1.0	< 0.10
LC_LC1	3/28/2022	< 1.0	0.12
LC_LC1	4/5/2022	< 1.0	0.13
LC_LC1	4/13/2022	< 1.0	0.39
LC_LC1	4/18/2022	< 1.0	< 0.10
LC_LC1	4/24/2022	< 1.0	0.10
LC_LC1	5/2/2022	< 1.0	0.12
LC_LC1	5/9/2022	1.3	0.14
LC_LC1	5/16/2022	< 1.0	0.13
LC_LC1	5/25/2022	< 1.0	< 0.10
LC_LC1	5/30/2022	< 1.0	< 0.10
LC_LC1	6/6/2022	1.4	1.20
LC_LC1	6/13/2022	4.4	1.80
LC_LC1	6/20/2022	7.6	1.96
LC_LC1	6/29/2022	1.8	1.00
LC_LC1	7/5/2022	3.0	2.13
LC_LC1	7/13/2022	1.9	< 0.10
LC_LC1	8/3/2022	< 1.0	0.12
LC_LC1	9/12/2022	< 1.0	< 0.10
LC_LC1	9/29/2022	< 1.0	0.19
LC_LC1	10/3/2022	< 1.0	0.10
LC_LC1	11/7/2022	< 1.0	< 0.10
LC_LC12	5/2/2022	< 1.0	0.74
LC_LC12	5/9/2022	< 1.0	0.39
LC_LC12	5/18/2022	1.6	0.30
LC_LC12	5/24/2022	3.6	0.17
LC_LC12	5/30/2022	< 1.0	0.12
LC_LC12	6/6/2022	< 1.0	0.21
LC_LC12	6/13/2022	< 1.0	0.21
LC_LC12	6/20/2022	1.3	0.48
LC_LC12	6/27/2022	< 1.0	0.31
LC_LC12	7/5/2022	< 1.0	0.12
LC_LC12	7/13/2022	1.4	0.12
LC_LC2	1/4/2022	< 1.0	0.12
LC_LC2	2/8/2022	< 1.0	< 0.10
LC_LC2	3/8/2022	< 1.0	< 0.10
LC_LC2	3/14/2022	< 1.0	< 0.10
LC_LC2	3/22/2022	< 1.0	< 0.10
LC_LC2	3/28/2022	2.7	< 0.10
LC_LC2	4/5/2022	< 1.0	0.14
LC_LC2	4/13/2022	< 1.0	0.29
LC_LC2	4/18/2022	< 1.0	< 0.10
LC_LC2	4/24/2022	< 1.0	< 0.10
LC_LC2	5/2/2022	< 1.0	0.27
LC_LC2	5/9/2022	< 1.0	0.14
LC_LC2	5/16/2022	< 1.0	0.18
LC_LC2	5/24/2022	< 1.0	< 0.10
LC_LC2	5/30/2022	< 1.0	0.44
LC_LC2	6/8/2022	7.2	1.31
LC_LC2	6/13/2022	8.5	3.12
LC_LC2	6/20/2022	54.0	29.7
LC_LC2	6/27/2022	31.1	2.16
LC_LC2	7/5/2022	2.8	1.49
LC_LC2	7/11/2022	2.5	0.32

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_LC2	8/3/2022	< 1.0	< 0.10
LC_LC2	8/23/2022	1.4	0.16
LC_LC2	9/6/2022	< 1.0	< 0.10
LC_LC2	10/3/2022	4.8	0.27
LC_LC2	11/8/2022	< 1.0	0.26
LC_LC2	12/5/2022	< 1.0	0.10
LC_LC3	1/4/2022	1.1	0.23
LC_LC3	1/7/2022	< 1.0	0.19
LC_LC3	1/10/2022	1.4	0.25
LC_LC3	1/25/2022	< 1.0	0.24
LC_LC3	2/1/2022	2.6	0.30
LC_LC3	2/8/2022	< 1.0	0.20
LC_LC3	2/15/2022	2.3	0.31
LC_LC3	2/22/2022	3.1	0.40
LC_LC3	3/1/2022	1.2	0.39
LC_LC3	3/8/2022	< 1.0	0.21
LC_LC3	3/15/2022	< 1.0	0.37
LC_LC3	3/22/2022	2.0	0.47
LC_LC3	3/28/2022	3.3	1.71
LC_LC3	4/7/2022	< 1.0	0.43
LC_LC3	4/11/2022	1.3	0.40
LC_LC3	4/19/2022	< 1.0	0.32
LC_LC3	4/25/2022	1.0	0.22
LC_LC3	5/5/2022	2.8	0.38
LC_LC3	5/9/2022	2.3	0.26
LC_LC3	5/17/2022	1.1	0.35
LC_LC3	5/24/2022	1.3	0.20
LC_LC3	5/31/2022	1.1	0.19
LC_LC3	6/6/2022	< 1.0	0.50
LC_LC3	6/14/2022	1.2	0.36
LC_LC3	6/22/2022	1.9	0.58
LC_LC3	6/27/2022	2.2	0.43
LC_LC3	7/5/2022	< 1.0	0.28
LC_LC3	7/11/2022	1.5	0.36
LC_LC3	7/19/2022	< 1.0	0.37
LC_LC3	7/26/2022	< 1.0	0.17
LC_LC3	8/3/2022	< 1.0	0.32
LC_LC3	8/8/2022	1.2	1.51
LC_LC3	8/16/2022	1.6	0.15
LC_LC3	8/17/2022	< 1.0	0.19
LC_LC3	8/23/2022	< 1.0	0.25
LC_LC3	8/30/2022	< 1.0	0.21
LC_LC3	9/6/2022	< 1.0	0.19
LC_LC3	9/13/2022	< 1.0	0.22
LC_LC3	9/19/2022	< 1.0	0.23
LC_LC3	9/29/2022	1.5	0.72
LC_LC3	10/3/2022	< 1.0	0.38
LC_LC3	10/11/2022	< 1.0	0.18
LC_LC3	10/18/2022	< 1.0	0.14
LC_LC3	10/25/2022	1.3	< 0.10
LC_LC3	11/1/2022	10.1	0.99
LC_LC3	11/8/2022	1.5	0.32
LC_LC3	11/14/2022	< 1.0	0.15
LC_LC3	11/21/2022	< 1.0	0.42
LC_LC3	11/28/2022	1.8	0.27

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_LC3	12/5/2022	2.2	0.24
LC_LC3	12/12/2022	< 1.0	0.34
LC_LC3	12/19/2022	< 1.0	0.20
LC_LC3	12/28/2022	< 1.0	0.21
LC_LC4	1/4/2022	< 1.0	0.27
LC_LC4	1/10/2022	1.4	0.11
LC_LC4	1/17/2022	< 1.0	0.13
LC_LC4	1/25/2022	< 1.0	0.12
LC_LC4	1/31/2022	< 1.0	0.18
LC_LC4	2/8/2022	< 1.0	< 0.10
LC_LC4	2/14/2022	< 1.0	0.11
LC_LC4	2/23/2022	< 1.0	0.14
LC_LC4	3/1/2022	1.6	1.09
LC_LC4	3/1/2022	7.4	7.01
LC_LC4	3/2/2022	1.3	3.36
LC_LC4	3/8/2022	< 1.0	< 0.10
LC_LC4	3/14/2022	2.8	1.14
LC_LC4	3/22/2022	< 1.0	0.17
LC_LC4	3/29/2022	1.8	0.98
LC_LC4	4/7/2022	< 1.0	0.22
LC_LC4	4/11/2022	1.1	0.17
LC_LC4	4/19/2022	6.7	0.45
LC_LC4	4/25/2022	3.1	0.23
LC_LC4	5/5/2022	5.2	0.76
LC_LC4	5/9/2022	3.1	1.27
LC_LC4	5/16/2022	2.2	0.41
LC_LC4	5/24/2022	3.7	0.33
LC_LC4	5/30/2022	32.5	4.79
LC_LC4	6/6/2022	8.6	1.98
LC_LC4	6/13/2022	17.0	3.80
LC_LC4	6/14/2022	12.8	11.6
LC_LC4	6/16/2022	6.5	4.35
LC_LC4	6/17/2022	18.4	9.19
LC_LC4	6/18/2022	133	42.4
LC_LC4	6/19/2022	34.4	13.2
LC_LC4	6/20/2022	18.5	5.89
LC_LC4	6/21/2022	5.8	4.47
LC_LC4	6/22/2022	8.9	4.37
LC_LC4	6/22/2022	12.0	5.07
LC_LC4	6/23/2022	12.0	1.67
LC_LC4	6/24/2022	5.8	2.11
LC_LC4	6/25/2022	3.1	1.29
LC_LC4	6/26/2022	2.3	0.78
LC_LC4	6/27/2022	3.8	1.83
LC_LC4	7/5/2022	2.0	1.07
LC_LC4	7/5/2022	1.9	0.53
LC_LC4	7/11/2022	1.3	0.74
LC_LC4	7/19/2022	1.3	0.21
LC_LC4	7/26/2022	< 1.0	0.21
LC_LC4	8/2/2022	1.5	0.18
LC_LC4	8/8/2022	1.2	0.16
LC_LC4	8/15/2022	2.0	0.18
LC_LC4	8/22/2022	1.0	0.21
LC_LC4	8/29/2022	2.5	0.42
LC_LC4	9/6/2022	1.3	0.20

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_LC4	9/13/2022	1.1	0.19
LC_LC4	9/19/2022	1.1	0.14
LC_LC4	9/29/2022	1.9	0.32
LC_LC4	10/3/2022	< 1.0	0.17
LC_LC4	10/11/2022	1.0	0.16
LC_LC4	10/17/2022	< 1.0	0.22
LC_LC4	10/24/2022	1.3	0.10
LC_LC4	10/31/2022	4.3	2.62
LC_LC4	11/7/2022	< 1.0	< 0.10
LC_LC4	11/14/2022	1.4	0.14
LC_LC4	11/21/2022	< 1.0	0.21
LC_LC4	11/28/2022	< 1.0	0.36
LC_LC4	12/5/2022	< 1.0	0.13
LC_LC4	12/12/2022	< 1.0	< 0.10
LC_LC4	12/19/2022	< 1.0	0.36
LC_LC4	12/28/2022	1.4	< 0.10
LC_LC5	1/6/2022	3.6	0.22
LC_LC5	2/1/2022	1.2	0.22
LC_LC5	2/15/2022	1.7	0.40
LC_LC5	2/22/2022	1.1	0.16
LC_LC5	3/1/2022	1.2	0.20
LC_LC5	3/8/2022	1.5	0.34
LC_LC5	3/15/2022	< 1.0	0.27
LC_LC5	3/22/2022	< 1.0	0.59
LC_LC5	3/29/2022	6.7	3.60
LC_LC5	4/5/2022	2.5	1.12
LC_LC5	4/13/2022	6.3	1.46
LC_LC5	4/18/2022	1.9	0.46
LC_LC5	4/25/2022	2.1	0.63
LC_LC5	5/3/2022	6.8	2.46
LC_LC5	5/9/2022	10.1	3.16
LC_LC5	5/17/2022	4.6	2.04
LC_LC5	5/24/2022	11.2	0.41
LC_LC5	5/31/2022	10.1	0.36
LC_LC5	6/6/2022	65.3	18.5
LC_LC5	6/14/2022	38.8	18.8
LC_LC5	6/22/2022	76.1	22.8
LC_LC5	6/27/2022	13.5	4.57
LC_LC5	7/5/2022	23.2	8.32
LC_LC5	7/11/2022	14.4	0.80
LC_LC5	8/16/2022	< 1.0	0.15
LC_LC5	8/22/2022	1.8	0.15
LC_LC5	8/30/2022	1.6	0.74
LC_LC5	9/6/2022	< 1.0	0.19
LC_LC5	9/13/2022	2.1	0.13
LC_LC5	10/11/2022	1.4	0.27
LC_LC5	10/18/2022	7.8	1.69
LC_LC5	10/25/2022	1.1	0.19
LC_LC5	11/1/2022	< 1.0	0.34
LC_LC5	11/8/2022	3.7	0.40
LC_LC5	12/5/2022	< 1.0	0.17
LC_LCUSWLC	1/4/2022	< 1.0	0.18
LC_LCUSWLC	1/10/2022	< 1.0	0.17
LC_LCUSWLC	1/17/2022	< 1.0	0.24
LC_LCUSWLC	1/19/2022	< 1.0	0.20

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_LCUSWLC	1/20/2022	2.9	0.15
LC_LCUSWLC	1/21/2022	1.9	0.13
LC_LCUSWLC	1/25/2022	< 1.0	0.18
LC_LCUSWLC	1/26/2022	< 1.0	0.12
LC_LCUSWLC	1/27/2022	< 1.0	0.19
LC_LCUSWLC	1/28/2022	2.8	0.24
LC_LCUSWLC	1/29/2022	< 1.0	0.17
LC_LCUSWLC	1/30/2022	< 1.0	0.18
LC_LCUSWLC	1/31/2022	< 1.0	0.22
LC_LCUSWLC	2/1/2022	< 1.0	0.19
LC_LCUSWLC	2/2/2022	< 1.0	0.23
LC_LCUSWLC	2/3/2022	< 1.0	0.28
LC_LCUSWLC	2/4/2022	< 1.0	0.20
LC_LCUSWLC	2/5/2022	< 1.0	0.19
LC_LCUSWLC	2/6/2022	< 1.0	< 0.10
LC_LCUSWLC	2/7/2022	1.8	0.10
LC_LCUSWLC	2/8/2022	< 1.0	0.11
LC_LCUSWLC	2/9/2022	1.0	0.17
LC_LCUSWLC	2/10/2022	1.5	0.22
LC_LCUSWLC	2/14/2022	< 1.0	0.15
LC_LCUSWLC	2/15/2022	< 1.0	0.17
LC_LCUSWLC	2/16/2022	1.6	0.20
LC_LCUSWLC	2/17/2022	< 1.0	0.14
LC_LCUSWLC	2/23/2022	< 1.0	0.16
LC_LCUSWLC	2/28/2022	< 1.0	0.14
LC_LCUSWLC	3/7/2022	1.7	< 0.10
LC_LCUSWLC	3/14/2022	2.6	0.23
LC_LCUSWLC	3/21/2022	< 1.0	0.36
LC_LCUSWLC	3/29/2022	1.9	2.67
LC_LCUSWLC	4/4/2022	< 1.0	0.59
LC_LCUSWLC	4/11/2022	2.4	0.60
LC_LCUSWLC	4/20/2022	< 1.0	0.20
LC_LCUSWLC	4/27/2022	< 1.0	0.33
LC_LCUSWLC	5/4/2022	< 1.0	0.37
LC_LCUSWLC	5/10/2022	< 1.0	0.36
LC_LCUSWLC	5/18/2022	< 1.0	0.39
LC_LCUSWLC	5/25/2022	< 1.0	0.16
LC_LCUSWLC	6/1/2022	< 1.0	0.68
LC_LCUSWLC	6/8/2022	< 1.0	0.43
LC_LCUSWLC	6/16/2022	< 1.0	0.29
LC_LCUSWLC	6/22/2022	< 1.0	0.78
LC_LCUSWLC	6/22/2022	4.7	2.10
LC_LCUSWLC	6/29/2022	2.3	0.56
LC_LCUSWLC	7/6/2022	< 1.0	0.25
LC_LCUSWLC	7/13/2022	< 1.0	0.20
LC_LCUSWLC	7/20/2022	< 1.0	0.33
LC_LCUSWLC	7/27/2022	< 1.0	0.44
LC_LCUSWLC	8/3/2022	< 1.0	0.22
LC_LCUSWLC	8/10/2022	< 1.0	0.12
LC_LCUSWLC	8/17/2022	< 1.0	0.20
LC_LCUSWLC	8/24/2022	< 1.0	0.22
LC_LCUSWLC	8/31/2022	5.7	0.35
LC_LCUSWLC	9/7/2022	1.1	0.43
LC_LCUSWLC	9/14/2022	< 1.0	0.29
LC_LCUSWLC	9/21/2022	< 1.0	0.22

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_LCUSWLC	9/28/2022	< 1.0	0.25
LC_LCUSWLC	10/5/2022	< 1.0	0.29
LC_LCUSWLC	10/12/2022	< 1.0	0.17
LC_LCUSWLC	10/19/2022	1.8	0.24
LC_LCUSWLC	10/26/2022	< 1.0	0.29
LC_LCUSWLC	11/2/2022	< 1.0	0.23
LC_LCUSWLC	11/9/2022	1.3	0.15
LC_LCUSWLC	11/16/2022	< 1.0	19.7
LC_LCUSWLC	11/23/2022	< 1.0	0.19
LC_LCUSWLC	11/30/2022	1.0	0.29
LC_LCUSWLC	12/6/2022	< 1.0	0.20
LC_LCUSWLC	12/14/2022	< 1.0	0.26
LC_LCUSWLC	12/21/2022	< 1.0	0.25
LC_LCUSWLC	12/28/2022	< 1.0	0.30
LC_SLC	1/6/2022	< 1.0	< 0.10
LC_SLC	2/1/2022	< 1.0	< 0.10
LC_SLC	2/15/2022	< 1.0	< 0.10
LC_SLC	2/22/2022	< 1.0	< 0.10
LC_SLC	3/1/2022	< 1.0	< 0.10
LC_SLC	3/8/2022	< 1.0	< 0.10
LC_SLC	3/8/2022	< 1.0	< 0.10
LC_SLC	3/15/2022	< 1.0	< 0.10
LC_SLC	4/5/2022	< 1.0	< 0.10
LC_SLC	5/17/2022	1.7	1.38
LC_SLC	5/24/2022	< 1.0	0.29
LC_SLC	5/31/2022	1.8	0.19
LC_SLC	6/7/2022	7.0	1.78
LC_SLC	6/14/2022	3.7	1.82
LC_SLC	7/8/2022	< 1.0	0.35
LC_SLC	8/16/2022	< 1.0	< 0.10
LC_SLC	8/23/2022	< 1.0	0.13
LC_SLC	8/30/2022	< 1.0	0.11
LC_SLC	8/31/2022	< 1.0	0.27
LC_SLC	9/6/2022	< 1.0	0.21
LC_SLC	9/13/2022	< 1.0	< 0.10
LC_SLC	10/11/2022	1.1	< 0.10
LC_SLC	10/18/2022	< 1.0	0.13
LC_SLC	10/25/2022	< 1.0	< 0.10
LC_SLC	11/1/2022	< 1.0	< 0.10
LC_SLC	11/8/2022	< 1.0	< 0.10
LC_SLC	12/5/2022	1.2	< 0.10
LC_SPDC	1/5/2022	< 1.0	0.34
LC_SPDC	1/12/2022	< 1.0	0.39
LC_SPDC	1/19/2022	2.1	0.36
LC_SPDC	1/26/2022	< 1.0	0.16
LC_SPDC	2/2/2022	< 1.0	0.28
LC_SPDC	2/9/2022	< 1.0	0.22
LC_SPDC	2/15/2022	< 1.0	0.27
LC_SPDC	2/22/2022	1.1	0.37
LC_SPDC	3/2/2022	< 1.0	0.20
LC_SPDC	3/7/2022	< 1.0	0.14
LC_SPDC	3/15/2022	2.6	0.20
LC_SPDC	3/23/2022	< 1.0	0.29
LC_SPDC	3/30/2022	2.1	1.82
LC_SPDC	4/6/2022	1.2	1.52

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_SPDC	4/12/2022	1.1	0.91
LC_SPDC	4/17/2022	< 1.0	0.43
LC_SPDC	4/24/2022	1.2	0.69
LC_SPDC	5/3/2022	5.7	1.96
LC_SPDC	5/5/2022	3.4	1.35
LC_SPDC	5/11/2022	< 1.0	0.63
LC_SPDC	5/13/2022	6.9	2.29
LC_SPDC	5/17/2022	< 1.0	1.26
LC_SPDC	5/19/2022	1.1	0.44
LC_SPDC	5/24/2022	1.4	0.50
LC_SPDC	5/25/2022	3.0	0.62
LC_SPDC	5/26/2022	1.4	0.44
LC_SPDC	5/31/2022	1.4	0.58
LC_SPDC	6/7/2022	1.4	0.68
LC_SPDC	6/10/2022	< 1.0	0.50
LC_SPDC	6/14/2022	< 1.0	0.47
LC_SPDC	6/17/2022	18.6	15.7
LC_SPDC	6/19/2022	14.9	15.9
LC_SPDC	6/21/2022	9.5	13.4
LC_SPDC	6/28/2022	2.9	1.16
LC_SPDC	7/7/2022	1.1	0.69
LC_SPDC	7/12/2022	< 1.0	0.50
LC_SPDC	7/18/2022	< 1.0	0.52
LC_SPDC	7/25/2022	1.3	0.93
LC_SPDC	8/2/2022	< 1.0	0.98
LC_SPDC	8/9/2022	< 1.0	0.27
LC_SPDC	8/16/2022	< 1.0	0.26
LC_SPDC	8/23/2022	2.2	1.54
LC_SPDC	8/30/2022	5.4	0.41
LC_SPDC	9/6/2022	2.3	0.58
LC_SPDC	9/13/2022	1.0	0.32
LC_SPDC	9/20/2022	< 1.0	0.34
LC_SPDC	9/27/2022	1.5	0.21
LC_SPDC	10/3/2022	3.3	1.34
LC_SPDC	10/12/2022	1.6	0.33
LC_SPDC	10/18/2022	2.5	< 0.10
LC_SPDC	10/25/2022	2.6	0.27
LC_SPDC	11/1/2022	1.3	0.30
LC_SPDC	11/8/2022	< 1.0	0.44
LC_SPDC	11/15/2022	1.5	0.68
LC_SPDC	11/22/2022	< 1.0	0.22
LC_SPDC	11/29/2022	1.1	0.26
LC_SPDC	12/7/2022	1.0	0.49
LC_SPDC	12/13/2022	< 1.0	0.23
LC_SPDC	12/22/2022	1.9	0.36
LC_SPDC	12/29/2022	1.4	0.33
LC_WLC	1/4/2022	1.4	< 0.10
LC_WLC	1/10/2022	2.9	< 0.10
LC_WLC	1/17/2022	1.0	< 0.10
LC_WLC	1/25/2022	1.2	< 0.10
LC_WLC	1/31/2022	< 1.0	< 0.10
LC_WLC	2/8/2022	1.6	< 0.10
LC_WLC	2/14/2022	< 1.0	< 0.10
LC_WLC	2/23/2022	2.0	< 0.10
LC_WLC	3/1/2022	2.0	< 0.10

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_WLC	3/8/2022	< 1.0	< 0.10
LC_WLC	3/14/2022	3.1	< 0.10
LC_WLC	3/22/2022	1.6	< 0.10
LC_WLC	3/28/2022	< 1.0	< 0.10
LC_WLC	4/5/2022	1.2	< 0.10
LC_WLC	4/11/2022	< 1.0	< 0.10
LC_WLC	4/18/2022	1.6	< 0.10
LC_WLC	4/25/2022	1.2	< 0.10
LC_WLC	5/3/2022	2.2	< 0.10
LC_WLC	5/9/2022	1.6	0.13
LC_WLC	5/16/2022	1.6	0.14
LC_WLC	5/24/2022	2.0	< 0.10
LC_WLC	5/30/2022	1.4	< 0.10
LC_WLC	6/6/2022	< 1.0	0.11
LC_WLC	6/13/2022	1.0	0.11
LC_WLC	6/22/2022	1.2	0.11
LC_WLC	6/27/2022	< 1.0	< 0.10
LC_WLC	7/5/2022	< 1.0	< 0.10
LC_WLC	7/11/2022	1.0	0.11
LC_WLC	7/19/2022	2.8	< 0.10
LC_WLC	7/26/2022	< 1.0	0.29
LC_WLC	8/3/2022	< 1.0	< 0.10
LC_WLC	8/8/2022	2.8	0.13
LC_WLC	8/15/2022	1.8	< 0.10
LC_WLC	8/22/2022	< 1.0	0.14
LC_WLC	8/29/2022	4.2	0.11
LC_WLC	9/6/2022	1.5	< 0.10
LC_WLC	9/13/2022	1.6	< 0.10
LC_WLC	9/19/2022	1.2	0.13
LC_WLC	9/29/2022	1.7	< 0.10
LC_WLC	10/3/2022	< 1.0	0.12
LC_WLC	10/12/2022	< 1.0	< 0.10
LC_WLC	10/17/2022	2.1	< 0.10
LC_WLC	10/24/2022	1.8	< 0.10
LC_WLC	10/31/2022	< 1.0	0.29
LC_WLC	11/7/2022	< 1.0	< 0.10
LC_WLC	11/14/2022	1.6	< 0.10
LC_WLC	11/21/2022	4.1	0.19
LC_WLC	11/28/2022	< 1.0	< 0.10
LC_WLC	12/5/2022	1.5	0.15
LC_WLC	12/12/2022	< 1.0	< 0.10
LC_WLC	12/19/2022	2.7	< 0.10
LC_WLC	12/28/2022	2.0	< 0.10

Teck Location Code	Sample Date	The sum of extractable petroleum hydrocarbons C10-C19 and C19-C32. N mg/l
		Result
LC_LC2	1/4/2022	< 0.4
LC_LC2	4/5/2022	< 0.4
LC_LC2	7/5/2022	< 0.4
LC_LC2	10/3/2022	< 0.4
LC_LC7	1/4/2022	< 0.4
LC_LC7	1/7/2022	< 0.4
LC_LC7	4/5/2022	< 0.4
LC_LC7	5/2/2022	< 0.4
LC_LC7	7/5/2022	< 0.4
LC_LC7	10/3/2022	< 0.4
LC_WLC	1/4/2022	< 0.4
LC_WLC	4/5/2022	< 0.4
LC_WLC	7/5/2022	< 0.4
LC_WLC	10/3/2022	< 0.4
LC_PIZP1101	3/11/2022	< 0.4
LC_PIZP1101	5/20/2022	< 0.4
LC_PIZP1101	8/5/2022	< 0.4
LC_PIZP1101	10/20/2022	< 0.4
LC_PIZP1105	3/10/2022	1.25
LC_PIZP1105	5/26/2022	< 0.4
LC_PIZP1105	8/30/2022	< 0.4
LC_PIZP1105	10/17/2022	< 0.4
LC_LVWB	3/10/2022	67.1
LC_LVWB	3/22/2022	4.83
LC_LVWB	3/31/2022	9.06
LC_LVWB	4/7/2022	1.78
LC_LVWB	5/26/2022	12.4
LC_LVWB	7/21/2022	5.1
LC_LVWB	9/15/2022	11.1
LC_LVWB	10/4/2022	12.4
LC_LVWB	11/17/2022	1.56
LC_LVWB	12/8/2022	1.74

Sample Date:				1/20/2022	2/10/2022	2/14/2022	2/24/2022	3/3/2022	3/10/2022	3/17/2022	4/27/2022	5/17/2022	7/21/2022	8/16/2022	9/15/2022	10/4/2022	11/17/2022	12/8/2022
Teck Location Code	**Fraction**	**Result Unit**	**Parameter**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
LC_SBPIN	D	mg/l	ALUMINUM	0.0151	0.0119				0.0447		0.0063	0.0046	0.0026	0.0091	0.0069	0.0227	0.0104	0.0087
LC_SBPIN	D	mg/l	ANTIMONY	0.00086	0.00030				0.00062		0.00038	0.00212	0.00262	0.00178	0.00392	0.00186	0.00081	0.00058
LC_SBPIN	D	mg/l	ARSENIC	0.00023	0.00032				0.00109		0.00022	0.00070	0.00064	0.00059	0.00098	0.00119	0.00029	0.00040
LC_SBPIN	D	mg/l	BARIUM	0.231	0.0760				0.0848		0.0937	0.206	0.143	0.0978	0.111	0.146	0.0979	0.0771
LC_SBPIN	D	mg/l	BISMUTH	< 0.000050	< 0.000050				< 0.000050		< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050
LC_SBPIN	D	mg/l	BORON	1.59	0.473				0.213		0.166	0.152	0.386	0.291	0.180	1.02	0.444	0.278
LC_SBPIN	D	mg/l	CARBON, DISSOLVED ORGANIC	350	32.1				14.8		1.75	4.28	7.28	29.7	18.7	104	45.2	33.8
LC_SBPIN	D	mg/l	CHLORIDE	12.5	17.3				35.6		3.76	15.0	9.20	28.5	24.5	31.6	9.93	22.7
LC_SBPIN	D	mg/l	CHROMIUM	0.00025	0.00024				< 0.00010		< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.00023	< 0.00010	< 0.00010
LC_SBPIN	D	mg/l	COPPER	< 0.00020	< 0.00020				< 0.00020		< 0.00020	0.00052	< 0.00020	< 0.00020	0.00041	< 0.00020	< 0.00020	0.00030
LC_SBPIN	D	mg/l	Hardness, Total or Dissolved CaCO3	268	160				222		196	278	238	272	335	434	232	191
LC_SBPIN	D	mg/l	IRON	1.78	0.832				< 0.010		0.302	< 0.010	0.126	0.026	0.011	0.594	0.200	0.146
LC_SBPIN	D	mg/l	LEAD	< 0.000050	0.000186				< 0.000050		< 0.000050	< 0.000050	< 0.000050	< 0.000050	0.000090	< 0.000050	< 0.000050	0.000206
LC_SBPIN	D	mg/l	LITHIUM	0.281	0.224				0.133		0.0859	0.105	0.193	0.220	0.180	0.278	0.118	0.191
LC_SBPIN	D	mg/l	MANGANESE	0.222	0.107				0.146		0.156	0.00272	0.106	0.0838	0.0954	0.242	0.120	0.0977
LC_SBPIN	D	mg/l	MERCURY						< 0.0000050		< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050
LC_SBPIN	D	mg/l	MOLYBDENUM	0.256	0.00431				0.0251		0.00168	0.0375	0.160	0.000970	0.0832	0.142	0.0842	0.0571
LC_SBPIN	D	mg/l	NICKEL	0.00179	0.00206				0.00111		0.00110	0.00399	0.00243	0.00144	0.00627	0.0150	0.00177	0.00238
LC_SBPIN	D	mg/l	ORTHO-PHOSPHATE	0.0030	2.60				0.0032		0.511	0.0474	0.0302	0.0011	0.0020	< 0.0010	0.0016	0.876
LC_SBPIN	D	mg/l	SILVER	< 0.000010	< 0.000010				< 0.000010		< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000010
LC_SBPIN	D	mg/l	STRONTIUM	0.189	0.0984				0.131		0.105	0.137	0.148	0.158	0.166	0.236	0.143	0.120
LC_SBPIN	D	mg/l	SULFATE (AS SO4)	61.5	2.99				59.4		33.9	96.7	100	3.67	234	168	46.7	69.8
LC_SBPIN	D	mg/l	THALLIUM	< 0.000010	< 0.000010				0.000043		< 0.000010	0.000019	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000010
LC_SBPIN	D	mg/l	TIN	< 0.00010	< 0.00010				< 0.00010		< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
LC_SBPIN	D	mg/l	TITANIUM	< 0.00030	< 0.00030				< 0.00030		< 0.00030	< 0.00030	< 0.00030	< 0.00030	< 0.00030	< 0.00030	< 0.00030	0.00044
LC_SBPIN	D	mg/l	URANIUM	0.000173	0.000036				0.00122		0.000714	0.00245	0.00232	0.000624	0.00480	0.00395	0.00116	0.00138
LC_SBPIN	D	mg/l	VANADIUM	0.00056	< 0.00050				< 0.00050		< 0.00050	0.00076	< 0.00050	< 0.00050	< 0.00050	0.00234	< 0.00050	0.00051
LC_SBPIN	D	mg/l	ZINC	0.0035	0.0187				0.0039		0.0046	0.0091	0.0082	0.0010	0.0157	0.0013	0.0036	0.0133
LC_SBPIN	D	ug/l	BERYLLIUM	0.021	< 0.020				< 0.020		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
LC_SBPIN	D	ug/l	CADMIUM	< 0.0400	0.0961				< 0.0200		< 0.0050	0.239	0.0386	0.0091	0.0581	0.0307	0.0340	0.0648
LC_SBPIN	D	ug/l	COBALT	0.81	1.34				0.22		0.87	0.43	0.88	0.57	1.21	2.35	0.24	0.50
LC_SBPIN	D	ug/l	SELENIUM	4.19	1.51				0.935		2.39	10.9	7.00	8.52	27.2	2.52	2.33	1.33
LC_SBPIN	N	deg c	TEMPERATURE, FIELD	17.8	22.9	22.1	21.0	21.4	16.5		14.0	11.0	18.3	17.581	17.2	18.3	16.1	15.9
LC_SBPIN	N	mg/l	ALKALINITY, TOTAL (As CaCO3)	216	171				224		223	206	195	340	245	314	204	189
LC_SBPIN	N	mg/l	BIOCHEMICAL OXYGEN DEMAND, FIVE DAY						30.4		2.0	3.2	5.3	58.4	29.0		78.1	42.6
LC_SBPIN	N	mg/l	BROMIDE	< 0.050	< 0.050				0.075		< 0.050	0.102	< 0.050	0.188	0.052	0.238	< 0.050	< 0.050
LC_SBPIN	N	mg/l	DISSOLVED OXYGEN, FIELD	2.13	5.13	4.47	2.26	1.97	3.82		4.9	8.14	3.99	2.49	7.9	2.49	2.57	3.33

Sample Date:				1/20/2022	2/10/2022	2/14/2022	2/24/2022	3/3/2022	3/10/2022	3/17/2022	4/27/2022	5/17/2022	7/21/2022	8/16/2022	9/15/2022	10/4/2022	11/17/2022	12/8/2022
Teck Location Code	Fraction	Result Unit	Parameter	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
LC_SBPIN	N	mg/l	Extractable Petroleum Hydrocarbons C10-C19	2.85	0.88	0.59	1.47	< 0.25	< 0.25	0.45	< 0.25	0.89	0.68	< 0.25	1.73	1.51	0.72	0.52
LC_SBPIN	N	mg/l	Extractable Petroleum Hydrocarbons C19-C32	16.8	0.68	0.38	1.82	< 0.25	0.31	2.29	< 0.25	1.73	< 0.25	< 0.25	5.69	2.24	0.39	1.18
LC_SBPIN	N	mg/l	FLUORIDE	0.189	0.226				0.223		0.287	0.427	0.459	0.289	0.658	0.322	0.253	0.412
LC_SBPIN	N	mg/l	NITRATE NITROGEN (NO3), AS N	0.0071	< 0.0050				0.0078		0.0078	0.0975	< 0.0050	0.0057	0.0093	0.186	0.0053	< 0.0050
LC_SBPIN	N	mg/l	NITRITE NITROGEN (NO2), AS N	0.0011	< 0.0010				< 0.0010		< 0.0010	0.0133	< 0.0010	< 0.0010	0.0043	0.0096	0.0016	< 0.0010
LC_SBPIN	N	mg/l	The sum of extractable petroleum hydrocarbons C10-C19 and C19-C32.	19.6 19.6	1.56 1.56	0.97 0.97	3.29 3.29	< 0.4 < 0.4	< 0.4 < 0.4	2.74 2.74	< 0.4 < 0.4	2.62 2.62	0.68 0.68	< 0.4 < 0.4	7.42 7.42	3.75 3.75	1.11 1.11	1.70 1.70
LC_SBPIN	N	mg/l	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	513	214				382		286	293	380	455	584	740	328	380
LC_SBPIN	N	mg/l	TOTAL KJELDAHL NITROGEN	1.09	2.12				0.448		1.05	4.07	1.05	1.55	2.80	8.86	3.48	2.39
LC_SBPIN	N	ph units	pH, Field	6.37	7.1	7.03	6.86	6.83	7.77		7.32	7.9	7.3	6.98	8.23	7.19	7.28	7.02
LC_SBPIN	N	ph units	pH, LAB	6.69	7.26				7.60		7.96	7.63	7.60	7.81	7.84	7.04	7.59	7.17
LC_SBPIN	N	us/cm	CONDUCTIVITY, LAB	617	377				587		465	595	530	669	903	939	467	421
LC_SBPIN	T	mg/l	ALUMINUM	0.263	0.0692				0.166		0.0195	1.30	0.0242	0.0205	0.343	2.90	0.118	0.0718
LC_SBPIN	T	mg/l	ANTIMONY	0.00136	0.00086				0.00061		0.00048	0.00243	0.00067	0.00192	0.00350	0.00215	0.00083	0.00105
LC_SBPIN	T	mg/l	ARSENIC	0.00038	0.00043				0.00117		0.00025	0.00289	0.00067	0.00055	0.00132	0.00371	0.00048	0.00062
LC_SBPIN	T	mg/l	BARIUM	0.266	0.0761				0.0891		0.0954	0.374	0.123	0.0864	0.153	0.428	0.0979	0.0906
LC_SBPIN	T	mg/l	BISMUTH	< 0.000050	< 0.000050				< 0.000050		< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000250	< 0.000050	< 0.000050
LC_SBPIN	T	mg/l	BORON	1.48	0.413				0.208		0.188	0.150	0.443	0.288	0.201	0.888	0.425	0.332
LC_SBPIN	T	mg/l	CALCIUM	80.0	41.9				57.4		50.5	76.3	64.7	69.9	83.4	121	65.0	60.5
LC_SBPIN	T	mg/l	CHROMIUM	0.00066	0.00029				0.00017		< 0.00010	0.00342	< 0.00010	< 0.00010	0.00093	0.00756	0.00035	0.00023
LC_SBPIN	T	mg/l	COPPER	0.0197	0.00115				0.00060		< 0.00050	0.0135	< 0.00050	< 0.00050	0.00358	0.0249	0.00072	0.00474
LC_SBPIN	T	mg/l	IRON	2.35	0.878				0.160		0.324	3.84	0.371	0.108	1.06	8.93	0.253	0.211
LC_SBPIN	T	mg/l	LEAD	0.000732	0.000259				0.000225		0.000072	0.00430	0.000076	0.000058	0.00102	0.00847	0.000227	0.00101
LC_SBPIN	T	mg/l	LITHIUM	0.269	0.196				0.122		0.0916	0.106	0.163	0.218	0.204	0.317	0.136	0.227
LC_SBPIN	T	mg/l	MAGNESIUM	22.2	13.5				16.7		17.8	26.2	20.4	27.0	35.0	41.2	19.4	20.0
LC_SBPIN	T	mg/l	MANGANESE	0.246	0.107				0.146		0.163	0.255	0.105	0.0851	0.114	0.365	0.126	0.109
LC_SBPIN	T	mg/l	MERCURY									< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000500	< 0.0000050	< 0.0000050
LC_SBPIN	T	mg/l	MOLYBDENUM	0.226	0.00421				0.0248		0.00162	0.0415	0.147	0.00229	0.0879	0.178	0.0858	0.0655
LC_SBPIN	T	mg/l	NICKEL	0.00329	0.00219				0.00133		0.00138	0.0162	0.00251	0.00162	0.00965	0.0429	0.00222	0.00395
LC_SBPIN	T	mg/l	NITROGEN, AMMONIA (AS N)	0.313	0.261				0.0479		0.846	0.878	0.0685	0.514	0.742	0.206	0.392	0.376
LC_SBPIN	T	mg/l	PHOSPHORUS	0.923	2.46				0.256		0.669	0.740	0.614	0.458	0.416	1.72	0.675	2.16
LC_SBPIN	T	mg/l	POTASSIUM	5.09	3.48				4.82		5.24	8.13	5.76	9.36	12.6	15.3	4.21	4.16
LC_SBPIN	T	mg/l	SILVER	< 0.000010	< 0.000010				< 0.000010		< 0.000010	0.000176	< 0.000010	< 0.000010	0.000039	0.000317	< 0.000010	< 0.000010
LC_SBPIN	T	mg/l	SODIUM	37.0	20.8				46.9		25.2	16.7	20.0	47.2	68.0	58.2	18.7	33.7
LC_SBPIN	T	mg/l	STRONTIUM	0.206	0.101				0.131		0.106	0.164	0.126	0.160	0.173	0.284	0.145	0.132
LC_SBPIN	T	mg/l	THALLIUM	0.000012	< 0.000010				0.000051		< 0.000010	0.000125	< 0.000010	< 0.000010	0.000028	0.000218	< 0.000010	< 0.000010
LC_SBPIN	T	mg/l	TIN	< 0.00010	< 0.00010				< 0.00010		< 0.00010	0.00013	< 0.00010	< 0.00010	< 0.00010	< 0.00050	< 0.00010	< 0.00010
LC_SBPIN	T	mg/l	TITANIUM	0.00557	0.00149				< 0.00210		< 0.00060	0.00803	0.00056	0.00046	0.00229	0.0198	0.00284	0.00165
LC_SBPIN	T	mg/l	TOTAL ORGANIC CARBON	363	27.5				17.3		2.14	52.4	9.88	40.5	48.6	155	50.0	47.1
LC_SBPIN	T	mg/l	URANIUM	0.000108	0.000116				0.000712		0.000579	0.00278	0.00191	0.000764	0.00486	0.00488	0.000912	0.00146
LC_SBPIN	T	mg/l	VANADIUM	0.00147	0.00111				0.00099		< 0.00050	0.0112	< 0.00050	0.00059	0.00405	0.0243	0.00088	0.00122
LC_SBPIN	T	mg/l	ZINC	0.151	0.0221				0.0095		0.0052	0.0596	0.0094	0.0033	0.123	0.134	0.0128	0.0572
LC_SBPIN	T	ug/l	BERYLLIUM	0.039	< 0.020				< 0.020		< 0.020	0.235	< 0.020	< 0.020	0.069	0.581	< 0.020	< 0.020
LC_SBPIN	T	ug/l	CADMIUM	0.277	0.110				0.0847		0.0141	1.11	0.0653	0.0272	0.246	1.34	0.0883	0.187
LC_SBPIN	T	ug/l	COBALT	1.10	1.40				0.29		0.92	4.30	0.84	0.60	1.82	8.92	0.44	0.74
LC_SBPIN	T	ug/l	MERCURY						0.00186		< 0.00050							
LC_SBPIN	T	ug/l	SELENIUM	3.24	1.24				0.140		3.01	9.24	5.59	2.13	13.0	4.63	2.99	2.76

	Parameter:	48-h Daphnia magna 100% screening (single concentration) acute lethality toxicity test - Units of % Mortality	96-h rainbow trout 100% screening (single concentration) acute lethality toxicity test - Units of % Mortality	COBALT	COBALT	COPPER	COPPER	Dimethylselenoxide	DISSOLVED OXYGEN, FIELD	MERCURY	MERCURY	Methaneselenonic Acid
	Fraction:	N	N	D	T	D	T	D	N	D	T	D
	Result Unit:	%	%	ug/l	ug/l	mg/l	mg/l	ug/l	mg/l	mg/l	mg/l	ug/l
Teck Location Code	Sample Date	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
LC_HSP	6/14/2022	0	0					0.01				0.01
LC_HSP	6/20/2022	0	0	0.27	0.33	0.00045	0.00063	0.01	10.04	5E-06	5E-06	0.01
LC_HSP	6/27/2022			0.16	0.22	0.00028	0.0005		9.39	5E-06	5E-06	
LC_HSP	7/5/2022	0	0	0.23	0.35	0.00031	0.0005	0.01	8.96	5E-06	5E-06	0.01
LC_HSP	7/11/2022			0.26	0.38	0.00041	0.0005		8.7	5E-06	5E-06	
LC_HSP	7/19/2022			0.24	0.52	0.00029	0.00064		8.11	5E-06	5E-06	
LC_HSP	7/26/2022			0.26	0.32	0.00032	0.0005		8.03	5E-06	5E-06	
LC_HSP	8/3/2022			0.23	0.35	0.00032	0.00052		8.05	5E-06	5E-06	
LC_HSP	8/8/2022			0.18	0.28	0.00033	0.0005		8.13	5E-06	5E-06	
LC_HSP	8/15/2022			0.18	0.26	0.00031	0.0005		8.12	5E-06	5E-06	
LC_HSP	8/25/2022	0	0	0.23	0.35	0.00034	0.0005	0.01	8.55	5E-06	5E-06	0.01
LC_HSP	9/28/2022			0.3	0.31	0.00053	0.0005	0.01		5E-06	5E-06	0.01
LC_HSP	10/3/2022	0	0	0.31	0.42	0.00036	0.0005	0.01	8.91	5E-06	5E-06	0.01
LC_HSP	10/12/2022			0.27	0.36	0.00033	0.0005		9.41	5E-06	5E-06	
LC_HSP	10/17/2022			0.25	0.39	0.00034	0.0005		9.31	5E-06	5E-06	
LC_HSP	10/26/2022			0.27	0.33	0.00034	0.0005	0.01	9.78	5E-06	5E-06	0.01
LC_HSP	11/2/2022			0.24	0.39	0.00034	0.00052	0.01	10.48	5E-06	5E-06	0.01
LC_HSP	11/7/2022			0.23	0.38	0.00032	0.0005	0.01	11	5E-06	5E-06	0.01
LC_HSP	11/14/2022	0	0	0.2	0.31	0.00034	0.0005		10.88	5E-06	5E-06	
LC_HSP	11/21/2022			0.16	0.28	0.00028	0.0005		10.54	5E-06	5E-06	
LC_HSP	11/28/2022			0.14	0.28	0.00033	0.0005		10.07	5E-06	5E-06	
LC_HSP	12/6/2022	20	0	0.11	0.28	0.00028	0.0005	0.01	10.76	5E-06	5E-06	0.01
LC_HSP	12/12/2022	0	0	0.1	0.25	0.00025	0.0005		10.35	5E-06	5E-06	
LC_HSP	12/19/2022			0.1	0.22	0.00026	0.0005		10.96	5E-06	5E-06	
LC_HSP	12/28/2022			0.14	0.36	0.0002	0.0005		10.08	5E-06	5E-06	
LC_MSAWCULV	10/13/2022	-	-	0.14	0.34	0.00025	0.0005	0.01	9.36	5E-06	5E-06	0.01
LC_MSAWCULV	10/19/2022	-	-	0.2	0.74	0.0004	0.0005	0.01	9.59	5E-06	5E-06	0.01
LC_MSAWCULV	10/26/2022	-	-	0.2	0.27	0.0004	0.001	0.01	9.45	5E-06	5E-06	0.01
LC_MSAWCULV	11/3/2022	-	-	0.2	0.2	0.0004	0.001	0.01	10.36	5E-06	5E-06	0.01
LC_MSAWCULV	11/9/2022	-	-	0.12	0.15	0.00027	0.0012	0.01	10.55	5E-06	5E-06	0.01
LC_MSAWCULV	12/14/2022	-	-	0.11	4.06	0.0009	0.00244		10.1	5E-06	5E-06	

	Parameter:	NICKEL	NICKEL	NITRITE NITROGEN (NO2), AS N	NITROGEN, AMMONIA (AS N)	PHOSPHORUS	Se(IV) – selenite SeO3(-2)	Se(VI) – selenate SeO4(-2)	SeCN – selenocyanate SeCN(-1) Acid	SELENIUM	SELENIUM	Selenosulfate, SeSO3	TOTAL SUSPENDED SOLIDS, LAB	Unknown selenium species
	Fraction:	D	T	N	T	T	D	D	D	D	T	D	N	D
	Result Unit:	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	ug/l
Teck Location Code	Sample Date	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
LC_HSP	6/14/2022						0.09	6.07	0.01			0.01		0.01
LC_HSP	6/20/2022	0.00235	0.00271	0.001	0.005	0.0172	0.066	6.19	0.01	7.43	7.01	0.01	13.3	0.01
LC_HSP	6/27/2022	0.00244	0.00273	0.0013	0.005	0.0084				8.84	11		4.5	
LC_HSP	7/5/2022	0.0041	0.00457	0.0039	0.0053	0.0057	0.129	8.98	0.01	9.64	10.3	0.01	5.4	0.01
LC_HSP	7/11/2022	0.00475	0.00495	0.0056	0.005	0.0055				11	10.3		8.9	
LC_HSP	7/19/2022	0.00479	0.00556	0.0066	0.005	0.0135				11	10.6		9.1	
LC_HSP	7/26/2022	0.00502	0.00518	0.007						11.1	10.4		1	
LC_HSP	8/3/2022	0.00477	0.00523	0.0062	0.0069	0.0048				10.4	9.86		1.9	
LC_HSP	8/8/2022	0.00468	0.00448	0.0067	0.0102	0.0044				11.4	9.26		2.1	
LC_HSP	8/15/2022	0.00494	0.00544	0.0069	0.0143	0.0022				10.5	9.33		1.3	
LC_HSP	8/25/2022	0.00505	0.00558	0.0092	0.0316	0.0032	0.239	9.21	0.01	10.4	8.3	0.01	2.2	0.01
LC_HSP	9/28/2022	0.0063	0.00622	0.0075	0.0161	0.0063	0.24	9.68	0.01	14.4	11	0.01	1	0.01
LC_HSP	10/3/2022	0.00656	0.00702	0.0072	0.0081	0.002	0.266	9.7	0.01	13	11.6	0.01	1.8	0.01
LC_HSP	10/12/2022	0.00645	0.00642	0.0057	0.005	0.0026				11.9	10.4		1.8	
LC_HSP	10/17/2022	0.00682	0.0077	0.0055	0.0091	0.0024				13.4	12.9		3.5	
LC_HSP	10/26/2022	0.00728	0.00762	0.0053	0.013	0.004	0.285	11.2	0.01	12.7	11.4	0.01	2	0.01
LC_HSP	11/2/2022	0.00787	0.0082	0.0083	0.0164	0.0051	0.288	10.3	0.01	13.6	14.4	0.01	1	0.01
LC_HSP	11/7/2022	0.00834	0.00853	0.0078	0.0173	0.003	0.328	10.6	0.01	12.4	12.4	0.01	5	0.01
LC_HSP	11/14/2022	0.0084	0.0083	0.0083	0.0158	0.002				14.1	12.3		1	
LC_HSP	11/21/2022	0.00784	0.00835	0.0086	0.0168	0.0023				14	12.2		1.8	
LC_HSP	11/28/2022	0.00907	0.00894	0.0088	0.0212	0.0098				13.5	13.1		1.1	
LC_HSP	12/6/2022	0.00859	0.00881	0.0084	0.0144	0.002	0.377	10.4	0.01	15.3	11.5	0.01	1	0.01
LC_HSP	12/12/2022	0.00857	0.00873	0.0088	0.0201	0.002				14	12.1		1.1	
LC_HSP	12/19/2022	0.00848	0.00888	0.0081	0.0235	0.002				15.3	13.7		1.7	
LC_HSP	12/28/2022	0.00767	0.0102	0.0084	0.0239	0.0029				13.9	12.3		1.6	
LC_MSAWCULV	10/13/2022	0.0477	0.047	0.005	0.005	0.003	0.344	154	0.01	182	167	0.01	2.2	0.01
LC_MSAWCULV	10/19/2022	0.0444	0.0512	0.0054	0.005	0.0033	0.319	146	0.01	175	167	0.01	2.6	0.01
LC_MSAWCULV	10/26/2022	0.0429	0.0505	0.005	0.005	0.004	0.385	162	0.01	155	163	0.01	6.6	0.01
LC_MSAWCULV	11/3/2022	0.0453	0.0469	0.005	0.005	0.0055	0.327	151	0.01	180	171	0.01	5.9	0.01
LC_MSAWCULV	11/9/2022	0.0448	0.0449	0.0064	0.005	0.0067	0.294	128	0.01	209	160	0.01	6.3	0.01
LC_MSAWCULV	12/14/2022	0.0421	0.0536	0.0061	0.005	0.0124				187	176		56.5	

9.9 Appendix I – 2022 LCO Hydrometric Monitoring Program

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TECK COAL LIMITED – LINE CREEK OPERATIONS

2022 LCO Hydrometric Program

Final Report
March 23, 2022
KWL Project No. 2544.072-300

Prepared for:

Teck

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1. Introduction

To satisfy permitting requirements, Teck Coal's Line Creek Operations (LCO) collects water quality and quantity data at multiple locations on its operation. The data is collected by LCO resources throughout the field season. Kerr Wood Leidal Associates (KWL) is retained by LCO to provide hydrometric network oversite to the data collection and to provide yearly data assurance and reporting along with the data collected.

This report details LCO's 2022 Hydrometric Monitoring Program and data is presented for the period between January and December 2022 (the monitoring period).

1.1 Flow Monitoring Protocol

Teck Coal Limited (Teck) operates four active coal mines in southeastern British Columbia with a fifth mine, Coal Mountain Mine (CMm), in a care and maintenance status. Teck has been developing protocols to provide consistent monitoring and reporting protocols to satisfy permitting requirements. Teck's Flow Monitoring Protocol[1] outlines standard procedures for flow monitoring and provides information on equipment, measurement approaches, calculations, documentation, and quality control.

The collection of hydrometric data by LCO should therefore, be consistent with the 2017 Flow Monitoring Protocol Document as well as the most recent version of the Manual of British Columbia Hydrometric Standards[2].

1.2 Hydrometric and Climate Stations

The Line Creek hydrometric network includes twelve (12) active hydrometric stations (collecting continuous water level and/or discharge data) and two active climate stations. These sites are listed in Table 1 and locations are shown on Figure 1.

1.3 Staff Gauge Sites

In addition to hydrometric and climate stations, LCO operates five sites where staff gauges have been installed and flows are measured periodically (no continuous water level data is collected). These sites and locations are also shown on Figure 1.

1.4 Roles and Responsibilities

LCO is responsible for collecting stage and discharge measurements throughout the year at each of its hydrometric stations and conducting regular maintenance of the sites (i.e. changing batteries). LCO field technicians also collect manual discharge measurements as part of the mine water quality sampling program.

KWL conducts one site visit per year to maintain the hydrometric stations (e.g., survey benchmarks, check equipment, etc.) and make any necessary adjustments or station equipment repair. In addition, KWL performs monthly quality assurance/quality control checks on the continuous water level data and

[1] KWL, 2017. *Flow Monitoring Protocol*. Report prepared for Teck Coal Limited. (KWL Project 2628.033).
[2] Ministry of Environment and Climate Change Strategy Knowledge Management Branch. December 2018. *Manual of British Columbia Hydrometric Standards*, Version 2.0 (Resources Information Standards Committee), 2018.

reviews the manual stage-discharge data collected by local LCO resources (LCO staff and other consultants). KWL develops or refines stage-discharge curves for each of the stations based on manual stage-discharge measurements.

Table 1: LCO Hydrometric, Climate, and Staff Gauge Site Summary

Monitoring Station ID	Station	Water Level Sensor	Stream Section	Status	Period of Record
LC_LC1	Hydrometric	Pressure Transducer	Open Channel	Active	Jun 2010 to present
LC_LC2	Hydrometric	Pressure Transducer	Open Channel	Active	Nov 2009 to present
LC_LC7	Staff Gauge	N/A	Weir	Active	N/A
LC_LCDS-LC2	Hydrometric (Water Level Only)	Pressure Transducer	Open Channel	Active	Jun 2010 to Jun 2013 2014 to present (water level only)
LC_LC9	Staff Gauge	N/A	Weir	Active	N/A
LC_WLC	Hydrometric	Pressure Transducer	Weir	Active	Nov 2009 to present
LC_LC3	Hydrometric	Pressure Transducer	Open Channel	Active	Nov 2009 to present
LC_SLC	Staff Gauge	N/A	Open Channel	Active	N/A
LC_LCDSSLCC	Hydrometric	Bubbler	Open Channel	Active	Jul 2016 to present
LC_DC3	Hydrometric	Pressure Transducer	Open Channel	Active	August 2019 to present
LC_DCEF	Hydrometric	Bubbler and Pressure Transducer	Open Channel	Active	May 2012 to present
LC_SPDC	Hydrometric	Flowmeter	Pipe	Under revision	Mar 2015 to present
LC_DCDS	Hydrometric	Pressure Transducer	Open Channel	Active	Jan 2016 to present
LC_DC4	Hydrometric	Pressure Transducer	Open Channel	Active	August 2019 to present
LC_DC1	Hydrometric	Bubbler	Open Channel	Active	Jul 2011 to present
LC_GRCK	Staff Gauge	N/A	Open Channel	Active	N/A
LC_UC	Staff Gauge	N/A	Open Channel	Active	N/A
MSA Weather	Climate	N/A	N/A	Active	Jun 2010 to present
Plant Weather	Climate	N/A	N/A	Active	Apr 2010 to present

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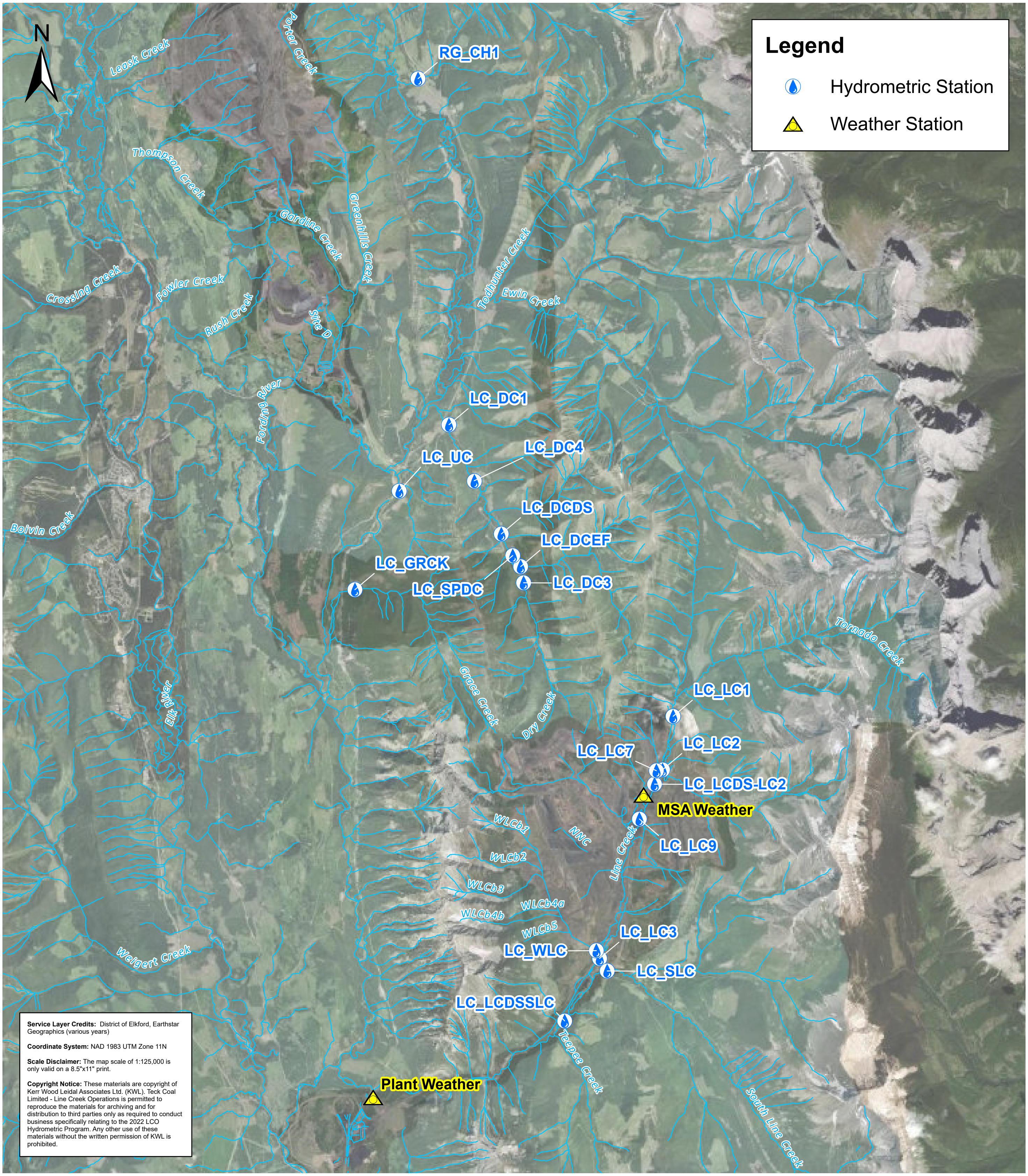
Teck Resources Limited - Line Creek Operations

2022 LCO Hydrometric Program

KERR WOOD LEIDAL
consulting engineers



Service Layer Credits: District of Elkford, Earthstar Geographics (various years)

Coordinate System: NAD 1983 UTM Zone 11N

Scale Disclaimer: The map scale of 1:125,000 is only valid on a 8.5"x11" print.

Project No.	2544-072
Date	March 2023
Scale	1:125,000

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LCO Hydrometric Station Locations

Figure 1

2. Stage-Discharge Relationships

2.1 Background

Each of LCO's hydrometric stations includes a continuous water level sensor and a staff gauge. Discharge is not measured directly by the sensors. Discharge is related to water level at the staff gauge through manual discharge measurements and the development of a stage-discharge relationship (SDR). At the remaining LCO stations there is no continuous water level sensor, but a staff gauge has been installed to allow for the development of a SDR at each station.

Stage-discharge relationships are created by measuring instantaneous discharge at different water levels and relating the measured discharge to water level on a fixed staff gauge. Measured flows are plotted against the associated stages, and a curve relating the two is fit through the plotted points (the SDR).

KWL uses a maximum-likelihood analysis method for creating SDRs. Discharge points are assigned an uncertainty value based on criteria outlined in the *Manual of British Columbia Hydrometric Standards*. The discharge measurements performed by LCO generally meet 'Class B' and 'Class C' hydrometric data standards (refer to Table 2 for a list of data quality indicators) and are typically assigned an uncertainty value of +/-15% to +/- 25%. A best-fit power law curve is generated to describe the relationship between measured discharge and stage.

Once a SDR has been developed for a given site, stage-discharge measurements are performed annually to confirm that the existing curve is representative of current channel conditions. Channel changes such as sediment deposition or erosion (typically caused by major flow events) can result in the need for a new SDR to be developed.

2.2 Offsets

SDRs reference the water level on the staff gauge (the stage) that is recorded by field crews at the time of each discharge measurement. Due to many factors (sensor drift, logger movement, environmental factors etc.) the logger values typically vary slightly from the staff gauge readings (less than 1 cm is typical). LCO staff record the staff gauge and sensor water level readings during each site visit. This data is used to calculate the visit offset values which are then applied during the post processing procedure to correct the water level time series data.

2.3 Station Datums

Each station uses a local datum to which stage values are referenced. Typically, the bottom of the station staff gauge is assigned the assumed value of 0.000 m to which all station benchmarks are referenced (station datum). The station benchmarks (three stable benchmarks) are surveyed each year to document any movement to them or the staff gauge; this was performed in 2022 by KWL for all the LCO stations discussed in this report.

2.4 Field Data Collection

Discharge Measurements

As mentioned previously, the collection of hydrometric data by LCO should be consistent with the *Flow Monitoring Protocol*. Table 2 summarizes discharge data quality indicators corresponding to different grades of hydrometric data according to the British Columbia Hydrometric Standards (also referred to as RISC). In general, LCO attempts to collect hydrometric data consistent with RISC Grade B standard, as follows:

- minimum three benchmarks per station;
- discharge measurements consist of 20 or more vertical panels (for open-channel-style measurements);
- vertical panels are spaced so that no one panel contains more than 10% of the total flow (note that even spacing may not achieve this criterion);
- <u>three</u> or more manual flow measurements are collected per year over an adequate range of streamflows; and
- two or more level checks are completed per year or at least once per year when the reference gauge and benchmarks have been documented to be stable.

Vertical Panels

As mentioned above, spacing should be adjusted such that the discharge measured in any one vertical panel does not exceed 10%. Practically speaking, this means tighter panel spacing in areas of the stream where the flow is concentrated; collecting evenly-spaced verticals may not achieve this criterion.

Relatively narrow wetted stream widths will require fine spacing to achieve 20 verticals. Tight spacing of verticals can be achieved using an electromagnetic-type velocity meter (such as the Marsh McBirney brand) or Acoustic Doppler Velocimeters (ADV). Propeller type meters have a minimum spacing limit; this should be considered when making tightly-spaced velocity measurements.

Improving the Measurement Section

Personnel making discharge measurements are encouraged to make improvements to the measurement cross-section to improve the hydraulic conditions. Improvements may include the following actions:

- removing large rocks and debris from the section, and immediately upstream;
- removing weeds; and
- concentrating into a single channel the flow when low water levels cause a braided channel.

The intent of improving the measurement section is to improve the accuracy of the discharge measurement; these changes <u>should not</u> affect the local hydraulic control and the station stage measured by the staff gauge (note the stage before and after any improvements to confirm there is no effect).

After improvements are made, allow sufficient time for conditions to stabilize before proceeding with the discharge measurement. Importantly, all improvements to the metering section should be completed <u>before</u> starting the measurement: do not make changes to the metering section (such as by moving rocks) during the discharge measurement.

Stage Measurements

Except at very low flows, the water level surface in a creek or river is rarely flat (streams naturally surge with time). As such, there is uncertainty associated with the stage measurement that needs to be incorporated into the SDR.

KWL suggests that the following field procedures be adopted when reading staff gauges:

- Observe the water level at the staff gauge for a sufficient period to observe any pattern in stage fluctuations at the time of measurement (e.g., 30 seconds);
- Make a 'best estimate' of the average stage (i.e., the stage around which the fluctuations are centered, or what the water level would be if the surface were flat);
- Record an estimate of the range of stage fluctuation (e.g., best estimate is 0.3 m, water level fluctuated between 0.295 m and 0.305 m); and
- If possible, record a short (e.g., 10-15 second) video rather than a photo to document the observed stage: a video provides far more accurate confirmation of the field conditions than photos, which rarely capture the 'real' stage value.

Channel Condition

Stream channel condition is also a factor in the grade that is assigned to the data. This factor can only be controlled through careful station siting to avoid locations with unstable beds or other hydraulic challenges.

Table 2: Summary of Discharge Data Quality Indicators for Field Procedures

<table>
<tr><th rowspan="2">Data Quality Indicator</th><th colspan="6">Standard Grade for Discharge Data</th></tr>
<tr><th>Grade A/RS</th><th>Grade A</th><th>Grade B</th><th>Grade C</th><th>Grade E (Estimated)</th><th>Grade U (Unknown Data Quality)</th></tr>
<tr><td colspan="7">Field Procedure</td></tr>
<tr><td>Minimum Number of Benchmarks</td><td>3</td><td>3</td><td>3</td><td>3</td><td rowspan="4">See notes below</td><td rowspan="4">Undefined</td></tr>
<tr><td>Number of Verticals in Manual Flow Measurements When Current Meter is Used</td><td>N/A</td><td>20 or more (if sufficient channel width to meet minimum flow meter panel widths) and not more than 10% of total flow in each panel</td><td>20 or more (if sufficient channel width to meet minimum flow meter panel widths) and not more than 10% of total flow in each panel</td><td>10 or more (if sufficient channel width to meet minimum flow meter panel widths) and not more than 20% of total flow in each panel</td></tr>
<tr><td>Number of Manual Flow Measurements Per Year</td><td>Minimum of one field measurement for rating verification</td><td>5 or more over adequate range of streamflows</td><td>3 or more over adequate range of streamflows</td><td>2 or more over adequate range of streamflows</td></tr>
<tr><td>Number of benchmark elevation and ref. gauge elevation level checks per year</td><td>2 or more, or at least once when ref. gauge and the benchmarks have been documented to be stable</td><td>2 or more, or at least once when ref. gauge and the benchmarks have been documented to be stable</td><td>2 or more, or at least once when ref. gauge and the benchmarks have been documented to be stable</td><td>1 or more</td></tr>
<tr><td colspan="7">Data Calculation & Assessment</td></tr>
<tr><td>Discharge rating accuracy /Rating curve shift deviation threshold</td><td><5%</td><td><7%</td><td><15%</td><td><25%</td><td rowspan="3">See notes below</td><td rowspan="3">Undefined</td></tr>
<tr><td>Data and calculation reviewed for anomalies</td><td>Yes</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Results are compared with other stations and/or other years for consistency</td><td>Yes</td><td>Yes</td><td>No</td><td>No</td></tr>
</table>

Notes:
Hydrometric data should be graded as “E” (i.e., Estimated) when stations were operated using RISC Standards (i.e., water level or discharge data could be either Grade A/RS, A, B or C but data were estimated because of instrument anomalies, shift correction, missing data or rating curve extrapolation beyond measured discharge level). Hydrometric data should be graded as “U” (i.e., Unknown data quality), when RISC Hydrometric Standards are not followed for data collection and/or data quality is unknown.

Source: Table 1: Standards Requirement Criteria (MoE, 2018).

3. 2022 Station Work

A summary of 2022 hydrometric work is provided below for each station. Appendices at the end of this report contain the following information for each station:

- the station SDR;
- a list of missing data (for stations with water level sensors);
- a list of replaced/repaired equipment (if applicable);
- a list of manual discharge measurements for 2022 (if applicable);
- average monthly discharge data (for stations with water level sensors); and
- an annual hydrograph (for stations with water level sensors).

3.1 LC_LC1

LC1 is located on Line Creek upstream of mine influence (Figure 1); this monitoring location is also used to sample water quality parameters representative of background (non-mine-influenced) conditions. In June 2020, the station was upgraded with a Sutron XLink Logger, OTT PLS Pressure transducer, and solar panels. The station has operated well following replacement in 2020.

The water level from January 1st to April 24th, 2022 was removed as it was heavily ice affected. Ice affected data (spikes and erroneous data) were also removed from the dataset in November and December 2022.

LC1 SDR

During the 2022 monitoring period, two discharge measurements were collected (one Grade B and one Grade C).

2022 measurements indicate a change to the hydraulic control occurred at the station, requiring an update to the SDR. This change likely occurred through winter 2021/2022 (ice scour) as both the pre-freshet measurement and post-freshet measurement plot similarly off the previous SDR. However, with only two measurements in 2022 at similar flows, there were insufficient points to develop a new SDR and the 2021 SDR was shifted using the two available 2022 discharge measurements. All 2022 station data are grade E. Caution should be used with higher flows as there are no measurements to confirm this portion of the dataset.

As the channel at this location has become unstable, it is recommended that as many manual measurements as possible, covering the range of the station's water levels, are performed at LC_LC1 in 2023 to refine the SDR equation.

Appendix A presents summary hydrometric data for LC1.

3.2 LC_LC2

LC2 is located on Line Creek downstream of LC1 and upstream of the Line Creek rock drain and LCDS-LC2 (Figure 1). At this location, the creek is influenced by mining activities. In June 2020, the station was upgraded with a Sutron XLink Logger, OTT PLS Pressure transducer, and solar panels.

The station performed well until February 9, 2022, at this point the station sensor began failing and displaying atmospheric diurnal effects. During winter 2022, these changes were interpreted as ice effects and data was removed. As the water level began to rise during freshet, the diurnal atmospheric inputs were minimized by water level change and "hidden". It was only in the context of the full 2022 water level dataset being available that the oddities were understood. A temporary sensor was installed on December 8, 2022 and has been reporting well so far. A permanent sensor will be installed in 2023.

All water level data following February 9, 2022 is downgraded to “grade E” and removed completely between February 9 to April 7 and September 13 to December 8, 2022. Ice affected data (spikes and erroneous data) were removed from the data set in January, February (until February 9) and December 2022.

LC2 SDR

During the 2022 monitoring period, one discharge measurement was collected (Grade C) which plotted off the SDR.

It is recommended that as many manual measurements as possible, covering the range of the station’s water levels, are performed at this site in 2023.

Appendix B presents summary hydrometric data for LC2.

3.3 LC_LC7

The LC7 site is the authorized discharge point located downstream of the MSA North Ponds which decant to a collector ditch located immediately upstream of the Line Creek Rock Drain (Figure 1). A concrete weir structure controls the flow and a staff gauge is affixed to the face of the structure. LC7 is a staff gauge site: no continuous water level data are collected at this site.

LC7 SDR

LC_LC7 discharge values are calculated using a weir equation. During the 2022 monitoring period, one manual discharge measurement was collected (Grade B) which plotted off the theoretical weir equation.

There is significant scatter in the historic station measurements. We suggest that additional notes/pictures be taken at the time of site visits to document channel conditions in an attempt to explain measurement scatter and that the crest of the weir be cleaned if aquatic growth is noted by the field crews. Because the measurements over the past few years have consistently plotted off the theoretical weir equation (i.e., theoretical weir equation is over-estimating flows), the equation was shifted to provide more accurate calculated measurement values. The data grade of the shifted SDR is E.

Affixing a sharp-crested weir plate to the face of the existing broad-crested concrete weir structure could be considered to resolve the station inaccuracies.

Appendix C presents summary hydrometric data for LC7.

3.4 LC_LCDS-LC2

LCDS-LC2 is located on Line Creek downstream of station LC2 and the MSAN ponds and upstream of LC3 (Figure 1). This is the last monitoring station before water flows into the Line Creek rock drain. Given proximity to the rock drain, this station is regularly backwatered throughout the spring months. The purpose of this station is to indicate water elevation of the pool that forms when Line Creek is backwatered during freshet by the capacity of the rock drain inlet.

In June 2020 the station was upgraded with a Sutron Xlink Logger, OTT PLS Pressure transducer, and solar panels.

The station operated well in 2022.

LCDS-LC2 SDR

No discharge measurements are collected at this station and the development of an SDR would have little value due to the backwater effect.

Stage data when the station was backwatered in 2022 are presented in Appendix D.

3.5 LC_LC9

LC9 is the authorized discharge point located at the spillway from the No Name Creek diversion and sediment pond to the Line Creek rock drain (Figure 1), upstream of the rock drain. A broad concrete weir structure regulates flow from the pond system. The staff gauge is located approximately 5 m downstream of the structure in a decant channel. LC9 is a staff gauge site: no continuous water level data are collected at this site.

LC9 SDR

During 2022, the sediment pond did not decant, therefore, no discharge measurements were collected.

There is no data to report for LC_LC9 in 2022.

3.6 LC_WLC

The West Line Creek (WLC) hydrometric station is located at a concrete structure downstream of the West Line Creek rock drain, and immediately upstream of the active wastewater treatment facility (AWTF) intake (Figure 1). Flow at WLC passes through a rated 120º V-notch weir. The station consists of a Sutron Xlink 500 logger connected to an Esterline pressure transducer sensor (installed with the original LC_WLC Station). The Esterline sensor failed in 2022 and was replaced with a temporary sensor, a new pressure sensor will be installed in 2023.

The station performed well during the 2022 monitoring period with no significant data removed.

WLC SDR

During the 2022 monitoring period, one manual discharge measurement was conducted (Grade C) and confirmed the theoretical weir equation. The SDR has remained stable over the years (as expected with an engineered structure).

One manual, open-channel, discharge measurement should be collected annually to confirm the weir continues to operate as expected.

Appendix E presents summary hydrometric data for WLC.

3.7 LC_LC3

LC3 is located downstream of the Line Creek rock drain and the West Line Creek Confluence. The hydrometric station is located above a trapezoidal section of engineered concrete channel. The station consists of a Sutron Xlink Logger, OTT PLS Pressure transducer, and solar panels.

In July 2021, a new vertical staff gauge was installed upstream of the concrete channel. The old staff gauge is affixed to the concrete side of the channel and is sloped at approximately 3 horizontals to 1 vertical[3].

The station operated well during the first half of 2022 with small periods of erroneous ice affected data removed in the winter months. Unfortunately, the station pressure transducer began to fail in late July. Data has been downgraded to "E" from July 26 – August 4 and removed from the record August 5 – December 8, 2022. A temporary sensor was installed on December 8, 2022 and has been performing well since installation.

LC3 SDR

During the 2022 monitoring period, five discharge measurements were collected (all Grade B).

A new SDR was created in 2022 in reference to the vertical staff gauge that was installed in July 2021. Due to the limited range of manual measurements with associated staff gauge readings from the vertical staff gauge, LC_LC3 discharge data is graded C.

It is recommended that five or more manual measurements (encompassing a range of flows) are conducted in 2023 and the vertical staff gauge is now reported as the primary gauge.

Appendix F presents summary hydrometric data for LC3.

3.8 LC_SLC

The South Line Creek site is located about 500 m upstream of the confluence with Line Creek. The site is accessed off the South Line Creek Forest Service Road. A new, staff gauge was installed by KWL in 2021 but was damaged by debris during the 2021/2022 period.

LC_SLC SDR

During the 2022 monitoring period, four manual discharge measurements were conducted (three Grade B and one Grade C). There is too much scatter exhibited in the measurement points (caused by channel instability) at this location to create a new SDR. Because a SDR can not be created, calculated measurements cannot be generated from the staff gauge readings recorded throughout the year.

To resolve the channel instability issue at this location LCO should do one of the following in 2023:

- Perform manual measurements and direct water level surveys during each visit, or
- The station should be moved to a more stable location.

Appendix G presents summary hydrometric data for SLC.

3.9 LC_LCDSSLC

Line Creek downstream of South Line Creek Confluence (LCDSSLCC) is located on Line Creek downstream of the South Line Creek Confluence and is the permit compliance location for LCO. This station consists of an FTS Axiom Logger and a Waterlog H-3553 Bubbler sensor.

The staff gauge on the left bank of the channel was destroyed during the 2022 freshet and was replaced with a new staff gauge on the right bank on August 24, 2022. The new staff gauge was installed in a location that is better protected against floating debris and direct impingement from the creek.

[3] Slope is 2.72H:1V based on field survey.

The station performed well during the 2022 period. A small amount of data was removed when the bubbler experienced cold-weather pressure leaks in the winter. The data from this site remains noisy which could be due to sediment interfering with the orifice tip. The orifice line should be purged regularly and may need to be trimmed periodically.

LCDSSLC SDR

During the 2022 monitoring period, three manual discharge measurements were conducted (two Grade B and one Grade C).

All staff gauge readings collected in 2022 were converted to the new staff gauge (if applicable). The single pre-freshet measurement confirms the 2021 SDR, however, the two post-freshet measurements show clear SDR movement. There are not enough measurements to create a new SDR, so the station SDR has been shifted post-freshet and Grade E. As many measurements as possible, covering the range of the stations water levels, should be performed in 2023 to create a new SDR.

LCDSSLC data is presented in Appendix H.

3.10 LC_DC3

DC3 is located on Dry Creek immediately upstream of the head pond/intake for the Dry Creek Settling Ponds. The station consists of a staff gauge, a Sutron Xlink Logger and Ott PLS-C pressure sensor that was installed in August 2019. A new staff gauge was installed at this site in 2022.

The station performed well during 2022. Ice affected data was removed at the beginning and end of the year.

DC3 SDR

During the 2022 monitoring period, six manual discharge measurements were conducted (one Grade B and five Grade U – no measurement information, missing panel summaries). 2022 measurements plotted well on the existing SDR and thus no change is required (Grade B).

Appendix I presents summary hydrometric data for DC3.

3.11 LC_DCEF

The Dry Creek East Fork (DCEF) hydrometric station is located on a tributary to Dry Creek known as East Fork. The hydrometric station is located immediately downstream of the Dry Creek Forest Service Road (FSR) bridge about 110 m upstream of the confluence with Dry Creek (Figure 1). This station consists of an FTS Axiom Logger and a Waterlog H-3553 Bubbler sensor. An OTT PLS-C pressure transducer (conductivity included on this sensor) was added in 2019.

The station experienced multiple outages in 2022. From January to March 2022 there are portions of missing data attributed to station power outages (low battery voltage due to limited solar recharging) and from September to December 2022 due to logger failure. Ice affected data was removed where clearly erroneous (January 2022), with periods of erroneous data removed throughout the year. Data from the pressure transducer is reported in 2022 as the data is much less “noisy” than the bubbler data used historically.

DCEF SDR

During the 2022 monitoring period, one manual discharge measurement was conducted (Grade C). The 2022 measurements plotted off the previous 2021 SDR; however, due to lack of supporting measurements, the SDR for this station cannot be refined and the data has been graded “E”.

It is recommended that as many manual measurements as possible, covering the range of the station’s water levels, are performed at this site in 2023.

Appendix J presents summary hydrometric data for DCEF.

3.12 LC_SPDC

The Setting Ponds at Dry Creek (SPDC) hydrometric station (SPDC Flowmeter) is located on the discharge pipe of the Dry Creek Settling Ponds, immediately before it discharges to an open channel to Dry Creek. There are also two flowmeters installed on the Dry Creek Settling Pond System; one on the inflow pipe from the head-pond prior to the splitter box (Flowmeter 1) and a second on the outlet pipe near the calcite treatment building (Flowmeter 2).

Data from Flowmeter 2 and the SPDC Flowmeter are presented in Appendix K. The two datasets agree with each other except tor the peak freshet period, it appears that the SPDC Flowmeter “topped out” at a maximum measurable flow rate of approximately 0.5 m^3/s.

3.13 LC_DCDS

The Dry Creek Downstream of Settling Ponds (DCDS) site is located on Dry Creek immediately downstream of the Dry Creek Settling Pond outflow confluence with Dry Creek. This location captures flow from DCEF, the Dry Creek Settling Ponds and any flow bypassing the settling ponds via the head pond spillway.

The station performed well during 2022. Ice affected data was removed from the dataset in late December 2022.

DCDS SDR

During the 2022 monitoring period, nine manual discharge measurements were conducted (two Grade B and seven Grade U – no measurement information, missing panel summaries).

The SDR was refined with 2022 points and references the new (2021) staff gauge.

Appendix L presents summary hydrometric data for DCDS.

3.14 LC_DC4

DC4 is located on Dry Creek midway between DCDS and DC1. The station consists of a staff gauge, a Sutron Xlink Logger and Ott PLS-C pressure sensor, which was installed in August 2019.

The station performed well during 2022. Ice affected data removed at the beginning of the year.

DC4 SDR

During the 2022 monitoring period, one manual discharge measurement was conducted (Grade B). The 2021 SDR was retained and is Graded C due to the lack of manual measurements in 2022.

Appendix M presents summary hydrometric data for DC4.

3.15 LC_DC1

The Dry Creek (DC1) hydrometric station is located upstream of the confluence of Dry Creek and the Fording River (Figure 1). This station was installed to monitor the flow regime of Dry Creek prior to development of mine operations in the headwaters of the watershed. This station consists of an FTS Axiom Logger, a Waterlog H-3553 Bubbler sensor, and an OTT PLS-C pressure transducer (conductivity included on this sensor).

Overall, the DC1 station operated well throughout the 2022 monitoring period. Water level through the 2022 ice cover period is heavily influenced by the in-channel ice and periods of erroneous data have been removed from the record.

DC1 SDR

During the 2022 monitoring period, four manual discharge measurements were conducted (one Grade B, three Grade U – no measurement information, missing panel summaries). Pre-freshet measurements confirm the 2021 SDR which was used up until freshet 2022. The single measurement performed following freshet 2022 indicated that a channel change occurred during freshet.

A new SDR could not be created from a single measurement and therefore the 2021 SDR was shifted post freshet to account for hydraulic control shift – all data post-freshet was graded “E”.

LCO should perform as many measurements (across a wide variety of flow regimes) as possible in 2023 to allow for the construction of a new SDR.

Appendix N presents summary hydrometric data for DC1.

3.16 LC_GRCK

The Grace Creek staff gauge is located approximately 1.5 km up the Grace Creek FSR (accessed via Fording Mine Road FSR) upstream of the CP rail tracks (Figure 1). Grace Creek is not mine influenced and is a tributary to the Fording River. The staff gauge is on the low side of the road, immediately downstream of the culvert. LC_GRCK is a staff gauge site: no continuous water level data are collected at this site.

GRCK SDR

During the 2022 monitoring period, three manual discharge measurements were conducted (two Grade B, one Grade C). The previous SDR is retained due to lack of measurements on the upper end of the SDR in 2022. The SDR is graded ‘E’ due to the amount of scatter.

Appendix O presents summary hydrometric data for GRCK.

3.17 LC_UC

The Unnamed Creek (UC) staff gauge is located approximately 670 m south from the Fording River Road along the Fording Mine Road FSR. Unnamed Creek is not mine-influenced and is a tributary to the Fording River. The staff gauge is located on the downstream side of the CP Rail tracks just below the culvert which conveys water under the tracks. No continuous water level data are collected at this site.

UC SDR

During the 2022 monitoring period, nine volumetric flow measurements (one Grade C, six Grade E and two Grade U - no measurement provided) were conducted. The existing data points for UC plot over a relatively small vertical range (stage) and large horizontal range (discharge) meaning this relationship does not allow for the generation of an accurate SDR and as such, manual flow measurements should be taken at this site until an SDR can be developed. Care should be taken to read the staff gauge to the millimeter in the hope that the relationship will become clearer.

The staff gauge should be surveyed against three benchmarks at least twice per year to verify that it has not moved.

Appendix P presents summary hydrometric data for LC_UC.

4. Summary of SDRs

4.1 Rating Curve Equations

Table 3 provides a summary of the SDR equations for the active LCO sites.

Table 3: Stage-Discharge Relationship Summary for LCO Sites

Monitoring Station ID	SDR Revised Since 2021	Stage-Discharge Relationship
LC_LC1	Yes	Discharge = $37.748*(Stage – 0.201)^{2.956}$
LC_LC2	No	Discharge = $31.427*(Stage – 0.466)^{2.524}$
LC_LC7	Yes	Discharge = $1.838*(2.0066 – ((Stage+(-0.02))*0.2))*(Stage+(-0.02))^{1.5}$
LC_LC9	No	Discharge = $2.45*(Stage + 0.38)^{5.98}$
LC_WLC	No	Discharge = $2.39*(Stage – 0.41)^{2.5}$
LC_LC3	Yes	Discharge = $36.941*(Stage – 0.099)^{2.526}$
LC_SLC	No	SDR Creation Not Possible, see text
LC_LCDSSLCC	Yes[a]	Pre-Freshet Discharge (January 1 – June 21, 2022): $17.611*(h+0.174)^{2.211}$ Post-Freshet Discharge (June 22 – December 31, 2022): $17.611*(h-0.018)^{2.211}$
LC_DC3	No	Discharge = $10.53*(h-0.03)^{2.32}$
LC_DCEF	No	Discharge = $7.96*(h-0.693)^{2.82}$
LC_SPDC	N/A	N/A
LC_DCDS	Yes	Discharge = $10.47*(h+0.070)^{2.63}$
LC_DC4	No	Discharge = $5.72*(Stage-0.007)^{1.69}$
LC_DC1	Yes[a]	Pre-Freshet Discharge (January 1 – June 18, 2022 [05:00 AM]): $14.891*(Stage – 0.295)^{1.688}$ Post-Freshet Discharge (June 18 [05:15 AM] – December 31, 2022): $14.891*(Stage – 0.348)^{1.68}$
LC_GRCK	No	Discharge = $2.19*(Stage –(-0.008))^{1.14}$
LC_UC[c]	N/A	N/A

Notes:
a. Shift applied post freshet. Unless specifically noted, SDR shifts occur at midnight.
b. Staff gauge movement, SDR adjusted.
c. No SDR created due to excessive scatter in available data.

SDRs are based on 'free discharge' conditions: curves are not valid during ice cover. If freezing of the water surface occurs, these conditions should be documented and the SDR should not be applied.

4.2 Recommended Upper Limit of Applicability

The recommended upper limit of applicability for each SDR is an indication of how far the curve should be extrapolated beyond the highest discharge measurement. An industry standard is to extrapolate to the lowest of:

- two times the highest discharge measurement; or
- the next major change in channel geometry not captured by discharge measurements (e.g., top of bank).

Table 4 summarizes the recommended upper limit of applicability for each of the LCO SDRs.

4.3 Data Gaps

Stage-discharge relationships should be refined annually as more discharge measurements are collected. The equations in Table 3 represent the estimated channel conditions for 2022 but some SDRs have gaps in discharge measurement information at various stages (i.e., a manual discharge measurement is required at one or more creek levels).

Table 4 lists major gaps in the manually measured flows. Manual flow measurements at each site should be continued over the next monitoring year to confirm that the SDR relationships remain valid and should target the observed gaps. Future discharge measurements should target these gaps (subject to 2022 flow values and field crew availability) to refine the SDRs and to be able to confidently extend them to capture the entire range of flow at each site.

Table 4: Recommended Upper Limit of Applicability Summary

Monitoring Station ID	Recommended Upper Limit of Applicability	Recommended Upper Limit of Applicability (m^3/s)	SDR Gaps
LC_LC1	2x highest discharge measurement	0.76	Entire range of flows to address channel instability
LC_LC2	2x highest discharge measurement	6.9	Flows above 2.5 m^3/s (approximately corresponding to the staff gauge reading 0.85 m)
LC_LC7	Top of weir	N/A	Entire range of flows to continue to confirm weir equation and explain measurement scatter
LC_LC9	2x highest discharge measurement	N/A	No flows in 2022
LC_WLC	Top of weir plate [a]	1.1	Entire range of flows to confirm weir is functioning as expected
LC_LC3	2x highest discharge measurement	2.62	Flows above 1.5 m^3/s (approximately corresponding staff gauge reading 0.375 m)
LC_SLC	2x highest discharge measurement	N/A	See text notes

Monitoring Station ID	Recommended Upper Limit of Applicability	Recommended Upper Limit of Applicability (m^3/s)	SDR Gaps
LC_LCDSSLCC	2x highest discharge measurement	21.5	Above 2 m^3/s (approximately corresponding to the stage above 0.46 m). Low flow, below 0.5 m^3/s (approx. corresponding to the stage below 0.325 m).
LC_DC3	2x highest discharge measurement	0.6	Entire range of flows to refine SDR
LC_DCEF	2x highest discharge measurement	1.2	Entire range of flows to address channel instability
LC_SPDC	Maximum rating of flowmeter	1.9	N/A
LC_DCDS	2x highest discharge measurement	0.8	Flows above 0.5 m^3/s (approximately corresponding to the staff gauge reading above 0.24 m)
LC_DC4	2x highest discharge measurement	1.1	Entire range of flows to refine SDR
LC_DC1	2x highest discharge measurement	3.5	Entire range of flows to address channel instability
LC_GRCK	Point at which flow measurements no longer correlate [b]	0.9	All range of flows

Notes:
The SDR is invalid above the top of the weir plate. Manual measurements must be obtained to accurately estimate discharge values for water levels that overtop the weir plate.
Recommended limit of applicability has been lowered due to uncertainty at higher stages.

5. Average Monthly Discharge

A list of average daily discharge values for each site is included in the corresponding appendices. Average monthly discharges are summarized in Table 5.

Table 5: Monthly Average Discharge Summary

Monthly Average Discharge (m^3/s)												
Month	LC1	LC2	LC3	WLC	LCDSSLCC	DC1	DC3	DC4	DCEF	DCDS	Dry Creek Flowmeter 2	SPDC
Jan	-	0.063	0.407	0.035	0.460	0.040*	0.034	0.066	0.015	0.066	0.058	0.057
Feb	-	0.050	0.406*	0.034	0.404	0.028*	0.036	0.065	0.012	0.063	0.054	0.054
Mar	-	0.037	0.435	0.035	0.459	0.072	0.052	0.074	0.111	0.080	0.072	0.072
Apr	0.213	0.196	0.733	0.038	0.727	0.254	0.119	0.267	0.076	0.205	0.154	0.150
May	0.493	0.502	1.369	0.066	2.244	0.669	0.210	0.547	0.236	0.421	0.285	0.264
Jun	2.752	3.198	5.465	0.197	5.519	0.964	0.324	0.855	0.485	0.780	0.412	0.351
Jul	1.439	0.956	2.845	0.120	2.776	0.430	0.144	0.359	0.032	0.251	0.206	0.207
Aug	0.219	0.212	0.873*	0.076	1.417	0.212	0.089	0.154	0.004	0.111	0.110	0.108
Sep	0.138	0.238	0.751*	0.060	1.345	0.121	0.058	0.091	-	0.087	0.089	0.089
Oct	0.078	-	0.684*	0.046	1.223	0.141	0.043	0.064	-	0.071	0.070	0.070
Nov	0.027	-	0.685*	0.046	1.161	0.122	0.049	0.050	-	0.065	0.060	0.060
Dec	-	0.044	0.584*	0.043	1.026	0.096	0.043	0.043	0.004	0.055	0.053	0.053
Notes: *Calculated and/or manual measurements used to calculate monthly average. Used when continuous data not available.												

6. Recommendations

Recommendations, to be performed by Teck, KWL or other consultants, for the continuation of the hydrometric monitoring program include:

1. Continue to obtain manual discharge measurements at all sites including sites with rated structures (a minimum of three per year). Specific recommendations for sites include:
   a. Obtain as many manual discharge measurements as possible at LC_LC1, LC_LC2, LC_DC1, LC_DCEF, throughout the range of the station water levels.
   b. Obtain five or more manual discharge measurements at LC_LC3 to confirm the SDR and/or refine the SDR with staff gauge readings from the vertical staff.
   c. Obtain five or more manual discharge measurements at LC_LCDSSLC to confirm the SDR and/or refine the SDR.
   d. Obtain six to ten manual discharge measurements at LC_UC over the entire range of flows. The staff gauge should be read to the nearest millimetre to try and reduce the possible scatter in the data.
2. Relocate LC_SLC to a more stable location. Obtain ten or more manual discharge measurements (throughout the range of the station water levels) at the new location for SDR development.
3. In general, when possible, target gaps in SDR shown in Table 4 when scheduling manual discharge measurements. This will assist in refining the SDR and in validating extrapolated discharge measurements.
4. Refine field procedures to be consistent with Teck's *Flow Monitoring Protocol* (2017) and to improve the accuracy of stage measurements (see Section 2.3).
5. Assess site conditions at LC_UC and confirm they are or are not suitable for developing an SDR at that location. Modify the measurement technique and site as required to improve measurement conditions and staff gauge readings as required.
6. Re-activate the SPDC Flowmeters (KWL will support) in 2023.
7. Continue documenting and submitting monthly updates to KWL of site activities to update offsets etc. as quickly as possible. This will improve the QA/QC process and provide improved preliminary data.
8. Compare manual measurements against the existing SDRs while in the field and inform KWL of any changes that may be starting to appear.
9. Complete an annual level tie-in survey that ties the staff gauges to local benchmarks at all stations to confirm the staff gauge is stable (KWL will complete during the annual site visit).
   a. Survey staff gauges and benchmarks at least twice per year at stations with staff gauge instability (LC_SLC, LC_LCDSSLC).
10. Continue to have monthly data reviews completed by KWL (or a qualified professional). This will assist with diagnosing problems and improve the availability of data by reducing station downtime.
11. Purchase and maintain a small inventory of equipment for future repair of stations. This will minimize the time stations are inactive due to equipment malfunction.

Report Submission

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Statement of Limitations

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Revision History

Revision #	Date	Status	Revision	Author
0	March 23, 2022	FINAL	Sealed Final Version to Client	MAC

KERR WOOD LEIDAL
consulting engineers

Appendix A

LC_LC1

Station Details			
Station Name:	**Line Creek upstream MSA North Pit**	**Reporting Year:**	**2022**
Site ID:	**LC_LC1**	**Station Type:**	Year-Round Continuous Data
EMS:	**E216142**	**Teck Mine:**	Line Creek Operation

Station Description:	LC1 is located on Line Creek in a location upstream of mine influence. The station consists of a real-time water level sensor, logger, and staff gauge.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	C
Rationale for Data Grade Recommendation (RSFMP)	Consistent with Compliance Monitoring (Q10 flow) data use.

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - April 24, 2022	M	Ice affected data removed.
April 25 - November 6, 2022	E	Station operating as expected.
November 6 - November 22, 2022	M	Ice affected data removed.
November 22 - November 28, 2022	E	Ice affects possible.
November 28 - December 31, 2022	M	Ice affected data removed.

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
March 28, 2022	0.330	-	E	0.088	-	-	Calculated Discharge. Ice affected.
April 5, 2022	0.320	-	E	0.069	-	-	Calculated Discharge. Ice affected.
April 13, 2022	0.000	-	E	-	-	-	Ice affected. No staff gauge reading.
April 18, 2022	0.360	-	E	0.163	-	-	Calculated Discharge. Ice affected.
April 24, 2022	0.350	-	E	0.135	-	-	Calculated Discharge. Ice affected.
May 2, 2022	0.360	-	E	0.163	-	-	Calculated Discharge
May 5, 2022	0.399	0.314	B	0.313	0.001	0.4%	KWL Annual Measurement, 24 panels, Max panel 9%
May 9, 2022	0.420	-	E	0.421	-	-	Calculated Discharge
May 16, 2022	0.400	-	E	0.317	-	-	Calculated Discharge
May 25, 2022	0.450	-	E	0.616	-	-	Calculated Discharge
May 30, 2022	0.480	-	E	0.863	-	-	Calculated Discharge
June 6, 2022	0.530	-	E	1.405	-	-	Calculated Discharge
July 13, 2022	0.550	-	E	1.674	-	-	Calculated Discharge
August 3, 2022	0.390	-	E	0.272	-	-	Calculated Discharge
September 1, 2022	0.390	0.274	B	0.272	0.002	0.6%	LCO Measurement, 21 panels, Max panel 9%
September 28, 2022	0.320	-	E	0.069	-	-	Calculated Discharge
October 3, 2022	0.340	-	E	0.110	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
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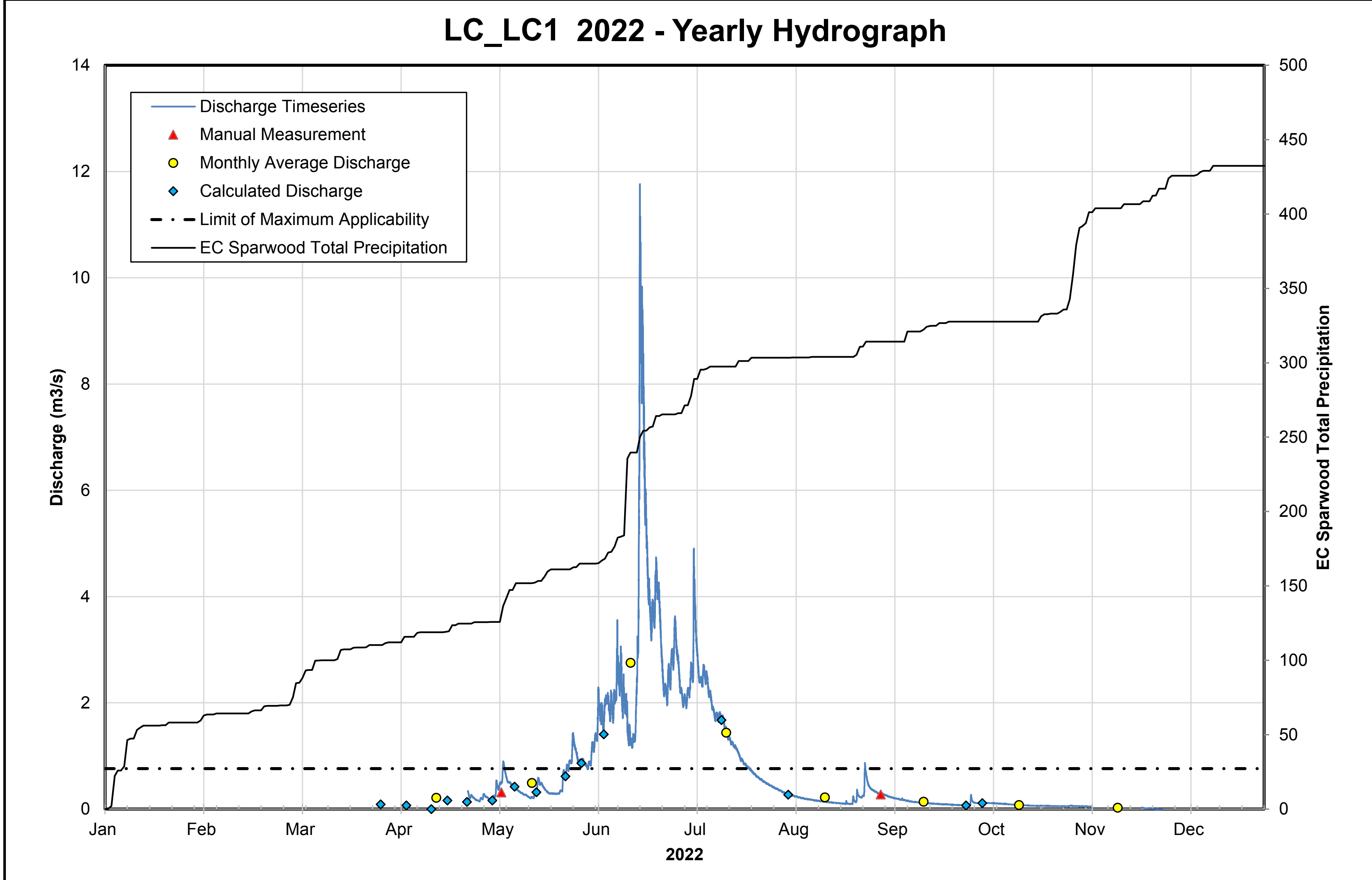
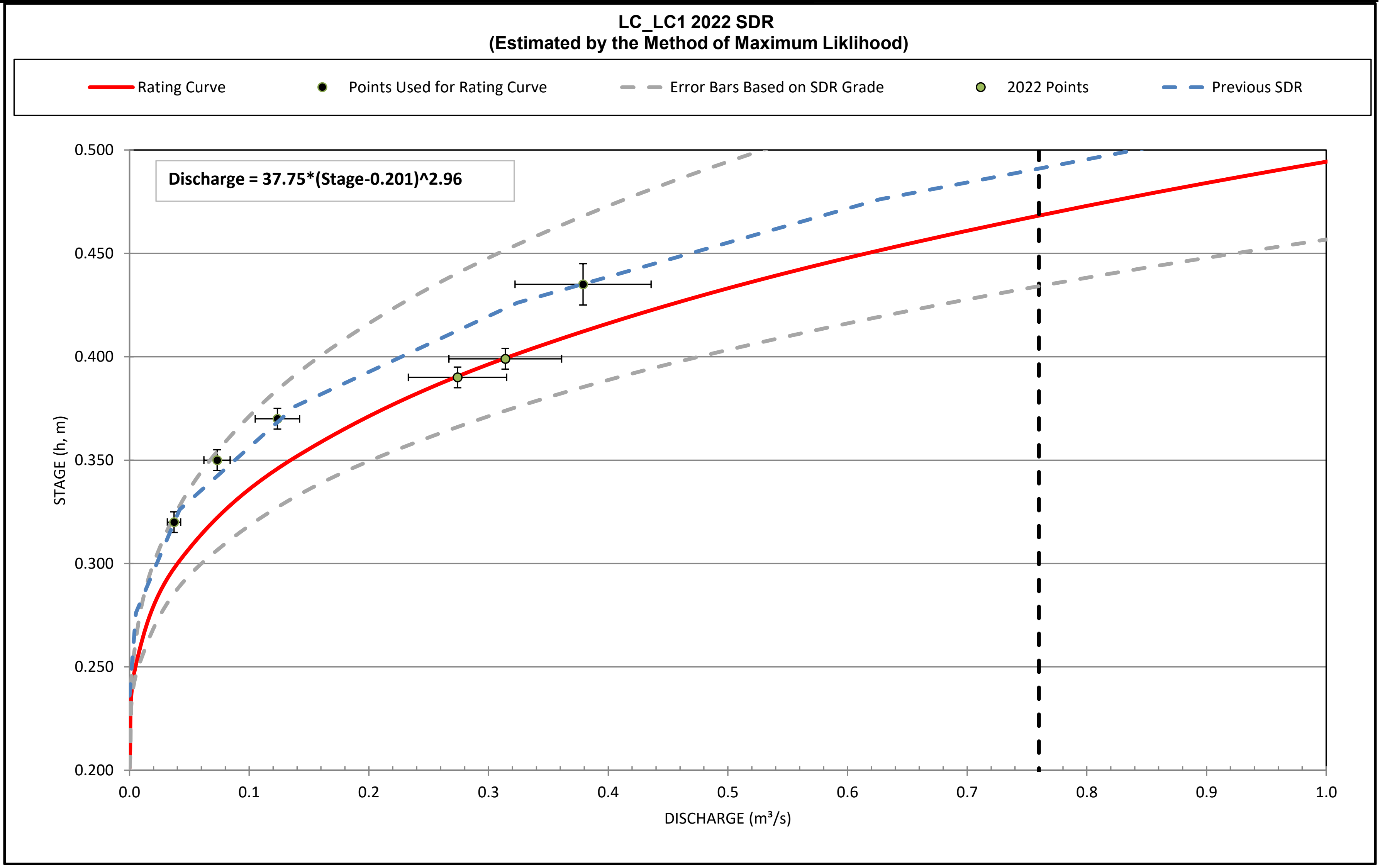
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
* Grades A, B, C, E and U based on the BC RISC Standards Document.							

Monthly Average Discharge m^3/sec											
January	February	March	April	May	June	July	August	September	October	November	December
#N/A	#N/A	#N/A	0.21	0.49	2.75	1.44	0.22	0.14	0.08	0.03	#N/A



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2022	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	E
Reason For Change	Hydraulic Control Shift During Event	**Data Grade Rational:**	It appears as if there has been a trend change, not enough measurements to verify or build a new SDR, therefore all 2022 data shifted and graded E.		



LC_LC1

Summary Report
Year: 2022
Measurement: Final Discharge (m3/s)

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	*	*	*	*	0.198	0.808	2.070	0.332	0.290 PK	0.114 PK	0.056 PK	*
2	*	*	*	*	0.186	0.942	2.057	0.303	0.276	0.109	0.053	*
3	*	*	*	*	0.309	1.214	2.292	0.277	0.251	0.109	0.052	*
4	*	*	*	*	0.421	1.564	2.991 PK	0.261	0.230	0.112	0.050	*
5	*	*	*	*	0.554	1.851	3.541	0.244	0.213	0.112	0.051	*
6	*	*	*	*	0.756	1.708	2.568	0.228	0.198	0.110	0.049	*
7	*	*	*	*	0.529	2.055	2.462	0.212	0.183	0.108	*	*
8	*	*	*	*	0.477	1.910	2.527	0.200	0.175	0.104	*	*
9	*	*	*	*	0.427	1.930	2.279	0.187	0.161	0.100	*	*
10	*	*	*	*	0.362	2.344	2.009	0.178	0.150	0.098	*	*
11	*	*	*	*	0.314	2.493	1.766	0.167	0.138	0.093	*	*
12	*	*	*	*	0.278	2.203	1.740	0.158	0.131	0.087	*	*
13	*	*	*	*	0.251	1.937	1.726	0.150	0.124	0.082	*	*
14	*	*	*	*	0.215	1.390	1.596	0.143	0.121	0.079	*	*
15	*	*	*	*	0.242	1.267	1.405	0.134	0.115	0.075	*	*
16	*	*	*	*	0.380	1.570	1.278	0.128	0.109	0.070	*	*
17	*	*	*	*	0.508	4.769 PK	1.194	0.121	0.104	0.067	*	*
18	*	*	*	*	0.438	9.002	1.110	0.115	0.099	0.065	*	*
19	*	*	*	*	0.348	6.425	0.965	0.109	0.096	0.062	*	*
20	*	*	*	*	0.299	4.452	0.881	0.105	0.092	0.059	*	*
21	*	*	*	*	0.291	3.597	0.810	0.107	0.090	0.060	*	*
22	*	*	*	*	0.288	3.818	0.754	0.100	0.088	0.062	0.025	*
23	*	*	*	*	0.302	4.255	0.687	0.118	0.085	0.059	0.016	*
24	*	*	*	0.337 PK	0.437	3.345	0.627	0.153	0.081	0.058	0.007	*
25	*	*	*	0.244	0.674	2.342	0.578	0.264	0.077	0.056	0.004	*
26	*	*	*	0.229	0.818	2.254	0.535	0.228	0.074	0.055	0.001	*
27	*	*	*	0.176	1.032 PK	2.579	0.494	0.502 PK	0.071	0.054	0.001	*
28	*	*	*	0.162	1.205	2.997	0.460	0.518	0.068	0.053	0.000	*
29	*		*	0.218	0.944	3.112	0.425	0.387	0.097	0.052	*	*
30	*		*	0.242	0.886	2.416	0.392	0.343	0.153	0.053	*	*
31	*		*		0.874		0.363	0.307		0.060		*
Mean	**---**	**---**	**---**	**0.230**	**0.492**	**2.752**	**1.438**	**0.219**	**0.138**	**0.079**	**0.028**	**---**
Maximum	**---**	**---**	**---**	**0.337**	**1.205**	**9.002**	**3.541**	**0.518**	**0.290**	**0.114**	**0.056**	**---**
Minimum	**---**	**---**	**---**	**0.162**	**0.186**	**0.808**	**0.363**	**0.100**	**0.068**	**0.052**	**0.000**	**---**
Peak 5-Minute	**---**	**---**	**---**	**0.341**	**1.435**	**11.760**	**4.901**	**0.867**	**0.313**	**0.122**	**0.058+**	**---**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix B

LC_LC2

Station Details			
Station Name:	**Line Cr. U/S of Rock Drain**	**Reporting Year:**	**2022**
Site ID:	**LC_LC2**	**Station Type:**	Year-Round Continuous Data
EMS:	**200335**	**Teck Mine:**	Line Creek Operation

Station Description:	The station is located upstream of the Line Creek rock drain.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	Governed by MAD data use.

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - February 9, 2022	E	Station operating as expected. Potential for ice in channel with clearly erroneous data removed.
February 10 - April 7, 2022	M	Erroneous data removed.
April 8 - June 16, 2022	E	Station sensor exhibiting more daily movement than expected
June 17 - June 18, 2022	E	Above 2x limit of maximum applicability.
June 19 - September 13, 2022	E	Station sensor exhibiting more daily movement than expected
September 13 - December 8, 2022	M	Sensor failure - erroneous data removed.
December 9 - 11, 2022	E	Sensor replaced. Station operating as expected.
December 12 -31, 2022	E	Station operating as expected. Potential for ice in channel, erroneous data removed.

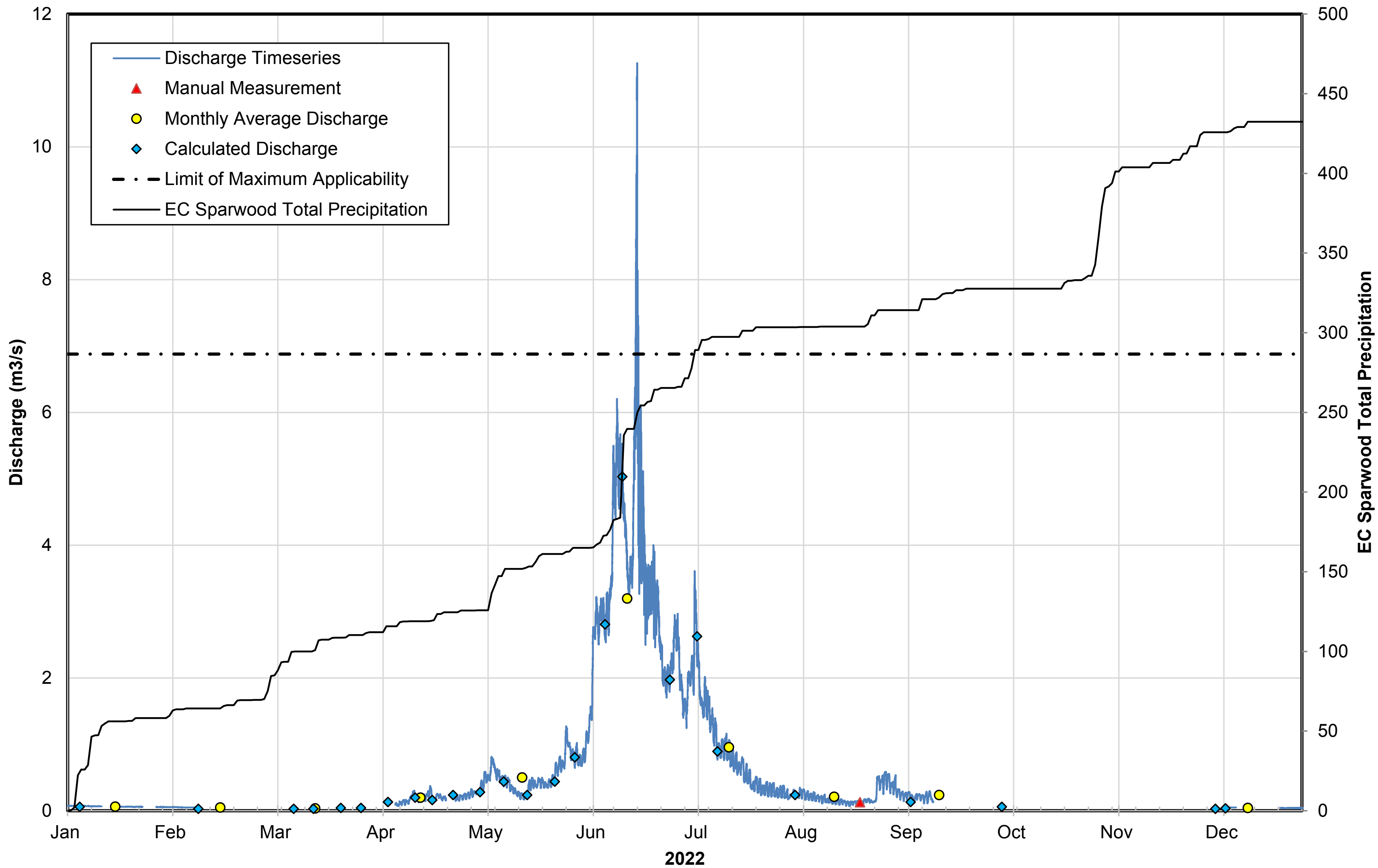
* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 4, 2022	0.550	-	E	0.061	-	-	Calculated Discharge
February 8, 2022	0.530	-	E	0.030	-	-	Calculated Discharge
March 8, 2022	0.530	-	E	0.030	-	-	Calculated Discharge
March 14, 2022	0.530	-	E	0.030	-	-	Calculated Discharge
March 22, 2022	0.540	-	E	0.044	-	-	Calculated Discharge
March 28, 2022	0.540	-	E	0.044	-	-	Calculated Discharge
April 5, 2022	0.580	-	E	0.131	-	-	Calculated Discharge
April 13, 2022	0.600	-	E	0.197	-	-	Calculated Discharge
April 18, 2022	0.590	-	E	0.162	-	-	Calculated Discharge
April 24, 2022	0.610	-	E	0.236	-	-	Calculated Discharge
May 2, 2022	0.620	-	E	0.280	-	-	Calculated Discharge
May 9, 2022	0.650	-	E	0.438	-	-	Calculated Discharge
May 16, 2022	0.610	-	E	0.236	-	-	Calculated Discharge
May 24, 2022	0.650	-	E	0.438	-	-	Calculated Discharge
May 30, 2022	0.700	-	E	0.804	-	-	Calculated Discharge
June 8, 2022	0.850	-	E	2.806	-	-	Calculated Discharge
June 13, 2022	0.950	-	E	5.033	-	-	Calculated Discharge
June 27, 2022	0.800	-	E	1.974	-	-	Calculated Discharge
July 5, 2022	0.840	-	E	2.626	-	-	Calculated Discharge
July 11, 2022	0.710	-	E	0.893	-	-	Calculated Discharge
August 3, 2022	0.610	-	E	0.236	-	-	Calculated Discharge
August 22, 2022	0.563	0.128	C	0.087	0.041	32.2%	KWL Measurement, 25 Panels, Max 11%. Measurement reviewed, no explanation for deviation from SDR.
September 6, 2022	0.580	-	E	0.131	-	-	Calculated Discharge
October 3, 2022	0.550	-	E	0.061	-	-	Calculated Discharge
December 5, 2022	0.530	-	E	0.030	-	-	Calculated Discharge.
December 8, 2022	0.535	-	E	0.037	-	-	Calculated Discharge. Sensor replaced.
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

* Grades A, B, C, E and U based on the BC RISC Standards Document.

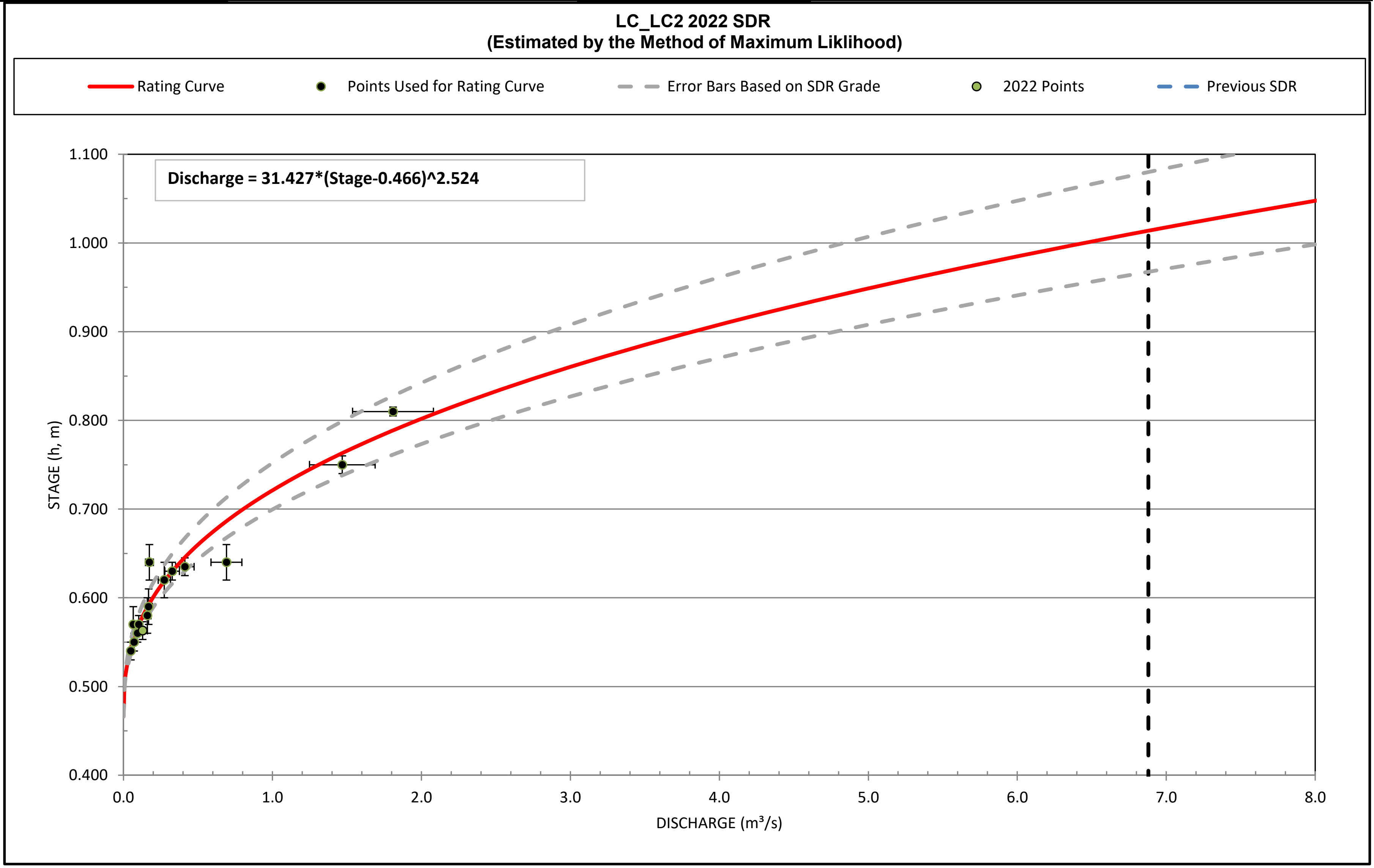
Monthly Average Discharge m³/sec											
January	February	March *	April	May	June	July	August	September	October	November	December
0.063	0.050	0.037	0.196	0.502	3.198	0.956	0.212	0.238	#N/A	#N/A	0.044

LC_LC2 2022 - Yearly Hydrograph



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2021	Updated from Previous Year:	No	SDR Data Grade:	E
Reason For Change		Data Grade Rational:	Only one measurement conducted in 2022. Suspect sensor in 2022.		



LC_LC2

Summary Report
Year: 2022
Measurement: Final Discharge (m3/s)

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.074 PK	0.054 PK	*	*	0.270	0.763	1.663	0.230	0.377	*	*	*
2	0.072	0.054	*	*	0.315	0.895	1.627	0.239	0.323 PK	*	*	*
3	0.071	0.051	*	*	0.413	1.167	2.010	0.249	0.257	*	*	*
4	0.072	0.050	*	*	0.507	1.699	2.347 PK	0.231	0.232	*	*	*
5	0.072	0.050	*	*	0.547	2.780	2.713	0.274	0.243	*	*	*
6	0.069	0.049	*	*	0.730	2.831	1.845	0.235	0.226	*	*	*
7	0.068	0.049	*	0.109	0.558	3.020	1.615	0.226	0.170	*	*	*
8	0.067	0.048	*	0.090	0.497	2.834	1.626	0.207	0.224	*	*	0.048 PK
9	0.067	0.048	*	0.124	0.458	3.037	1.428	0.203	0.213	*	*	0.048
10	0.066	*	*	0.136	0.452	3.902	1.241	0.196	0.193	*	*	0.048
11	0.065	*	*	0.141	0.377	4.986	1.012	0.170	0.201	*	*	0.048
12	*	*	*	0.227	0.311	5.272	0.919	0.170	0.228	*	*	*
13	*	*	*	0.226	0.268	4.960	0.942	0.148	0.137	*	*	*
14	0.062	*	*	0.187	0.230	4.242	0.938	0.148	*	*	*	*
15	0.062	*	*	0.191	0.221	3.476	0.843	0.144	*	*	*	*
16	0.061	*	*	0.207	0.268	3.903	0.758	0.137	*	*	*	*
17	0.059	*	*	0.270 PK	0.404	7.080 PK	0.705	0.138	*	*	*	*
18	0.060	*	*	0.225	0.407	5.451	0.688	0.120	*	*	*	*
19	0.061	*	*	0.193	0.412	4.451	0.566	0.106	*	*	*	*
20	0.058	*	*	0.229	0.428	3.345	0.527	0.121	*	*	*	*
21	0.059	*	*	0.188	0.404	3.279	0.438	0.130	*	*	*	*
22	0.059	*	*	0.191	0.392	3.411	0.391	0.119	*	*	*	*
23	0.059	*	*	*	0.428	3.037	0.379	0.126	*	*	*	*
24	*	*	*	0.233	0.513	2.762	0.347	0.156	*	*	*	0.042
25	*	*	*	0.195	0.642	2.140	0.317	0.152	*	*	*	0.041
26	*	*	*	0.188	0.707	1.966	0.318	0.134	*	*	*	0.042
27	0.056	*	*	0.206	0.803	2.052	0.327	0.289	*	*	*	0.042
28	0.056	*	*	0.223	1.076 PK	2.344	0.296	0.437	*	*	*	0.042
29	0.055		*	0.243	0.879	2.711	0.267	0.430	*	*	*	0.041
30	0.054		*	0.269	0.814	2.159	0.284	0.486 PK	*	*	*	0.041
31	0.053		*		0.806		0.266	0.426		*		0.041
Mean	**0.063**	**0.050**	**---**	**0.195**	**0.501**	**3.199**	**0.956**	**0.212**	**0.233**	**---**	**---**	**0.044**
Maximum	**0.074**	**0.054**	**---**	**0.270**	**1.076**	**7.080**	**2.713**	**0.486**	**0.377**	**---**	**---**	**0.048**
Minimum	**0.053**	**0.048**	**---**	**0.090**	**0.221**	**0.763**	**0.266**	**0.106**	**0.137**	**---**	**---**	**0.041**
Peak 5-Minute	**0.078**	**0.057**	**---**	**0.372**	**1.269**	**11.262**	**3.610**	**0.587**	**0.536**	**---**	**---**	**0.049+**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix C

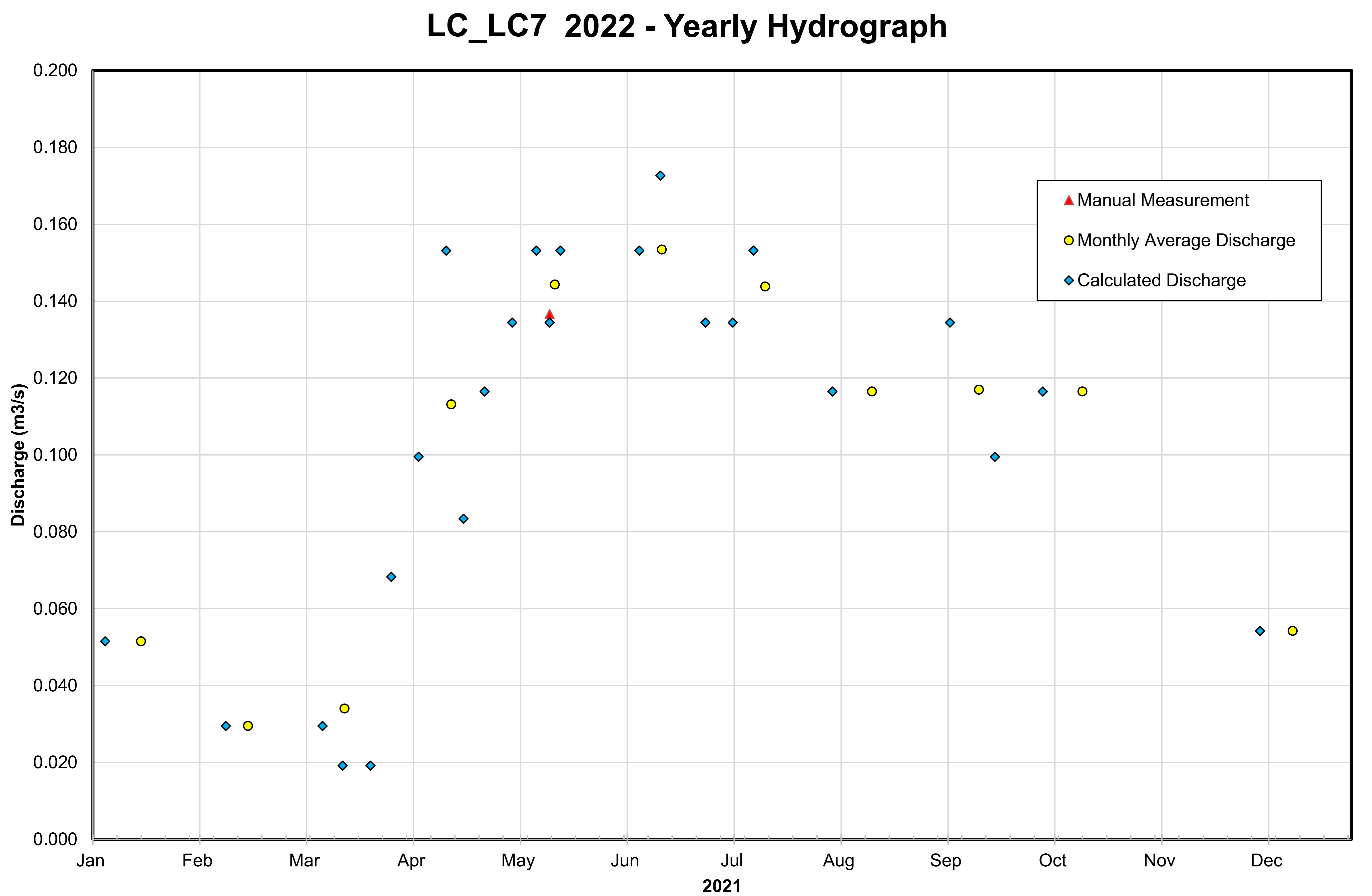
LC_LC7

Station Details			
Station Name:	**MSA North Ponds Effluent to Line Creek**	**Reporting Year:**	**2022**
Site ID:	**LC_LC7**	**Station Type:**	Manual Measurements
EMS:	**E216144**	**Teck Mine:**	Line Creek Operation
Station Description:	The LC7 site is the authorized discharge point located downstream of the MSA North Ponds which decant to a collector ditch located immediately upstream of the Line Creek Rock Drain. A concrete weir structure controls the flow and a staff gauge is affixed to the face of the structure. LC7 is a staff gauge site: no continuous water level data are collected at this site.		
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol		
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B		
Rationale for Data Grade Recommendation (RSFMP)	Governed by MAD data use.		

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 4, 2022	0.078	-	E	0.053	-	-	Calculated Discharge
February 8, 2022	0.060	-	E	0.030	-	-	Calculated Discharge
March 8, 2022	0.060	-	E	0.030	-	-	Calculated Discharge
March 14, 2022	0.050	-	E	0.020	-	-	Calculated Discharge
March 22, 2022	0.050	-	E	0.020	-	-	Calculated Discharge
March 28, 2022	0.090	-	E	0.070	-	-	Calculated Discharge
April 5, 2022	0.110	-	E	0.102	-	-	Calculated Discharge
April 13, 2022	0.140	-	E	0.156	-	-	Calculated Discharge
April 18, 2022	0.100	-	E	0.085	-	-	Calculated Discharge
April 24, 2022	0.120	-	E	0.119	-	-	Calculated Discharge
May 2, 2022	0.130	-	E	0.137	-	-	Calculated Discharge
May 9, 2022	0.140	-	E	0.156	-	-	Calculated Discharge
May 13, 2022	0.130	0.137	B	0.137	0.000	-0.3%	LCO measurement, 22 panels, Max 10%
May 16, 2022	0.140	-	E	0.156	-	-	Calculated Discharge
June 8, 2022	0.140	-	E	0.156	-	-	Calculated Discharge
June 14, 2022	0.150	-	E	0.176	-	-	Calculated Discharge
June 27, 2022	0.130	-	E	0.137	-	-	Calculated Discharge
July 5, 2022	0.130	-	E	0.137	-	-	Calculated Discharge
July 11, 2022	0.140	-	E	0.156	-	-	Calculated Discharge
August 3, 2022	0.120	-	E	0.119	-	-	Calculated Discharge
September 6, 2022	0.130	-	E	0.137	-	-	Calculated Discharge
September 19, 2022	0.110	-	E	0.102	-	-	Calculated Discharge
October 3, 2022	0.120	-	E	0.119	-	-	Calculated Discharge
December 5, 2022	0.080	-	E	0.055	-	-	Calculated Discharge
	-	-		-	-	-	
	-	-		-	-	-	
	-	-		-	-	-	
	-	-		-	-	-	
	-	-		-	-	-	
	-	-		-	-	-	
	-	-		-	-	-	

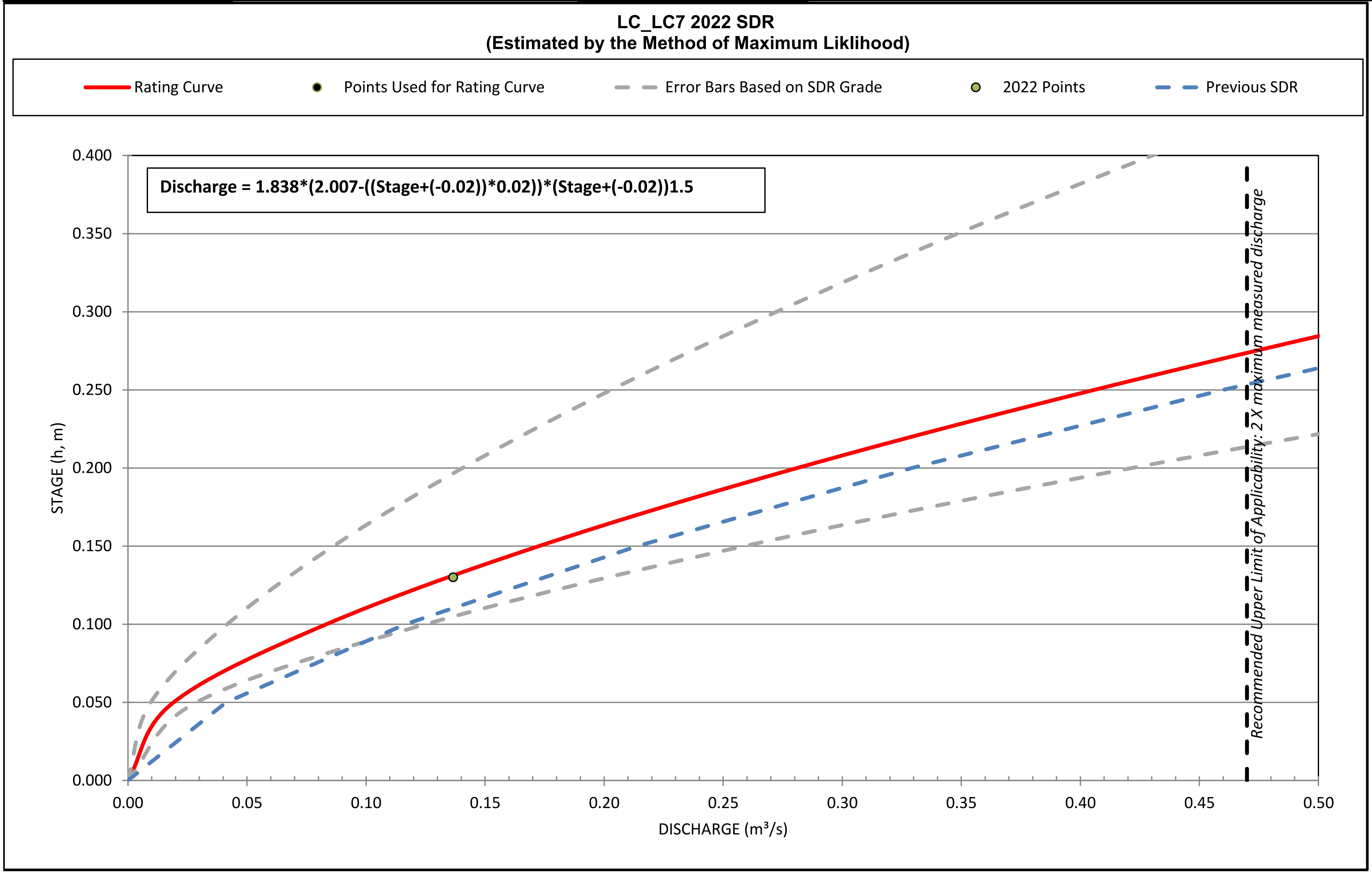
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m^3/sec											
January*	February*	March*	April*	May*	June*	July*	August*	September*	October*	November	December*
0.051	0.029	0.034	0.113	0.144	0.153	0.144	0.117	0.117	0.117	#N/A	0.054



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2022	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	E
Reason For Change	Clear change in trend	**Data Grade Rational:**	Rated structure (rectangular broad crested weir) and equation, there is significant measurement scatter.		



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Appendix D

LC_LCDS-LC2

LC_LCDSLC2
Start Date: 2022-01-01 00:00
End Date: 2022-12-31 23:59
Preliminary Level (m)
Preliminary Level (m)
5
4
3
2
1
0
-1
2022-01-01 00:00
2022-02-04 00:00
2022-03-10 00:00
2022-04-13 00:00
2022-05-17 00:00
2022-06-20 00:00
2022-07-24 00:00
2022-08-27 00:00
2022-09-30 00:00
2022-11-03 00:00
2023-01-01 00:00

LC_LCDSLC2
Summary Report
Year: 2022
Measurement: Preliminary Level (m)

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	*	*	*	*	*	*	1.611	*	*	*	*	*
2	*	*	*	*	*	*	0.811	*	*	*	*	*
3	*	*	*	*	*	*	0.625	*	*	*	*	*
4	*	*	*	*	*	0.283	0.929	*	*	*	*	*
5	*	*	*	*	*	1.866	2.248 PK	*	*	*	*	*
6	*	*	*	*	*	2.799	2.040	*	*	*	*	*
7	*	*	*	*	*	2.717	1.258	*	*	*	*	*
8	*	*	*	*	*	2.621	0.907	*	*	*	*	*
9	*	*	*	*	*	2.547	0.515	*	*	*	*	*
10	*	*	*	*	*	2.788	0.090	*	*	*	*	*
11	*	*	*	*	*	3.108	*	*	*	*	*	*
12	*	*	*	*	*	3.053	*	*	*	*	*	*
13	*	*	*	*	*	2.974	*	*	*	*	*	*
14	*	*	*	*	*	2.736	*	*	*	*	*	*
15	*	*	*	*	*	2.175	*	*	*	*	*	*
16	*	*	*	*	*	1.956	*	*	*	*	*	*
17	*	*	*	*	*	3.325	*	*	*	*	*	*
18	*	*	*	*	*	4.145	*	*	*	*	*	*
19	*	*	*	*	*	3.858	*	*	*	*	*	*
20	*	*	*	*	*	4.505 PK	*	*	*	*	*	*
21	*	*	*	*	*	4.554	*	*	*	*	*	*
22	*	*	*	*	*	4.554	*	*	*	*	*	*
23	*	*	*	*	*	4.554	*	*	*	*	*	*
24	*	*	*	*	*	4.554	*	*	*	*	*	*
25	*	*	*	*	*	4.203	*	*	*	*	*	*
26	*	*	*	*	*	3.422	*	*	*	*	*	*
27	*	*	*	*	*	2.891	*	*	*	*	*	*
28	*	*	*	*	*	2.683	*	*	*	*	*	*
29	*		*	*	*	2.743	*	*	*	*	*	*
30	*		*	*	*	2.459	*	*	*	*	*	*
31	*		*		*		*	*		*		*
Mean	---	---	---	---	---	**3.114**	**1.103**	---	---	---	---	---
Maximum	---	---	---	---	---	**4.554+**	**2.248**	---	---	---	---	---
Minimum	---	---	---	---	---	**0.283**	**0.090**	---	---	---	---	---
Peak 5-Minute	---	---	---	---	---	**4.554+**	**2.425+**	---	---	---	---	---

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix E

LC_WLC

Station Details			
Station Name:	**West Line Creek**	**Reporting Year:**	**2022**
Site ID:	**LC_WLC**	**Station Type:**	Year-Round Continuous Data
EMS:	**E261958**	**Teck Mine:**	Line Creek Operation

Station Description:	The West Line Creek (WLC) hydrometric station is located at a concrete structure downstream of the West Line Creek rock drain, and immediately upstream of the active wastewater treatment (AWTF) intake. Flow at WLC passes through a rated 120° V-notch weir.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	The site should achieve Grade B data to be consistent with the MAD data use (don't require Grade A data for AWTF operations because this is to understand how much flow may be bypassing treatment, not for the operation of the AWTF)

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - December 31, 2022	B	Station Operating as expected

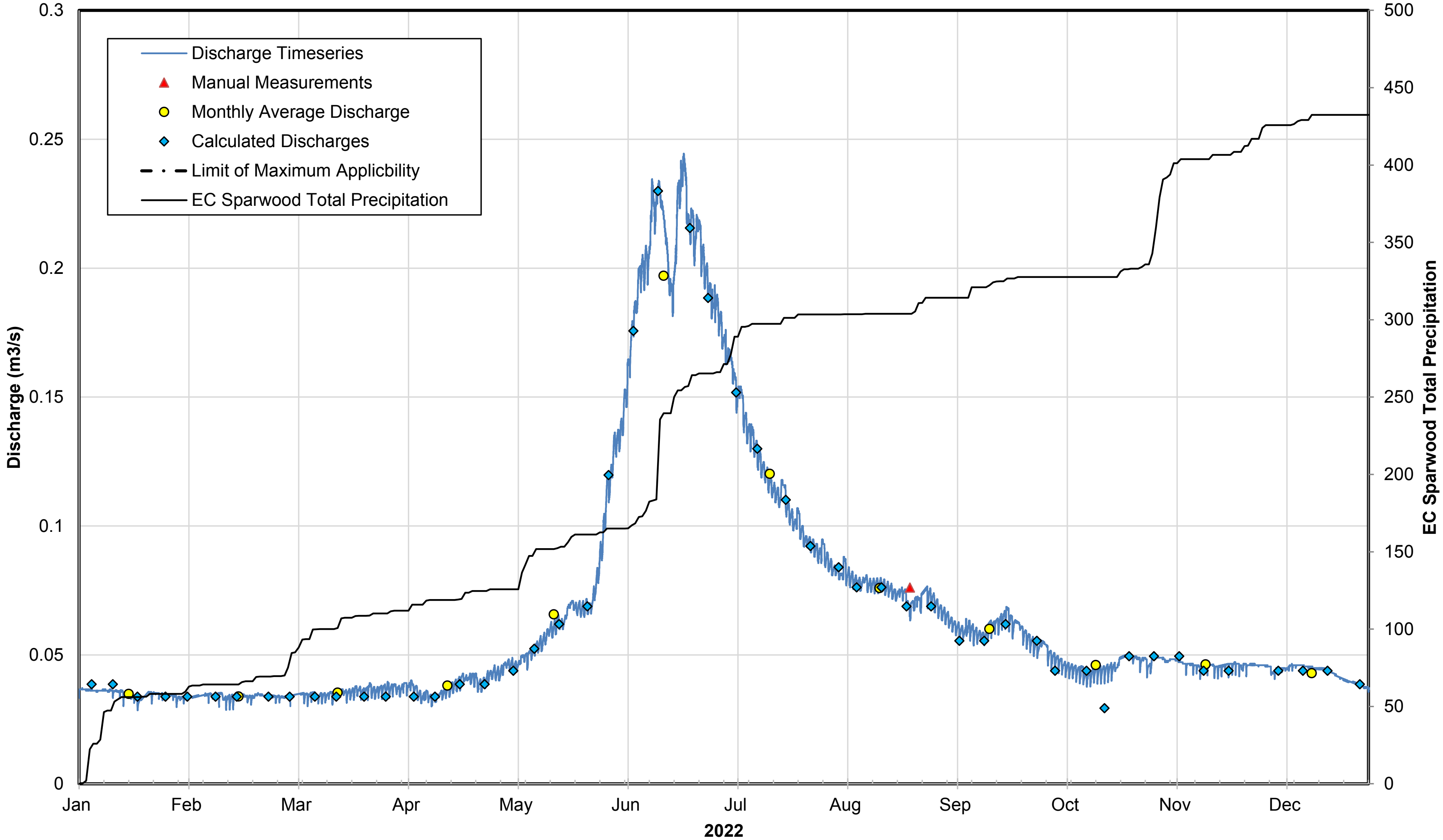
* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 4, 2022	0.600	-	B	0.039	-	-	Calculated Discharge
January 10, 2022	0.600	-	B	0.039	-	-	Calculated Discharge
January 17, 2022	0.590	-	B	0.034	-	-	Calculated Discharge
January 25, 2022	0.590	-	B	0.034	-	-	Calculated Discharge
January 31, 2022	0.590	-	B	0.034	-	-	Calculated Discharge
February 8, 2022	0.590	-	B	0.034	-	-	Calculated Discharge
February 14, 2022	0.590	-	B	0.034	-	-	Calculated Discharge
February 23, 2022	0.590	-	B	0.034	-	-	Calculated Discharge
March 1, 2022	0.590	-	B	0.034	-	-	Calculated Discharge
March 8, 2022	0.590	-	B	0.034	-	-	Calculated Discharge
March 14, 2022	0.590	-	B	0.034	-	-	Calculated Discharge
March 22, 2022	0.590	-	B	0.034	-	-	Calculated Discharge
March 28, 2022	0.590	-	B	0.034	-	-	Calculated Discharge
April 5, 2022	0.590	-	B	0.034	-	-	Calculated Discharge
April 11, 2022	0.590	-	B	0.034	-	-	Calculated Discharge
April 18, 2022	0.600	-	B	0.039	-	-	Calculated Discharge
April 25, 2022	0.600	-	B	0.039	-	-	Calculated Discharge
May 3, 2022	0.610	-	B	0.044	-	-	Calculated Discharge
May 9, 2022	0.625	-	B	0.052	-	-	Calculated Discharge
May 16, 2022	0.640	-	B	0.062	-	-	Calculated Discharge
May 24, 2022	0.650	-	B	0.069	-	-	Calculated Discharge
May 30, 2022	0.710	-	B	0.120	-	-	Calculated Discharge
June 6, 2022	0.760	-	B	0.176	-	-	Calculated Discharge
June 13, 2022	0.800	-	B	0.230	-	-	Calculated Discharge
June 22, 2022	0.790	-	B	0.216	-	-	Calculated Discharge
June 27, 2022	0.770	-	B	0.188	-	-	Calculated Discharge
July 5, 2022	0.740	-	B	0.152	-	-	Calculated Discharge
July 11, 2022	0.720	-	B	0.130	-	-	Calculated Discharge
July 19, 2022	0.700	-	B	0.110	-	-	Calculated Discharge
July 26, 2022	0.680	-	B	0.092	-	-	Calculated Discharge
August 3, 2022	0.670	-	B	0.084	-	-	Calculated Discharge
August 8, 2022	0.660	-	B	0.076	-	-	Calculated Discharge
August 15, 2022	0.660	-	B	0.076	-	-	Calculated Discharge
* Grades A, B, C, E and U based on the BC RISC Standards Document.							

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
August 22, 2022	0.650	-	B	0.069	-	-	Calculated Discharge
August 23, 2022	0.645	0.076	C	0.065	0.011	14.2%	KWL Measurement, 19 panels, max 14.3%
August 29, 2022	0.650	-	B	0.069	-	-	Calculated Discharge
September 6, 2022	0.630	-	B	0.055	-	-	Calculated Discharge
September 13, 2022	0.630	-	B	0.055	-	-	Calculated Discharge
September 19, 2022	0.640	-	B	0.062	-	-	Calculated Discharge
September 28, 2022	0.630	-	B	0.055	-	-	Calculated Discharge
October 3, 2022	0.610	-	B	0.044	-	-	Calculated Discharge
October 12, 2022	0.610	-	B	0.044	-	-	Calculated Discharge
October 17, 2022	0.580	-	B	0.029	-	-	Calculated Discharge, Suspect staff reading, no photo provided
October 24, 2022	0.620	-	B	0.049	-	-	Calculated Discharge
October 31, 2022	0.620	-	B	0.049	-	-	Calculated Discharge
November 7, 2022	0.620	-	B	0.049	-	-	Calculated Discharge
November 14, 2022	0.610	-	B	0.044	-	-	Calculated Discharge
November 21, 2022	0.610	-	B	0.044	-	-	Calculated Discharge
December 5, 2022	0.610	-	B	0.044	-	-	Calculated Discharge
December 12, 2022	0.610	-	B	0.044	-	-	Calculated Discharge
December 19, 2022	0.610	-	B	0.044	-	-	Calculated Discharge
December 28, 2022	0.600	-	B	0.039	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
* Grades A, B, C, E and U based on the BC RISC Standards Document.							

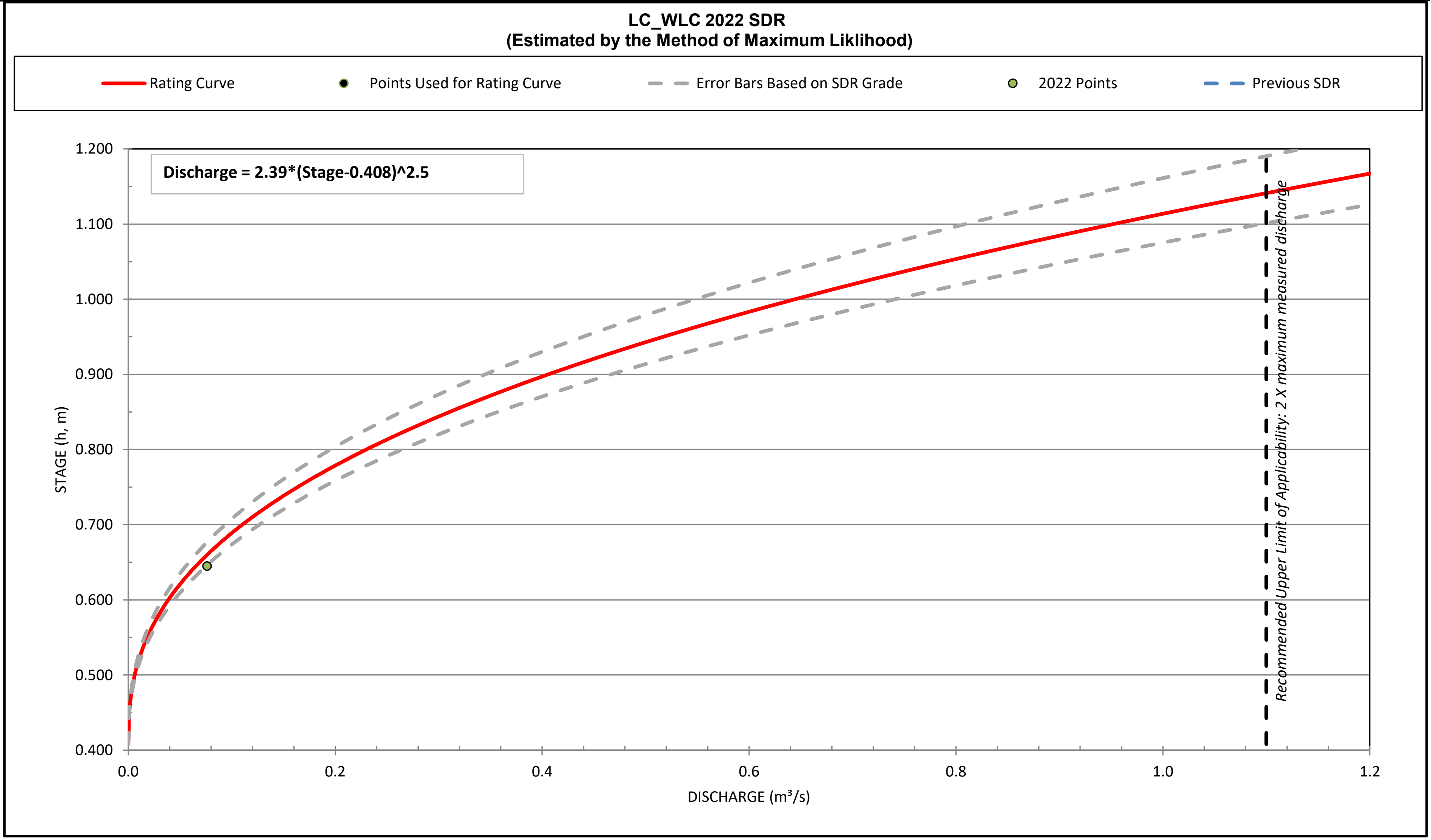
Monthly Average Discharge m³/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.035	0.034	0.035	0.038	0.066	0.197	0.120	0.076	0.060	0.046	0.046	0.043

LC_WLC 2022 - Yearly Hydrograph



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2012	**Updated from Previous Year:**	No	**SDR Data Grade:**	B
Reason For Change		**Data Grade Rational:**	Engineered structure, 90 degree V-Notch Weir		



LC_WLC
Summary Report
Year: 2022
Measurement: Final Discharge (m3/s)

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.037 PK	0.034	0.034	0.036	0.046	0.132	0.176 PK	0.084	0.067 PK	0.051 PK	0.049 PK	0.046
2	0.037	0.034	0.034	0.038	0.046	0.135	0.169	0.083	0.065	0.049	0.049	0.046
3	0.037	0.034	0.035	0.038	0.046	0.142	0.166	0.082	0.064	0.048	0.048	0.044
4	0.036	0.034	0.035	0.039	0.046	0.153	0.161	0.082 PK	0.062	0.048	0.048	0.043
5	0.036	0.035	0.034	0.037	0.048	0.166	0.152	0.083	0.061	0.046	0.048	0.045
6	0.036	0.034	0.034	0.035	0.049	0.180	0.153	0.080	0.060	0.045	0.048	0.045
7	0.036	0.034	0.035	0.034	0.049	0.188	0.145	0.079	0.059	0.045	0.048	0.045
8	0.036	0.034	0.035	0.034	0.050	0.199	0.139	0.078	0.060	0.044	0.047	0.045
9	0.036	0.034	0.034	0.034	0.052	0.200	0.136	0.077	0.060	0.044	0.046	0.046 PK
10	0.036	0.034 PK	0.034	0.033	0.053	0.203	0.133	0.079	0.059	0.044	0.047	0.046
11	0.036	0.033	0.034	0.033	0.054	0.220	0.128	0.078	0.058	0.043	0.046	0.046
12	0.036	0.033	0.035	0.034	0.056	0.223	0.124	0.077	0.058	0.042	0.045	0.046
13	0.035	0.033	0.034	0.035	0.059	0.230	0.121	0.077	0.057	0.042	0.045	0.045
14	0.035	0.035	0.035	0.036	0.060	0.224	0.118	0.077	0.060	0.043	0.045	0.045
15	0.034	0.035	0.036	0.037	0.061	0.214	0.115	0.077	0.061	0.044	0.045	0.045
16	0.033	0.034	0.036	0.038	0.063	0.198	0.113	0.076	0.062	0.044	0.046	0.045
17	0.032	0.033	0.035	0.038	0.062	0.191	0.111	0.076	0.062	0.044	0.045	0.045
18	0.033	0.033	0.035	0.040	0.065	0.209	0.116	0.075	0.064	0.044	0.045	0.044
19	*	0.034	0.036	0.041	0.069	0.231	0.110	0.074	0.066	0.045	0.045	0.044
20	0.035	0.035	0.037	0.041	0.070	0.238 PK	0.105	0.074	0.065	0.045	0.046	0.043
21	0.035	0.034	0.036	0.041	0.068	0.228	0.102	0.074	0.062	0.047	0.046	0.042
22	0.035	0.034	0.036	0.041	0.068	0.217	0.103	0.072	0.063	0.049	0.046	0.042
23	0.035	0.034	0.037	0.039	0.068	0.213	0.101	0.068	0.062	0.050	0.046	0.041
24	0.034	0.034	0.037	0.038	0.069	0.216	0.096	0.069	0.059	0.050	0.046	0.040
25	0.035	0.033	0.036	0.039	0.069	0.210	0.094	0.072	0.057	0.049	0.045	0.040
26	0.035	0.033	0.036	0.042	0.074	0.201	0.093	0.071	0.056	0.049	0.046	0.039
27	0.034	0.034	0.037	0.043	0.081	0.195	0.092	0.075	0.054	0.047	0.046	0.039
28	0.033	0.034	0.037	0.043	0.091	0.188	0.090	0.074	0.053	0.049	0.046	0.038
29	0.033		0.037 PK	0.043	0.105	0.186	0.091	0.072	0.054	0.046	0.046	0.038
30	0.033		0.037	0.044 PK	0.115	0.183	0.089	0.071	0.054	0.046	0.046	0.037
31	0.034		0.037		0.123 PK		0.086	0.068		0.049		0.037
Mean	**0.035**	**0.034**	**0.035**	**0.038**	**0.066**	**0.197**	**0.120**	**0.076**	**0.060**	**0.046**	**0.046**	**0.043**
Maximum	**0.037**	**0.035**	**0.037**	**0.044**	**0.123**	**0.238**	**0.176**	**0.084**	**0.067**	**0.051**	**0.049**	**0.046**
Minimum	**0.032**	**0.033**	**0.034**	**0.033**	**0.046**	**0.132**	**0.086**	**0.068**	**0.053**	**0.042**	**0.045**	**0.037**
Peak 5-Minute	**0.037+**	**0.035**	**0.040+**	**0.047+**	**0.134**	**0.244**	**0.183**	**0.088+**	**0.069**	**0.054**	**0.049+**	**0.047**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix F

LC_LC3

Station Details			
Station Name:	**Line Cr. D/S of West Line Creek**	**Reporting Year:**	**2022**
Site ID:	**LC_LC3**	**Station Type:**	Year-Round Continuous Data
EMS:	**200337**	**Teck Mine:**	Line Creek Operation
Station Description:	LC3 is located downstream of the Line Creek rock drain and the West Line Creek Confluence. The hydrometric station is located above a trapezoidal section of engineered concrete channel.		
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol		
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B		
Rationale for Data Grade Recommendation (RSFMP)	Governed by MAD and AWTF design data uses.		

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - March 15, 2022	E	Station operating as expected. Potential ice effects. Erroneous data removed.
March 16 - May 28, 2022	C	Station operating as expected.
May 29 - July 17, 2022	E	Station operating as expected. Discharge above 2x maximum applicability.
July 18 - July 26, 2022	C	Station operating as expected.
July 26 - August 4, 2022	E	Sensor beginning to fail.
August 5 - December 8, 2022	M	Sensor failed. Erroneous data removed from record.
December 8 - 31, 2022	E	Sensor replaced. Station operating as expected with potential ice affects.

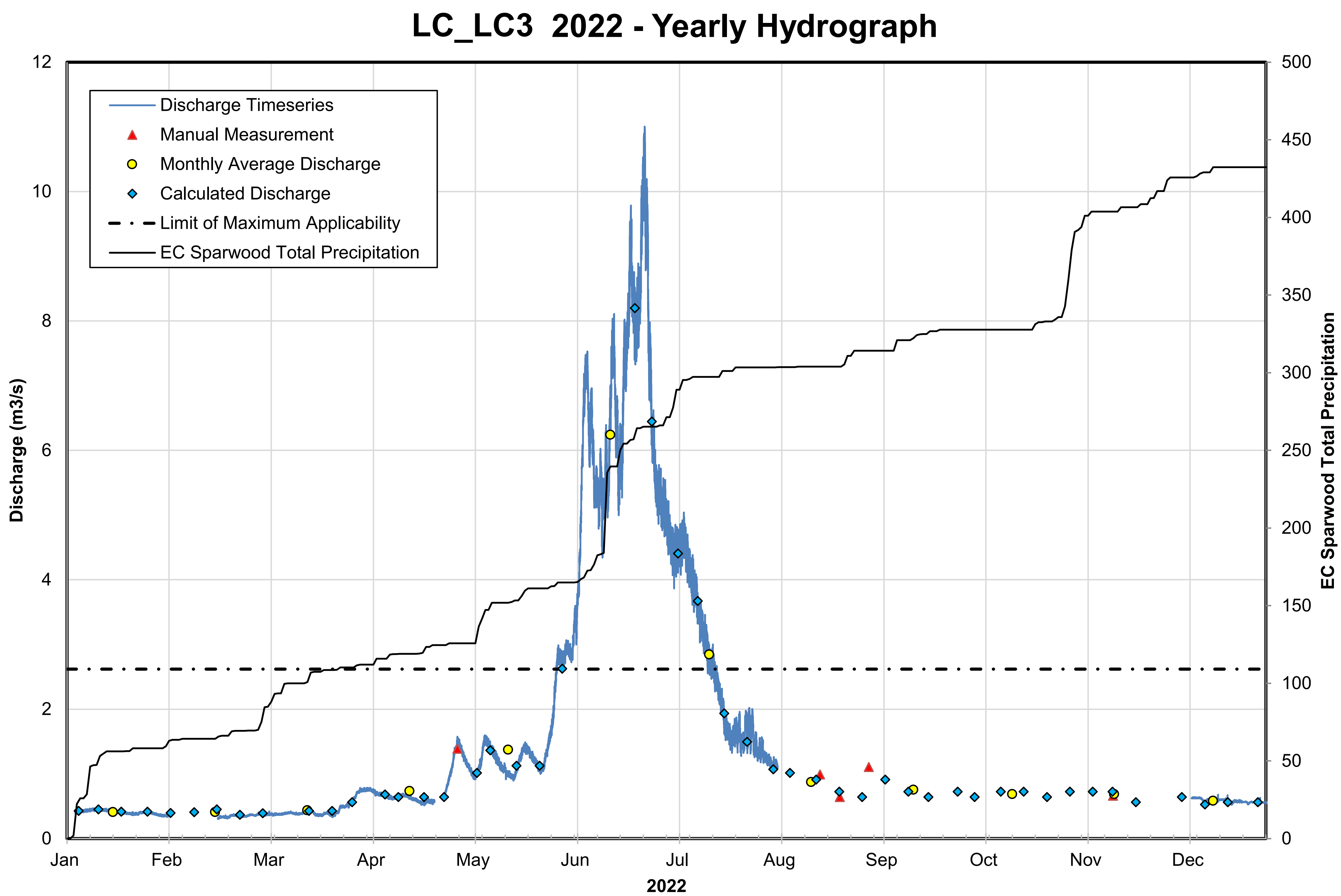
* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 4, 2022	0.270	-	E	0.427	-	-	Calculated Discharge
January 10, 2022	0.274	-	E	0.452	-	-	Calculated Discharge. Potential ice effects.
January 17, 2022	0.268	-	E	0.414	-	-	Calculated Discharge. Potential ice effects.
January 25, 2022	0.268	-	E	0.414	-	-	Calculated Discharge. Potential ice effects.
February 1, 2022	0.265	-	E	0.396	-	-	Calculated Discharge. Potential ice effects.
February 8, 2022	0.267	-	E	0.408	-	-	Calculated Discharge. Potential ice effects.
February 15, 2022	0.274	-	E	0.452	-	-	Calculated Discharge. Potential ice effects.
February 22, 2022	0.260	-	E	0.366	-	-	Calculated Discharge. Potential ice effects.
March 1, 2022	0.264	-	E	0.390	-	-	Calculated Discharge. Potential ice effects.
March 15, 2022	0.270	-	C	0.427	-	-	Calculated Discharge
March 22, 2022	0.270	-	C	0.427	-	-	Calculated Discharge
March 28, 2022	0.290	-	C	0.564	-	-	Calculated Discharge
April 7, 2022	0.305	-	C	0.683	-	-	Calculated Discharge
April 11, 2022	0.300	-	C	0.642	-	-	Calculated Discharge
April 19, 2022	0.300	-	C	0.642	-	-	Calculated Discharge
April 25, 2022	0.300	-	C	0.642	-	-	Calculated Discharge
April 29, 2022	0.380	1.388	B	1.496	-0.108	-7.8%	LCO measurement, 21 panels, 9.9%
May 5, 2022	0.340	-	C	1.015	-	-	Calculated Discharge
May 9, 2022	0.370	-	C	1.365	-	-	Calculated Discharge
May 17, 2022	0.350	-	C	1.125	-	-	Calculated Discharge
May 24, 2022	0.350	-	C	1.125	-	-	Calculated Discharge
May 31, 2022	0.450	-	E	2.624	-	-	Calculated Discharge. Above 2x limit of max applicability.
June 6, 2022	0.830	-	E	16.740	-	-	Calculated Discharge. Suspect staff gauge reading. Above 2x limit of max applicability.
June 22, 2022	0.650	-	E	8.197	-	-	Calculated Discharge. Above 2x limit of max applicability.
June 27, 2022	0.600	-	E	6.446	-	-	Calculated Discharge. Above 2x limit of max applicability.
July 5, 2022	0.530	-	E	4.408	-	-	Calculated Discharge. Above 2x limit of max applicability.
July 11, 2022	0.500	-	E	3.673	-	-	Calculated Discharge. Above 2x limit of max applicability.
July 19, 2022	0.410	-	C	1.933	-	-	Calculated Discharge
July 26, 2022	0.380	-	C	1.496	-	-	Calculated Discharge
August 3, 2022	0.345	-	E	1.069	-	-	Calculated Discharge
August 8, 2022	0.340	-	E	1.015	-	-	Calculated Discharge

* Grades A, B, C, E and U based on the BC RISC Standards Document.

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
August 16, 2022	0.330	-	E	0.912	-	-	Calculated Discharge
August 17, 2022	0.330	0.990	B	0.912	0.078	7.8%	LCO Measurement, 20 panels, Max 7%
August 23, 2022	0.315	0.640	B	0.770	-0.130	-20.3%	KWL Measurement, 23 Panels, Max 9.9%, measurement reviewed, no explanation for deviation from SDR
August 30, 2022	0.300	-	E	0.642	-	-	Calculated Discharge
September 1, 2022	0.335	1.107	B	0.963	0.144	13.0%	LCO Measurement, 20 panels, max 7%
September 6, 2022	0.330	-	E	0.912	-	-	Calculated Discharge
September 13, 2022	0.310	-	E	0.726	-	-	Calculated Discharge
September 19, 2022	0.300	-	E	0.642	-	-	Calculated Discharge
September 28, 2022	0.310	-	E	0.726	-	-	Calculated Discharge
October 3, 2022	0.300	-	E	0.642	-	-	Calculated Discharge
October 11, 2022	0.310	-	E	0.726	-	-	Calculated Discharge
October 18, 2022	0.310	-	E	0.726	-	-	Calculated Discharge
October 25, 2022	0.300	-	E	0.642	-	-	Calculated Discharge
November 1, 2022	0.310	-	E	0.726	-	-	Calculated Discharge
November 8, 2022	0.310	-	E	0.726	-	-	Calculated Discharge
November 14, 2022	0.310	-	E	0.726	-	-	Calculated Discharge
November 14, 2022	0.305	0.663	B	0.683	-0.020	-3.0%	LCO Measurement, 20 panels, max 8%
November 21, 2022	0.290	-	E	0.564	-	-	Calculated Discharge
December 5, 2022	0.300	-	E	0.642	-	-	Calculated Discharge
December 12, 2022	0.285	-	E	0.528	-	-	Calculated Discharge
December 19, 2022	0.290	-	E	0.564	-	-	Calculated Discharge
December 28, 2022	0.290	-	E	0.564	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
* Grades A, B, C, E and U based on the BC RISC Standards Document.							

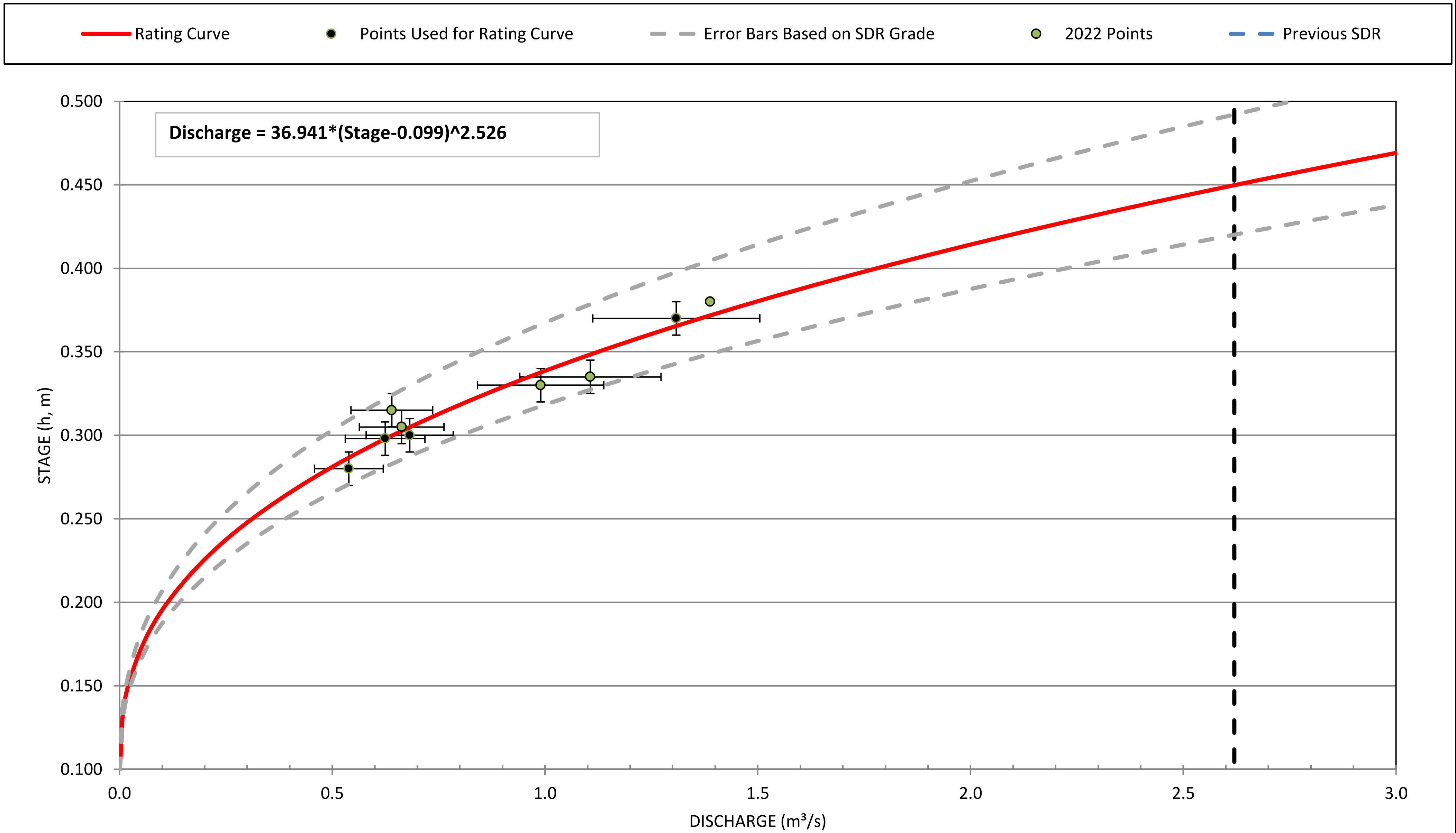
Monthly Average Discharge m³/sec											
January	February*	March	April	May	June	July	August*	September*	October*	November*	December
0.407	0.406	0.435	0.733	1.371	6.239	2.845	0.873	0.751	0.684	0.685	0.584



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2022	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	C
Reason For Change	New Station	**Data Grade Rational:**	This SDR refers to the new vertical staff gauge, the SDR is Graded C due to limited number and range of measurements.		

LC_LC3 2022 SDR
(Estimated by the Method of Maximum Liklihood)



LC_LC3
Summary Report
Year: 2022
Measurement: Final Discharge (m3/s)

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	*	*	0.372	0.751	1.263	2.605	5.059 PK	1.229 PK	*	*	*	*
2	*	*	0.368	0.757	1.151	2.369	4.853	1.179	*	*	*	*
3	0.414	*	0.376	0.748	1.057	2.206	4.546	1.116	*	*	*	*
4	0.418	*	0.371	0.716	0.963	2.344	4.419	1.123	*	*	*	*
5	0.423	*	0.373	0.689	1.006	2.683	4.477	*	*	*	*	*
6	0.429	*	0.374	0.681	1.150	3.872	4.584	*	*	*	*	*
7	0.438	*	0.380	0.664	1.444	4.879	4.616	*	*	*	*	*
8	0.445	*	0.391	0.642	1.502	4.463	4.327	*	*	*	*	0.629
9	0.448	*	0.401	0.630	1.412	4.480	4.096	*	*	*	*	0.629
10	0.458 PK	*	0.394	0.629	1.328	3.892	3.919	*	*	*	*	0.628
11	0.444	*	0.384	0.647	1.238	3.912	3.624	*	*	*	*	0.612
12	0.441	*	0.382	0.670	1.150	3.956	3.340	*	*	*	*	0.567
13	0.437	*	0.394	0.667	1.084	4.408	3.118	*	*	*	*	0.607
14	0.428	*	0.406	0.651	1.016	4.667	2.927	*	*	*	*	0.611
15	0.421	0.312	0.425	0.626	0.983	6.223	2.711	*	*	*	*	0.609
16	0.405	0.329	0.414	0.605	0.949	5.948	2.621	*	*	*	*	0.605 PK
17	0.403	0.333	0.372	0.581	1.054	5.080	2.418	*	*	*	*	0.602
18	0.399	0.328	0.362	0.556	1.221	5.517	2.154	*	*	*	*	0.597
19	0.387	0.344	0.365	0.545	1.373	6.994	1.872	*	*	*	*	0.589
20	0.385	0.361	0.391	0.577	1.393	7.858	1.691	*	*	*	*	0.554
21	0.383	0.351	0.379	0.574	1.329	8.572	1.565	*	*	*	*	0.571
22	0.385	0.341	0.355	0.574	1.244	7.971	1.576	*	*	*	*	0.573
23	0.402	0.343	0.377	*	1.157	8.180	1.629	*	*	*	*	0.571
24	0.405	0.348	0.433	0.622	1.079	9.401	1.582	*	*	*	*	0.565
25	0.397	0.363	0.496	0.657	1.094	10.097 PK	1.537	*	*	*	*	0.548
26	0.394	0.363	0.497	0.827	1.308	8.408	1.689	*	*	*	*	0.562
27	0.383	0.364	0.524	1.018	1.552	6.637	1.706	*	*	*	*	0.568
28	0.367	0.380 PK	0.577	1.248	1.850	5.793	1.557	*	*	*	*	0.565
29	0.359		0.649	1.510 PK	2.524	5.315	1.398	*	*	*	*	0.559
30	0.355		0.723 PK	1.419	2.832 PK	5.211	1.342	*	*	*	*	0.557
31	0.351		0.742		2.731		1.335	*		*		0.555
Mean	**0.407**	**0.347**	**0.434**	**0.741**	**1.369**	**5.465**	**2.848**	**1.162**	**---**	**---**	**---**	**0.585**
Maximum	**0.458**	**0.380**	**0.742**	**1.510**	**2.832**	**10.097**	**5.059**	**1.229**	**---**	**---**	**---**	**0.629**
Minimum	**0.351**	**0.312**	**0.355**	**0.545**	**0.949**	**2.206**	**1.335**	**1.116**	**---**	**---**	**---**	**0.548**
Peak 5-Minute	**0.476**	**0.402**	**0.783**	**1.574**	**2.986**	**11.005**	**5.569**	**1.325**	**---**	**---**	**---**	**0.679+**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix G

LC_SLC

Station Details			
Station Name:	South Line Creek West Side of Main Rock Drain	**Reporting Year:**	2022
Site ID:	LC_SLC	**Station Type:**	Manual Measurements
EMS:	E282149	**Teck Mine:**	Line Creek Operation
Station Description:	The South Line Creek site is located about 500 m upstream of the confluence with Line Creek. The station consits of a staff gauge.		
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol		
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B		
Rationale for Data Grade Recommendation (RSFMP)	Governed by MAD and AWTF Design data uses.		

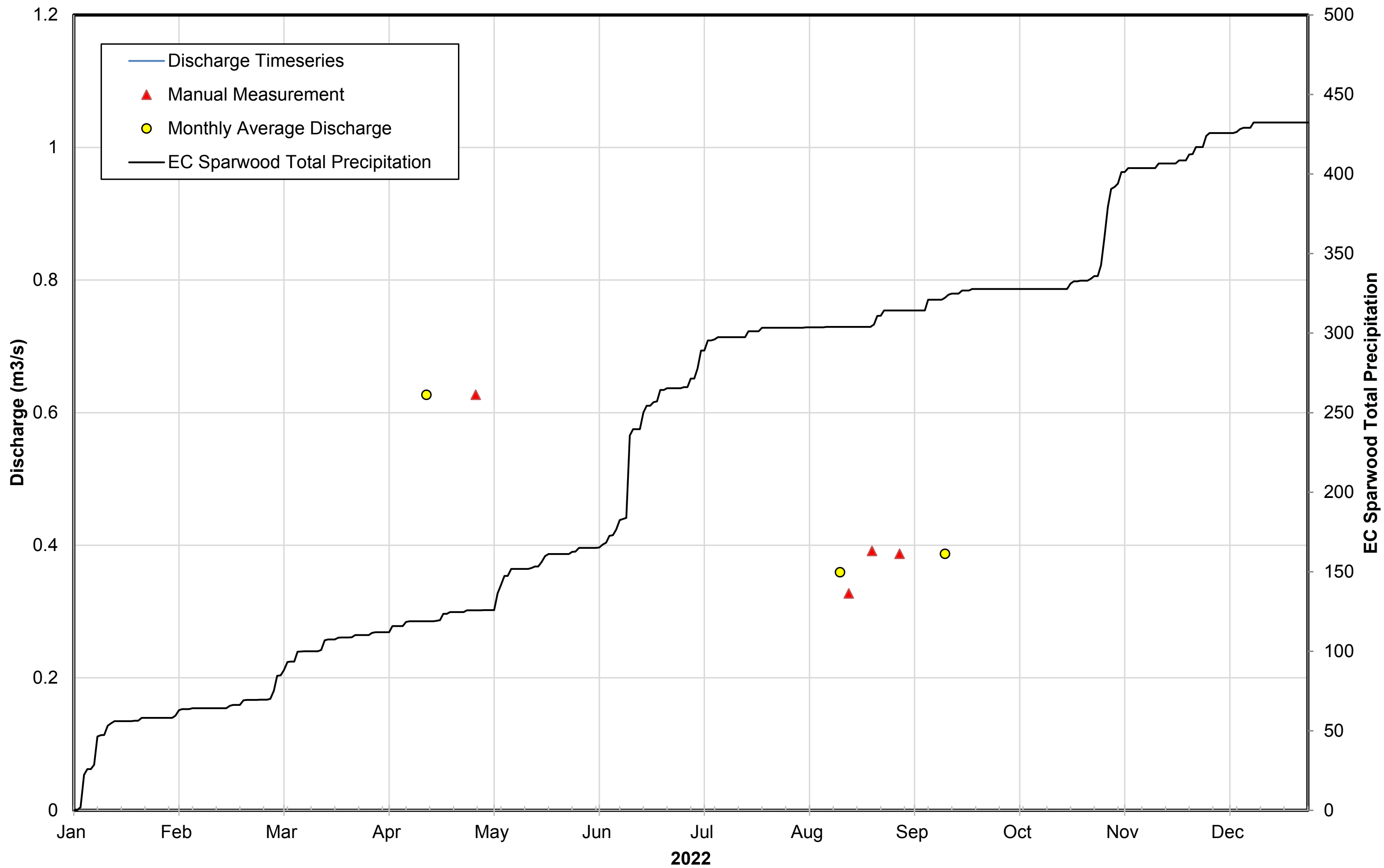
Summary Table of Yearly Discharge Measurements

Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
April 29, 2022	-	0.627	B	-	-	-	LCO Measurement, 24 Panels, 10%
August 17, 2022	-	0.327	B	-	-	-	LCO Measurement, 24 Panels, 9.7%
August 24, 2022	-	0.391	C	-	-	-	KWL Measurement, 23 Panels, 11%
September 1, 2022	-	0.387	B	-	-	-	LCO Measurement, 21 Panels, 10%
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m³/sec											
January	February	March	April*	May	June	July	August*	September*	October	November	December
#N/A	#N/A	#N/A	0.63	#N/A	#N/A	#N/A	0.36	0.39	#N/A	#N/A	#N/A

LC_SLC 2022 - Yearly Hydrograph



* Calculated and/or manual measurements used to calculate monthly average

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Appendix H

LC_LCDSSLC

Station Details			
Station Name:	Line Creek Immediately Downstream of South Line Creek confluence	Reporting Year:	2022
Site ID:	LC_LCDSSLC	Station Type:	Year-Round Continuous Data
EMS:	E297110	Teck Mine:	Line Creek Operation
Station Description:	This station is located on Line Creek located immediately downstream of the South Line Creek Confluence. A permanent bubbler water level sensor and datalogger are present at the site.		
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol		
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B		
Rationale for Data Grade Recommendation (RSFMP)	Governed by MAD and RWQM data uses.		

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - March 1, 2022	E	Pressure leak at sensor, erroneous data has been removed. Potential ice in channel.
March 1 - June 21, 2022	C	Station operating as expected, Grade C SDR.
June 21 - June 23, 2022	M	Sensor failure - no data.
June 23 - October 31, 2022	E	Station operating as expected, Grade E SDR
November 1 - December 31, 2022	E	Station operating as expected, potential ice in channel.

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

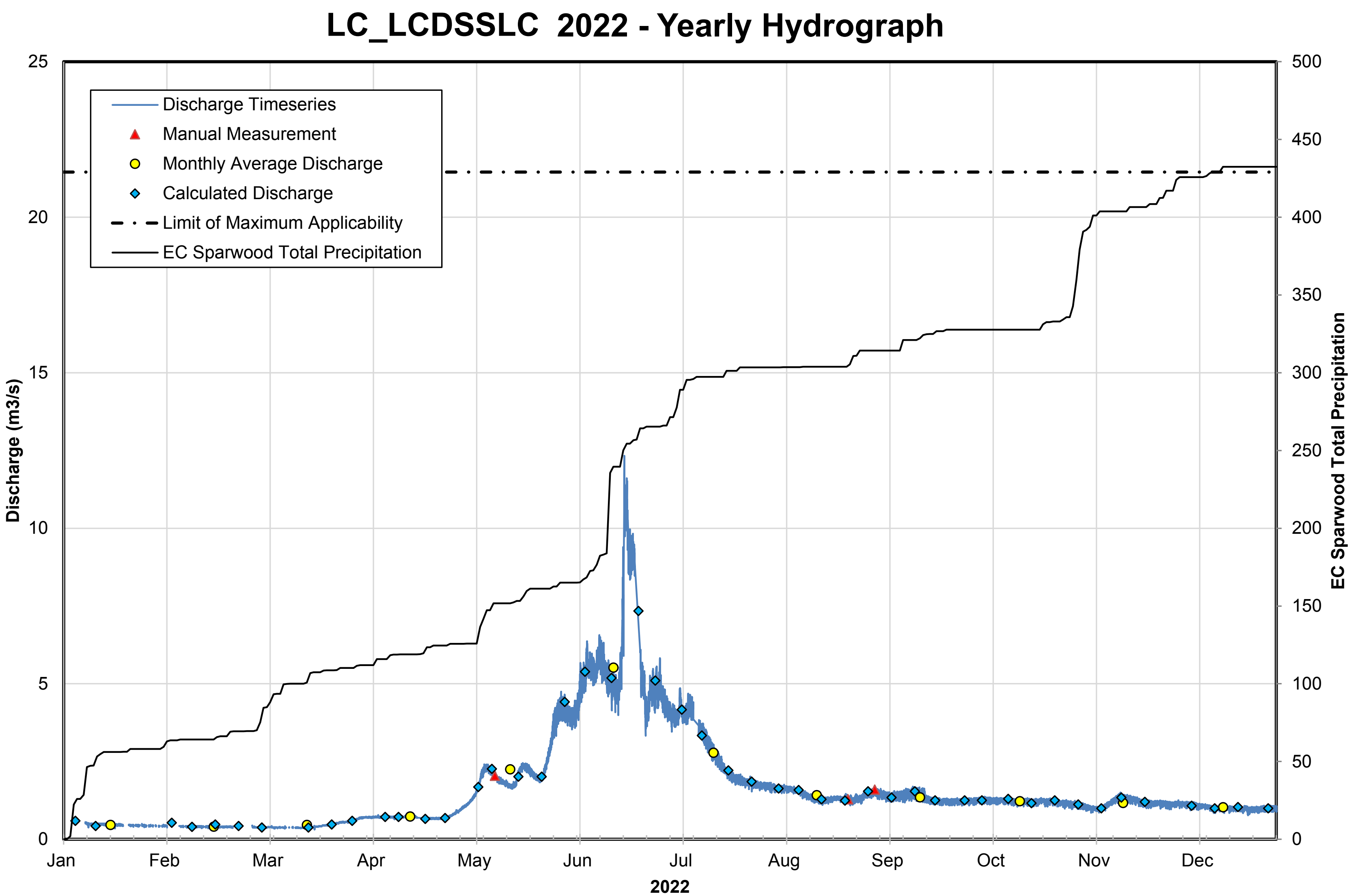
Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 4, 2022	0.041	-	E	0.588	-	-	Calculated Discharge
January 10, 2022	0.011	-	E	0.422	-	-	Calculated Discharge
February 2, 2022	0.031	-	E	0.530	-	-	Calculated Discharge
February 8, 2022	0.006	-	E	0.397	-	-	Calculated Discharge
February 15, 2022	0.021	-	E	0.474	-	-	Calculated Discharge
February 22, 2022	0.011	-	E	0.422	-	-	Calculated Discharge
March 1, 2022	0.001	-	C	0.373	-	-	Calculated Discharge
March 15, 2022	0.001	-	C	0.373	-	-	Calculated Discharge
March 22, 2022	0.021	-	C	0.474	-	-	Calculated Discharge
March 28, 2022	0.041	-	C	0.588	-	-	Calculated Discharge
April 7, 2022	0.061	-	C	0.716	-	-	Calculated Discharge
April 11, 2022	0.061	-	C	0.716	-	-	Calculated Discharge
April 19, 2022	0.051	-	C	0.651	-	-	Calculated Discharge
April 25, 2022	0.056	-	C	0.683	-	-	Calculated Discharge
May 5, 2022	0.171	-	C	1.674	-	-	Calculated Discharge
May 9, 2022	0.221	-	C	2.258	-	-	Calculated Discharge
May 10, 2022	0.177	2.040	C	1.739	0.300	14.7%	LCO Measurement 28 Panels, Max 10%
May 17, 2022	0.201	-	C	2.013	-	-	Calculated Discharge
May 24, 2022	0.201	-	C	2.013	-	-	Calculated Discharge
May 31, 2022	0.361	-	C	4.417	-	-	Calculated Discharge
June 6, 2022	0.411	-	C	5.382	-	-	Calculated Discharge
June 14, 2022	0.401	-	C	5.181	-	-	Calculated Discharge
June 22, 2022	0.691	-	E	7.337	-	-	Calculated Discharge
June 27, 2022	0.589	-	E	5.102	-	-	Calculated Discharge
July 5, 2022	0.539	-	E	4.166	-	-	Calculated Discharge
July 11, 2022	0.489	-	E	3.333	-	-	Calculated Discharge
July 19, 2022	0.409	-	E	2.208	-	-	Calculated Discharge
July 26, 2022	0.379	-	E	1.851	-	-	Calculated Discharge
August 3, 2022	0.359	-	E	1.632	-	-	Calculated Discharge
August 9, 2022	0.354	-	E	1.580	-	-	Calculated Discharge
August 16, 2022	0.324	-	E	1.284	-	-	Calculated Discharge
August 23, 2022	0.319	-	E	1.238	-	-	Calculated Discharge
August 24, 2022	0.334	1.285	B	1.379	-0.094	-7.3%	KWL Measurement, 22 Panels, Max 8.9%

* Grades A, B, C, E and U based on the BC RISC Standards Document.

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
August 30, 2022	0.350	-	E	1.538	-	-	Calculated Discharge
September 1, 2022	0.345	1.592	B	1.487	0.104	6.5%	LCO Measurement, 21 panels, Max 9.8%
September 6, 2022	0.330	-	E	1.341	-	-	Calculated Discharge
September 13, 2022	0.350	-	E	1.538	-	-	Calculated Discharge
September 19, 2022	0.320	-	E	1.248	-	-	Calculated Discharge
September 28, 2022	0.320	-	E	1.248	-	-	Calculated Discharge
October 3, 2022	0.320	-	E	1.248	-	-	Calculated Discharge
October 11, 2022	0.325	-	E	1.294	-	-	Calculated Discharge
October 18, 2022	0.310	-	E	1.158	-	-	Calculated Discharge
October 25, 2022	0.320	-	E	1.248	-	-	Calculated Discharge
November 1, 2022	0.305	-	E	1.115	-	-	Calculated Discharge
November 8, 2022	0.290	-	E	0.990	-	-	Calculated Discharge
November 14, 2022	0.330	-	E	1.341	-	-	Calculated Discharge
November 21, 2022	0.315	-	E	1.202	-	-	Calculated Discharge
December 5, 2022	0.300	-	E	1.072	-	-	Calculated Discharge
December 12, 2022	0.290	-	E	0.990	-	-	Calculated Discharge
December 19, 2022	0.295	-	E	1.031	-	-	Calculated Discharge
December 28, 2022	0.290	-	E	0.990	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

* Grades A, B, C, E and U based on the BC RISC Standards Document.

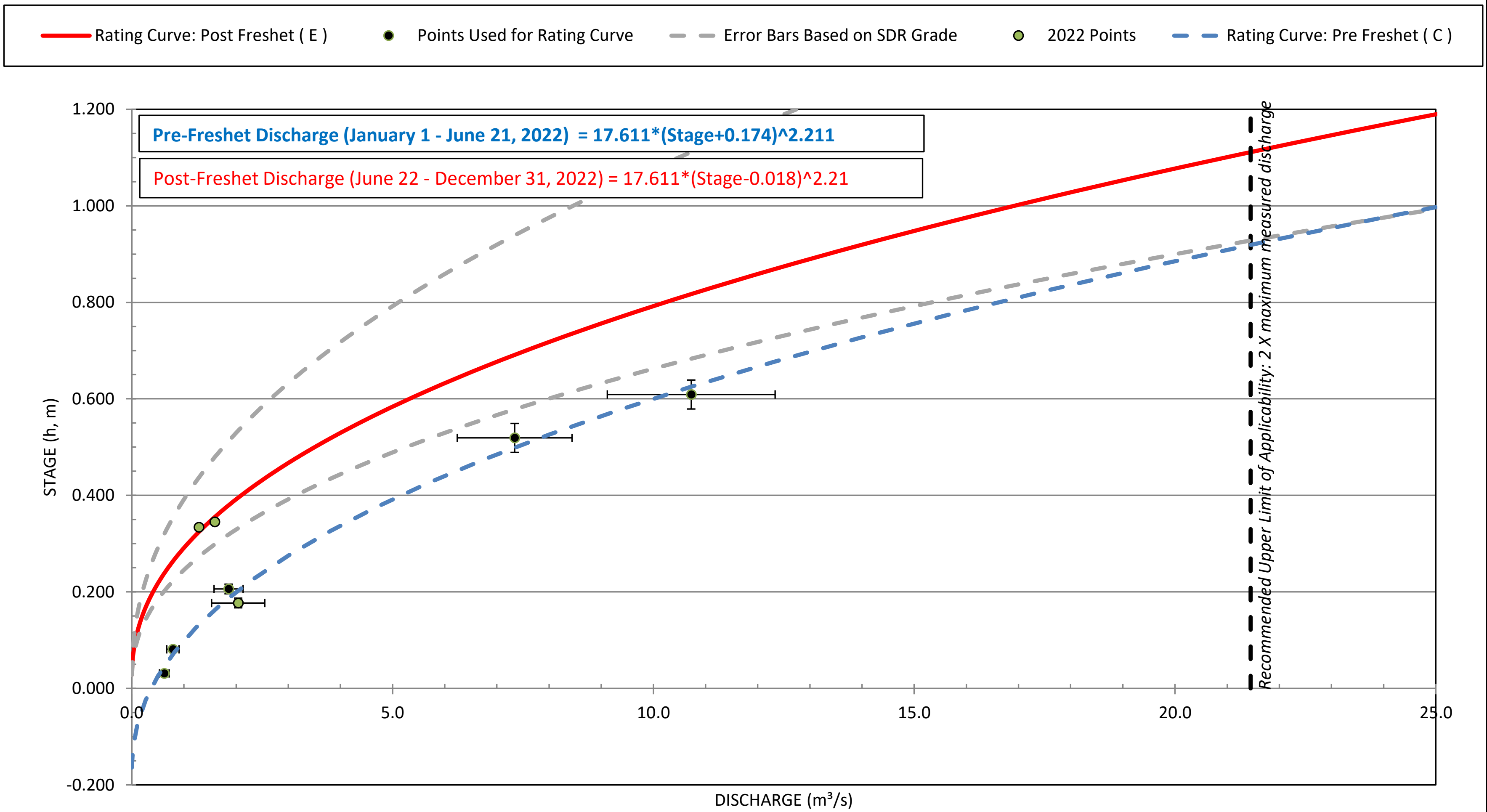
Monthly Average Discharge m^3/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.46	0.40	0.46	0.73	2.24	5.52	2.78	1.42	1.34	1.22	1.16	1.03



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2022	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	E
Reason For Change	Relocation of staff gauge	**Data Grade Rational:**	2022 SDRs are converted to new right bank staff gauge. Grade C until freshet, Grade E post-freshet due to limited points available to construct new SDR.		

LC_LCDSSLC 2022 SDR
(Estimated by the Method of Maximum Liklihood)



LC_LCDSSLC
Summary Report
Year: 2022
Measurement: Final Discharge (m3/s)

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	*	0.408	0.382	0.702	1.067	4.035	4.199	1.685 PK	1.518	1.245	1.095	1.147 PK
2	*	*	0.380	0.706	1.150	3.936	4.005	1.666	1.476	1.266	1.079	1.135
3	*	*	0.386	0.703	1.274	4.000	3.941	1.651	1.452	1.276 PK	1.057	1.124
4	*	0.428	0.386	0.713	1.435	4.390	4.061	1.638	1.433	1.276	1.024	1.125
5	*	0.413	0.375	0.713	1.700	5.080	4.248 PK	1.640	1.392	1.262	0.995	1.116
6	*	0.414	0.378	0.704	2.075	5.321	4.005	1.620	1.376	1.260	1.002	1.107
7	0.521 PK	0.411	0.378	0.700	2.261	5.652	4.182	1.601	1.392	1.257	0.983	1.076
8	0.485	0.407	0.377	0.710	2.277	5.474	4.155	1.579	1.412	1.256	0.986	1.072
9	0.489	0.406	0.378	0.714	2.158	5.371	3.860	1.564	1.426	1.267	1.050	1.063
10	0.488	0.414	0.377	0.718	2.031	5.849	3.610	1.496	1.441	1.249	1.125	1.043
11	0.478	0.404	0.373	0.724	1.921	5.796	3.529	1.449	1.459	1.236	1.196	1.014
12	0.481	0.404	0.372	0.720	1.851	5.451	3.323	1.394	1.464 PK	1.225	1.279	0.977
13	0.479	0.406	0.368	0.733	1.795	5.261	3.114	1.355	1.501	1.217	1.357	1.000
14	0.472	0.403	0.374	0.735	1.735	4.943	2.939	1.318	1.449	1.209	1.406 PK	1.001
15	0.468	0.417 PK	0.381	0.725	1.702	4.891	2.786	1.278	1.458	1.220	1.362	0.990
16	0.458	0.399	0.386	0.719	1.762	4.873	2.618	1.242	1.378	1.226	1.330	0.998
17	0.463	0.401	0.392	0.695	2.087	6.391	2.435	1.251	1.282	1.223	1.297	0.992
18	0.458	0.401	0.414	0.686	2.288	10.151 PK	2.258	1.274	1.257	1.206	1.272	0.984
19	*	0.403	0.430	0.682	2.324	9.730	2.121	1.288	1.249	1.218	1.237	0.993
20	0.458	0.398	0.450	0.671	2.266	9.113	2.049	1.316	1.241	1.220	1.180	0.977
21	0.447	*	0.455	0.667	2.143	9.109	1.976	1.314	1.219	1.241	1.158	1.005
22	0.441	*	0.467	0.666	2.016	*	1.961	1.303	1.233	1.221	1.157	0.941
23	0.441	*	0.492	0.666	1.956	5.260	1.917	1.347	1.214	1.211	1.153	0.968
24	0.443	*	0.529	0.667	1.970	4.445	1.865	1.315	1.223	1.239	1.160	0.970
25	0.436	*	0.552	0.683	2.267	4.285	1.855	1.237	1.222	1.240	1.169	0.966
26	0.435	0.399	0.555	0.723	2.678	4.908	1.826	1.283	1.225	1.202	1.162	0.998
27	0.438	0.385	0.564	0.775	3.215	4.709	1.783	1.348	1.215	1.178	1.157	0.991
28	0.434	0.381	0.594	0.840	3.811	4.881	1.761	1.365	1.229	1.161	1.133	0.996
29	0.423		0.629	0.902	4.097	4.752	1.736	1.465	1.239	1.149	1.130	0.997
30	0.432		0.665	0.986 PK	4.215 PK	4.366	1.731	1.459	1.240	1.137	1.145	1.004
31	0.432		0.692 PK		4.182		1.715	1.479		1.128		1.004
Mean	**0.458**	**0.405**	**0.449**	**0.725**	**2.249**	**5.601**	**2.825**	**1.426**	**1.344**	**1.223**	**1.161**	**1.025**
Maximum	**0.521**	**0.428**	**0.692**	**0.986**	**4.215**	**10.151**	**4.248**	**1.685**	**1.518**	**1.276**	**1.406**	**1.147**
Minimum	**0.423**	**0.381**	**0.368**	**0.666**	**1.067**	**3.936**	**1.715**	**1.237**	**1.214**	**1.128**	**0.983**	**0.941**
Peak 5-Minute	**0.554**	**0.475**	**0.717+**	**1.064**	**4.750**	**12.332**	**4.860**	**1.825**	**1.695**	**1.371+**	**1.503**	**1.258**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix I

LC_DC3

Station Details			
Station Name:	Dry Creek upstream of East Tributary Creek	Reporting Year:	2022
Site ID:	LC_DC3	Station Type:	Year-Round Continuous Data
EMS:	E288273	Teck Mine:	Line Creek Operation

Station Description:	DC3 is located on Dry Creek immediately upstream of the head pond/intake for the Dry Creek Settling Ponds.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	Governed by AWTF design data use.

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - February 20, 2022	E	Station operated as expected, ice in channel possible
February 20 - February 23, 2022	M	Ice affected data removed
February 23 - April 19, 2022	E	Station operated as expected, ice in channel possible
April 20 - June 17, 2022	B	Station operated as expected
June 17 - June 20, 2022	E	Station operated as expected, discharge data above limit of applicability
June 20 - November 1, 2022	B	Station operated as expected
November 1 - December 18, 2022	E	Station operated as expected, ice in channel possible
December 18 - December 26, 2022	M	Ice affected data removed
December 26 - December 31, 2022	E	Station operated as expected, ice in channel possible

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

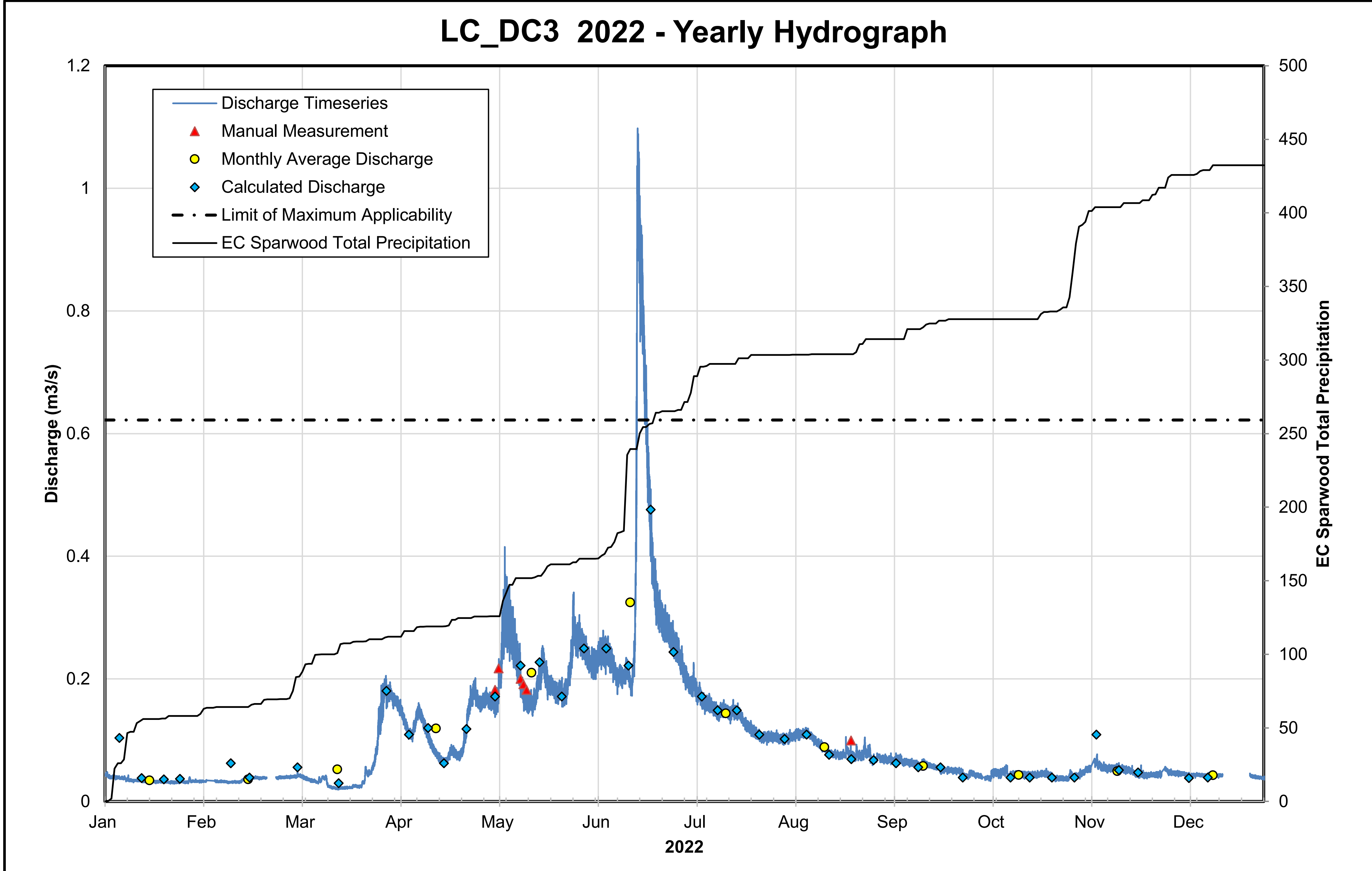
Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 5, 2022	0.167	-	E	0.104	-	-	Calculated Discharge. Suspect staff gauge reading.
January 12, 2022	0.119	-	E	0.038	-	-	Calculated Discharge
January 19, 2022	0.117	-	E	0.036	-	-	Calculated Discharge
January 24, 2022	0.118	-	E	0.037	-	-	Calculated Discharge
February 9, 2022	0.140	-	E	0.062	-	-	Calculated Discharge. Suspect staff gauge reading.
February 15, 2022	0.120	-	E	0.039	-	-	Calculated Discharge
March 2, 2022	0.135	-	E	0.056	-	-	Calculated Discharge
March 15, 2022	0.110	-	E	0.030	-	-	Calculated Discharge. Suspect staff gauge reading.
March 30, 2022	0.204	-	E	0.181	-	-	Calculated Discharge
April 6, 2022	0.170	-	E	0.109	-	-	Calculated Discharge
April 12, 2022	0.176	-	E	0.120	-	-	Calculated Discharge
April 17, 2022	0.140	-	E	0.062	-	-	Calculated Discharge
April 24, 2022	0.175	-	B	0.118	-	-	Calculated Discharge
May 3, 2022	0.211	0.182	U	0.198	-0.016	-8.7%	Lotic Measurement, no flow info
May 3, 2022	0.200	-	B	0.171	-	-	Calculated Discharge
May 4, 2022	0.224	0.217	U	0.232	-0.015	-7.1%	Lotic Measurement, no flow info
May 11, 2022	0.220	0.200	U	0.221	-0.021	-10.7%	Lotic Measurement, no flow info
May 11, 2022	0.220	-	B	0.221	-	-	Calculated Discharge
May 12, 2022	0.218	0.191	U	0.216	-0.025	-13.1%	Lotic Measurement, no flow info
May 13, 2022	0.213	0.182	U	0.203	-0.021	-11.5%	Lotic Measurement, no flow info
May 17, 2022	0.222	-	B	0.227	-	-	Calculated Discharge
May 24, 2022	0.200	-	B	0.171	-	-	Calculated Discharge
May 31, 2022	0.230	-	B	0.250	-	-	Calculated Discharge
June 7, 2022	0.230	-	B	0.250	-	-	Calculated Discharge
June 14, 2022	0.220	-	B	0.221	-	-	Calculated Discharge
June 21, 2022	0.294	-	B	0.476	-	-	Calculated Discharge
June 28, 2022	0.228	-	B	0.244	-	-	Calculated Discharge
July 7, 2022	0.200	-	B	0.171	-	-	Calculated Discharge
July 12, 2022	0.190	-	B	0.149	-	-	Calculated Discharge
July 18, 2022	0.190	-	B	0.149	-	-	Calculated Discharge

* Grades A, B, C, E and U based on the BC RISC Standards Document.

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
July 25, 2022	0.170	-	B	0.109	-	-	Calculated Discharge
August 2, 2022	0.166	-	B	0.102	-	-	Calculated Discharge
August 9, 2022	0.170	-	B	0.109	-	-	Calculated Discharge
August 16, 2022	0.150	-	B	0.076	-	-	Calculated Discharge
August 23, 2022	0.169	0.099	B	0.107	-0.008	-7.8%	KWL measurement, 23 panels, max panel 9%
August 23, 2022	0.145	-	B	0.069	-	-	Calculated Discharge
August 30, 2022	0.144	-	B	0.068	-	-	Calculated Discharge
September 6, 2022	0.140	-	B	0.062	-	-	Calculated Discharge
September 13, 2022	0.135	-	B	0.056	-	-	Calculated Discharge
September 20, 2022	0.135	-	B	0.056	-	-	Calculated Discharge
September 27, 2022	0.120	-	B	0.039	-	-	Calculated Discharge
October 12, 2022	0.120	-	B	0.039	-	-	Calculated Discharge
October 18, 2022	0.120	-	B	0.039	-	-	Calculated Discharge
October 25, 2022	0.120	-	B	0.039	-	-	Calculated Discharge
November 1, 2022	0.120	-	E	0.039	-	-	Calculated Discharge
November 8, 2022	0.170	-	E	0.109	-	-	Calculated Discharge. Suspect staff gauge reading.
November 15, 2022	0.131	-	E	0.051	-	-	Calculated Discharge
November 21, 2022	0.128	-	E	0.048	-	-	Calculated Discharge
December 7, 2022	0.119	-	E	0.038	-	-	Calculated Discharge
December 13, 2022	0.120	-	E	0.039	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

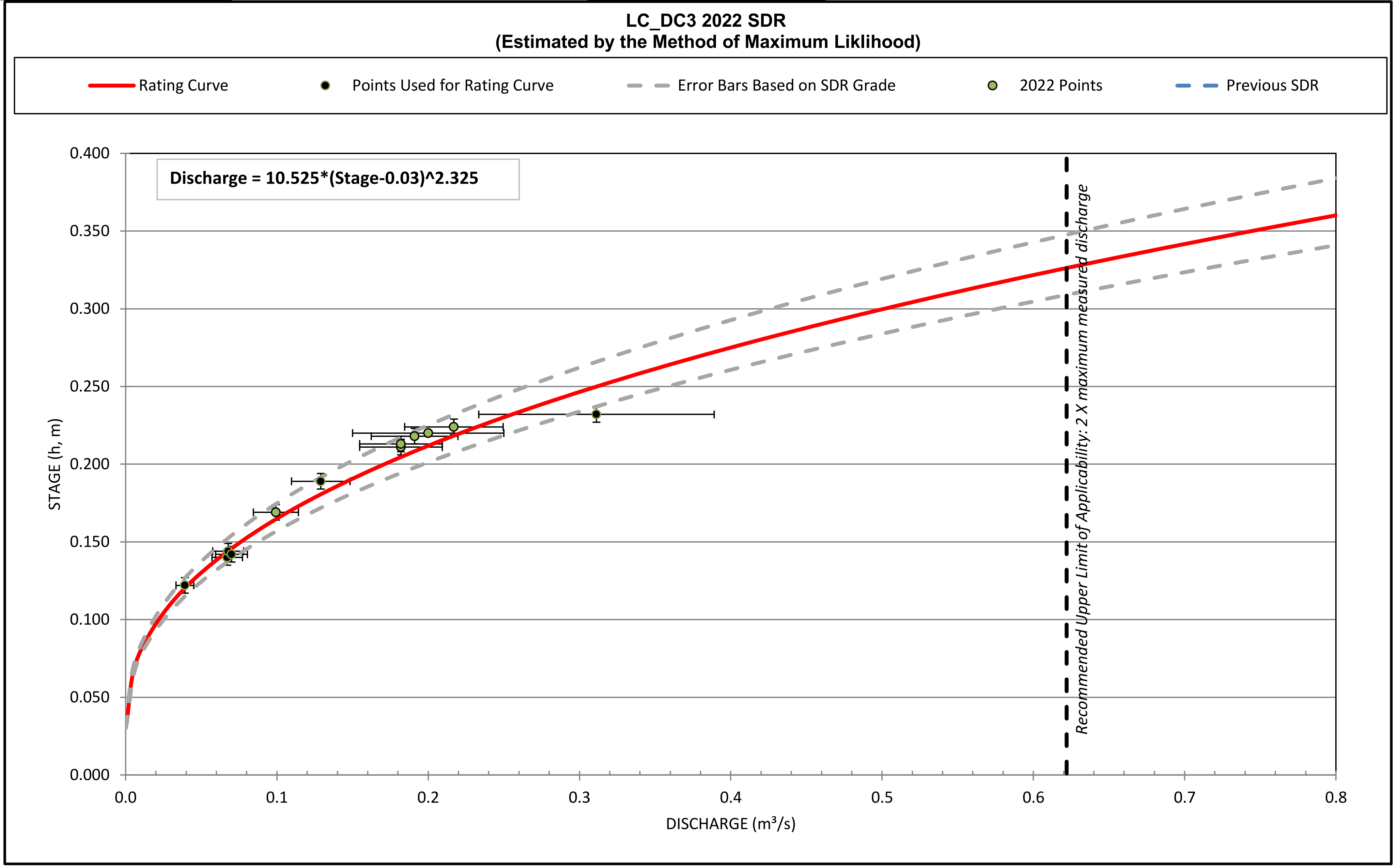
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m³/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.03	0.036	0.052	0.119	0.210	0.324	0.144	0.089	0.058	0.043	0.049	0.043



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2021	**Updated from Previous Year:**	No	**SDR Data Grade:**	B
Reason For Change		**Data Grade Rational:**	2022 Measurements plotted well on the 2021 SDR.		



LC_DC3

Summary Report
Year: 2022
Measurement: Final Discharge 2022 (m3/s)

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.044 PK	0.033	0.041	0.166	0.165	0.238	0.218 PK	0.103	0.071	0.043	0.041	0.046 PK
2	0.041	*	0.042	0.162	0.162	0.226	0.202	0.102	0.068	0.042	0.043	0.046
3	0.040	*	0.042	0.153	0.160	0.227	0.191	0.103	0.068	0.041	0.045	0.045
4	0.039	0.033	0.039	0.140	0.183	0.232	0.191	0.105	0.068 PK	0.039	0.048	0.045
5	0.039	0.033	0.037	0.125	0.229	0.243	0.185	0.107	0.067	0.039	0.052	0.045
6	0.038	0.032	0.035	0.111	0.296 PK	0.245	0.177	0.108	0.068	0.043	0.054	0.044
7	0.037	0.032	0.033	0.109	0.291	0.242	0.166	0.109	0.068	0.047	0.066	0.043
8	0.035	0.032	0.032	0.128	0.274	0.236	0.159	0.111	0.066	0.047	0.064 PK	0.043
9	0.034	0.031	0.034	0.146	0.256	0.224	0.158	0.112 PK	0.064	0.047	0.059	0.043
10	0.034	0.032	0.038	0.138	0.230	0.207	0.154	0.108	0.063	0.050	0.055	0.043
11	0.034	0.032	0.036	0.123	0.201	0.205	0.150	0.103	0.061	0.046 PK	0.054	0.043
12	0.034	0.032	0.024	0.107	0.171	0.204	0.146	0.097	0.061	0.042	0.054	0.042
13	0.033	0.035	0.023	0.094	0.163	0.209	0.148	0.093	0.060	0.045	0.055	0.043
14	0.033	0.039	0.021	0.083	0.162	0.206	0.149	0.088	0.060	0.045	0.055	0.043
15	0.033	0.038	0.022	0.075	0.163	0.197	0.147	0.083	0.063	0.045	0.055	0.042
16	0.033	0.038	0.022	0.069	0.179	0.311	0.144	0.078	0.060	0.044	0.053	0.042
17	0.033	0.039	0.022	0.065	0.201	0.936 PK	0.146	0.076	0.058	0.044	0.051	0.042
18	0.032	0.038	0.022	0.068	0.226	0.846	0.145	0.076	0.056	0.044	0.051	0.043
19	0.032	0.038	0.023	0.079	0.205	0.708	0.141	0.076	0.055	0.043	0.049	*
20	0.032	0.038	0.025	0.081	0.187	0.557	0.132	0.076	0.052	0.043	0.046	*
21	0.032	*	0.025	0.076	0.188	0.441	0.125	0.079	0.050	0.044	0.044	*
22	0.031	*	0.026	0.075	0.179	0.367	0.122	0.080	0.051	0.046	0.044	*
23	0.031	0.039	0.038	0.088	0.177	0.323	0.116	0.075	0.051	0.044	0.043	*
24	0.032	0.039	0.046	0.118	0.175	0.305	0.111	0.073	0.050	0.044	0.043	*
25	0.032	0.039	0.048	0.155	0.180	0.291	0.107	0.077	0.050	0.041	0.043	*
26	0.032	0.039	0.062	0.173	0.195	0.284	0.104	0.074	0.049	0.038	0.043	*
27	0.034	0.040	0.093	0.174 PK	0.236	0.273	0.104	0.083	0.044	0.038	0.043	*
28	0.033	0.040 PK	0.138	0.160	0.284	0.263	0.105	0.080	0.041	0.038	0.044	*
29	0.033		0.168	0.161	0.265	0.254	0.104	0.074	0.043	0.037	0.055	*
30	0.033		0.177 PK	0.167	0.266	0.235	0.104	0.068	0.045	0.038	0.051	*
31	0.033		0.179		0.252		0.104	0.070		0.045		*
Mean	**0.034**	**0.036**	**0.052**	**0.119**	**0.210**	**0.324**	**0.144**	**0.089**	**0.058**	**0.043**	**0.050**	**0.044**
Maximum	**0.044**	**0.040**	**0.179**	**0.174**	**0.296**	**0.936**	**0.218**	**0.112**	**0.071**	**0.050**	**0.066**	**0.046**
Minimum	**0.031**	**0.031**	**0.021**	**0.065**	**0.160**	**0.197**	**0.104**	**0.068**	**0.041**	**0.037**	**0.041**	**0.042**
Peak 5-Minute	**0.048**	**0.043**	**0.205**	**0.201**	**0.415**	**1.098**	**0.253**	**0.120**	**0.078+**	**0.060**	**0.077**	**0.053**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix J

LC_DCEF

Station Details			
Station Name:	East Tributary of Dry Creek	Reporting Year:	2022
Site ID:	LC_DCEF	Station Type:	Year-Round Continuous Data
EMS:	E288274	Teck Mine:	Line Creek Operation
Station Description:	The Dry Creek East Fork (DCEF) hydrometric station is located on a tributary to Dry Creek known as East Fork. The hydrometric station is located immediately downstream of the Dry Creek Forest Service Road (FSR) bridge about 110 m upstream of the confluence with Dry Creek.		
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol		
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B		
Rationale for Data Grade Recommendation (RSFMP)	Governed by WQ sampling data use.		

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - 18, 2022	M	Station Outage, low battery due to limited solar panel exposure
January 18 - 31, 2022	M	Ice affected data removed.
January 31-February 21, 2022	E	Station operated as expected
February 21-March 30, 2022	M	Station Outage, low battery due to limited solar panel exposure
March 30- June 3, 2022	E	Station Operated as expected
June 3 - 8, 2022	M	Erroneous sensor data removed
June 8 - 12, 2022	E	Station Operated as expected
June 12 - 15, 2022	M	Erroneous sensor data removed
June 15 - July 2, 2022	E	Station Operated as expected
July 2 - 7 , 2022	M	Erroneous sensor data removed
July 7 - 15, 2022	E	Station Operated as expected
July 15 - 21, 2022	M	Erroneous sensor data removed
July 21- August 6, 2022	E	Station Operated as expected
August 6 - 11, 2022	M	Erroneous sensor data removed
August 11- 14, 2022	E	Station Operated as expected
August 14 - 16, 2022	M	Erroneous sensor data removed
August 16 - 23, 2022	E	Station Operated as expected
August 23- September 14, 2022	M	Erroneous sensor data removed
September 14- December 31, 2022	M	Station Outage, logger failure

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 5, 2022	0.800	-	E	0.015	-	-	Calculated Discharge
February 9, 2022	0.780	-	E	0.008	-	-	Calculated Discharge
March 7, 2022	0.790	-	E	0.011	-	-	Calculated Discharge
April 6, 2022	0.870	-	E	0.060	-	-	Calculated Discharge
May 3, 2022	0.901	-	E	0.095	-	-	Lotic Measurement
May 3, 2022	0.900	-	E	0.094	-	-	Calculated Discharge
August 23, 2022	0.790	0.027	C	0.011	0.016	59.2%	KWL Measurement, 18 Panels, 17%. Measurement reviewed, no explanation for deviation from SDR.
December 7, 2022	0.760	-	E	0.004	-	-	Calculated Discharge
	-	-	-	-	-	-	
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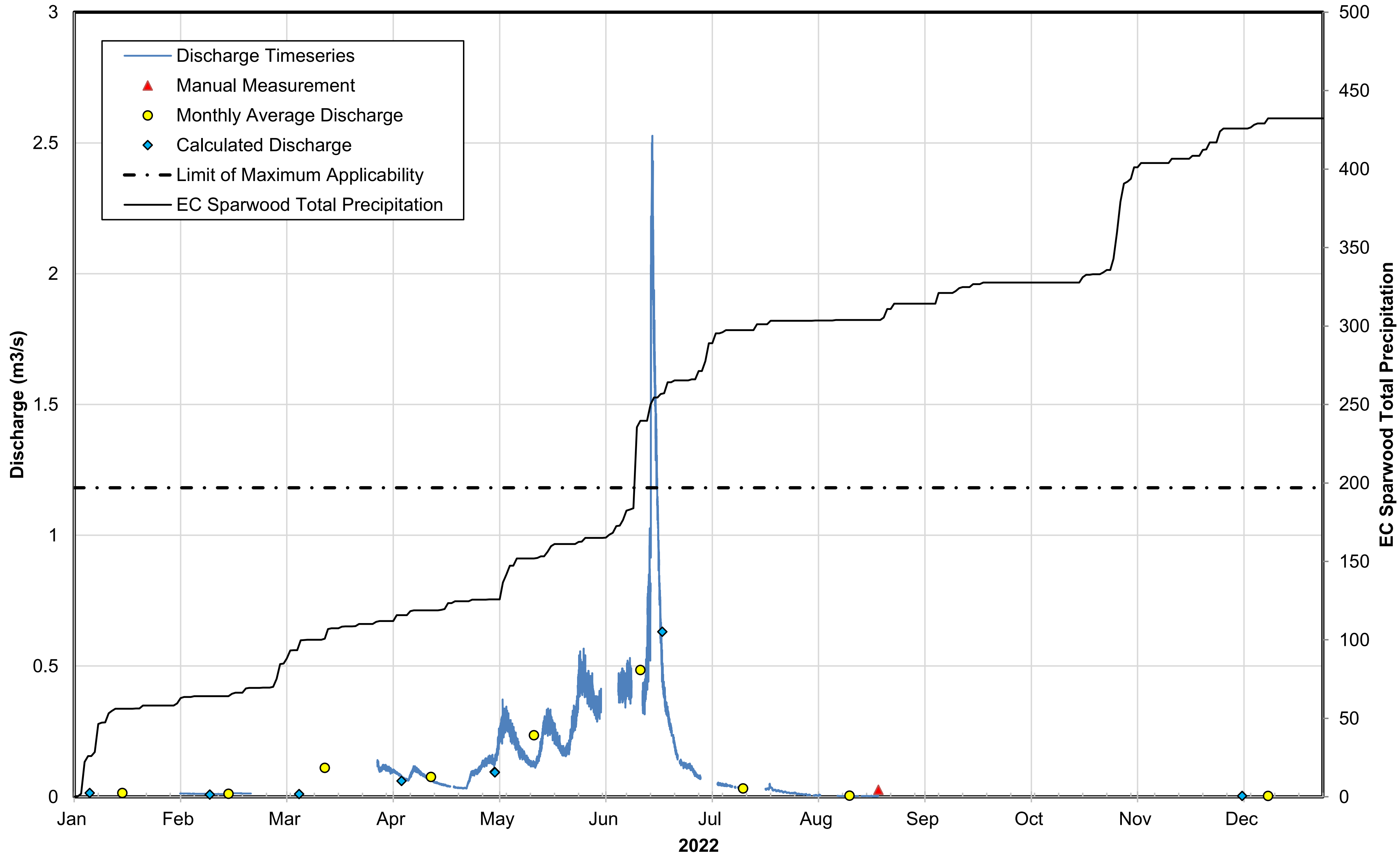
	-	-	-	-	-	-	
* Grades A, B, C, E and U based on the BC RISC Standards Document.							

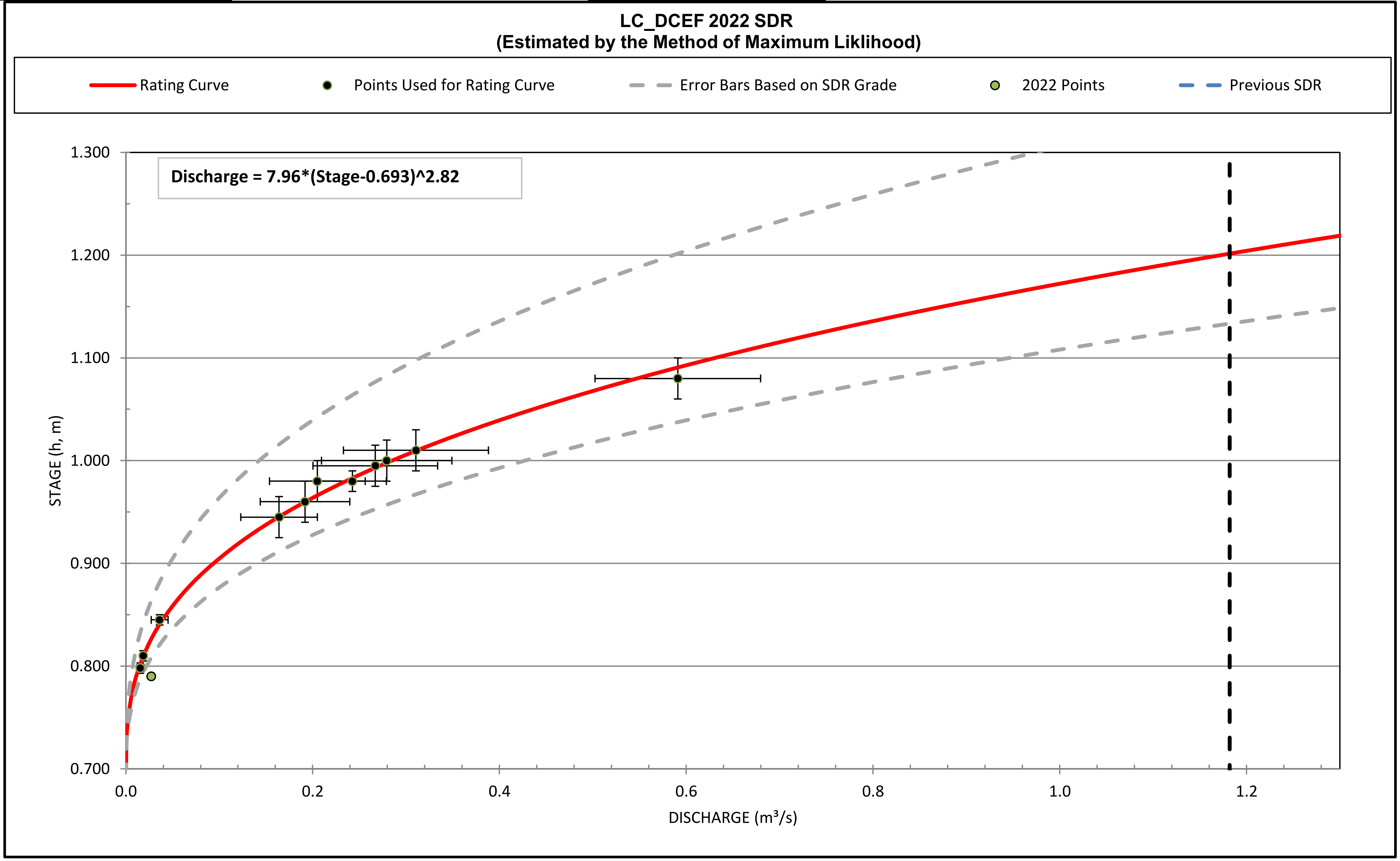
Monthly Average Discharge m³/sec											
January*	February	March	April	May	June	July	August	September	October	November	December*
0.015	0.012	0.111	0.076	0.236	0.485	0.032	0.004	#N/A	#N/A	#N/A	0.004

LC_DCEF 2022 - Yearly Hydrograph



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2021	**Updated from Previous Year:**	No	**SDR Data Grade:**	E
Reason For Change	Hydraulic Control Shift During Freshet	**Data Grade Rational:**	Potential channel change, not enough measurements to confirm.		



LC_DCEF

Summary Report
Year: 2022
Measurement: Final Discharge (m3/s)

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	*	0.012	*	0.113	0.139	0.365	0.082 PK	0.009 PK	*	*	*	*
2	*	0.013	*	0.108	0.142	0.337	0.074	0.008	*	*	*	*
3	*	0.012	*	0.101	0.138	0.354	*	0.008	*	*	*	*
4	*	0.012	*	0.096	0.190	*	*	0.005	*	*	*	*
5	*	0.012	*	0.087	0.262	*	*	0.006	*	*	*	*
6	*	0.012	*	0.076	0.292	*	*	0.007	*	*	*	*
7	*	0.012	*	0.068	0.279	*	0.049	*	*	*	*	*
8	*	0.011	*	0.069	0.243	0.423	0.047	*	*	*	*	*
9	*	0.011	*	0.095	0.217	0.424	0.045	*	*	*	*	*
10	*	0.011	*	0.106	0.185	0.413	0.045	*	*	*	*	*
11	*	0.011	*	0.097	0.165	0.439	0.041	0.004	*	*	*	*
12	*	0.011	*	0.086	0.149	0.427	0.037	0.003	*	*	*	*
13	*	0.011	*	0.077	0.134	*	0.035	0.003	*	*	*	*
14	*	0.012	*	0.069	0.126	*	0.034	0.003	*	*	*	*
15	*	0.013 PK	*	0.061	0.128	0.372	0.032	*	*	*	*	*
16	*	0.013	*	0.054	0.158	0.419	*	0.003	*	*	*	*
17	*	0.013	*	0.050	0.231	0.684	*	0.003	*	*	*	*
18	*	0.013	*	0.046	0.277	2.062 PK	*	0.003	*	*	*	*
19	*	0.013	*	0.043	0.281	1.451	*	0.003	*	*	*	*
20	*	0.013	*	0.040	0.254	0.874	*	0.003	*	*	*	*
21	*	0.013	*	0.037	0.223	0.488	0.029	0.003	*	*	*	*
22	*	*	*	0.035	0.194	0.348	0.035	0.002	*	*	*	*
23	*	*	*	0.034	0.173	0.288	0.030	0.002	*	*	*	*
24	*	*	*	0.033	0.173	0.229	0.025	*	*	*	*	*
25	*	*	*	0.042	0.209	0.173	0.022	*	*	*	*	*
26	*	*	*	0.077	0.278	0.131	0.019	*	*	*	*	*
27	*	*	*	0.091	0.338	0.123	0.018	*	*	*	*	*
28	*	*	*	0.097	0.451	0.118	0.015	*	*	*	*	*
29	*		*	0.114	0.452 PK	0.114	0.015	*	*	*	*	*
30	*		0.119 PK	0.129 PK	0.419	0.098	0.013	*	*	*	*	*
31	0.013 PK		0.106		0.406		0.011	*		*		*
Mean	**0.013**	**0.012**	**0.112**	**0.074**	**0.236**	**0.465**	**0.034**	**0.004**	**---**	**---**	**---**	**---**
Maximum	**0.013**	**0.013**	**0.119**	**0.129**	**0.452**	**2.062**	**0.082**	**0.009**	**---**	**---**	**---**	**---**
Minimum	**0.013**	**0.011**	**0.106**	**0.033**	**0.126**	**0.098**	**0.011**	**0.002**	**---**	**---**	**---**	**---**
Peak 5-Minute	**0.013**	**0.013**	**0.140**	**0.147**	**0.567**	**2.527**	**0.093+**	**0.011+**	**---**	**---**	**---**	**---**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix K

LC_SPDC

Station Details			
Station Name:	**Dry Creek Sed. Ponds effluent to Dry Creek via the return channel**	**Reporting Year:**	**2022**
Site ID:	**LC_SPDC**	**Station Type:**	Year-Round Continuous Data
EMS:	**E295211**	**Teck Mine:**	Line Creek Operation
Station Description:	Area-Velocity meter installed at the outlet of the the Dry Creek Sediment Ponds outflow pipeline. The station is immediately upstream of the confluence with Dry Creek. Flowmeter 2 which measures flow exiting Dry Creek Settling Pond 2 on the outlet pipe near the calcite treatment building is also included on this site.		
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol		
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B		
Rationale for Data Grade Recommendation (RSFMP)	Governed by WQ sampling data use.		

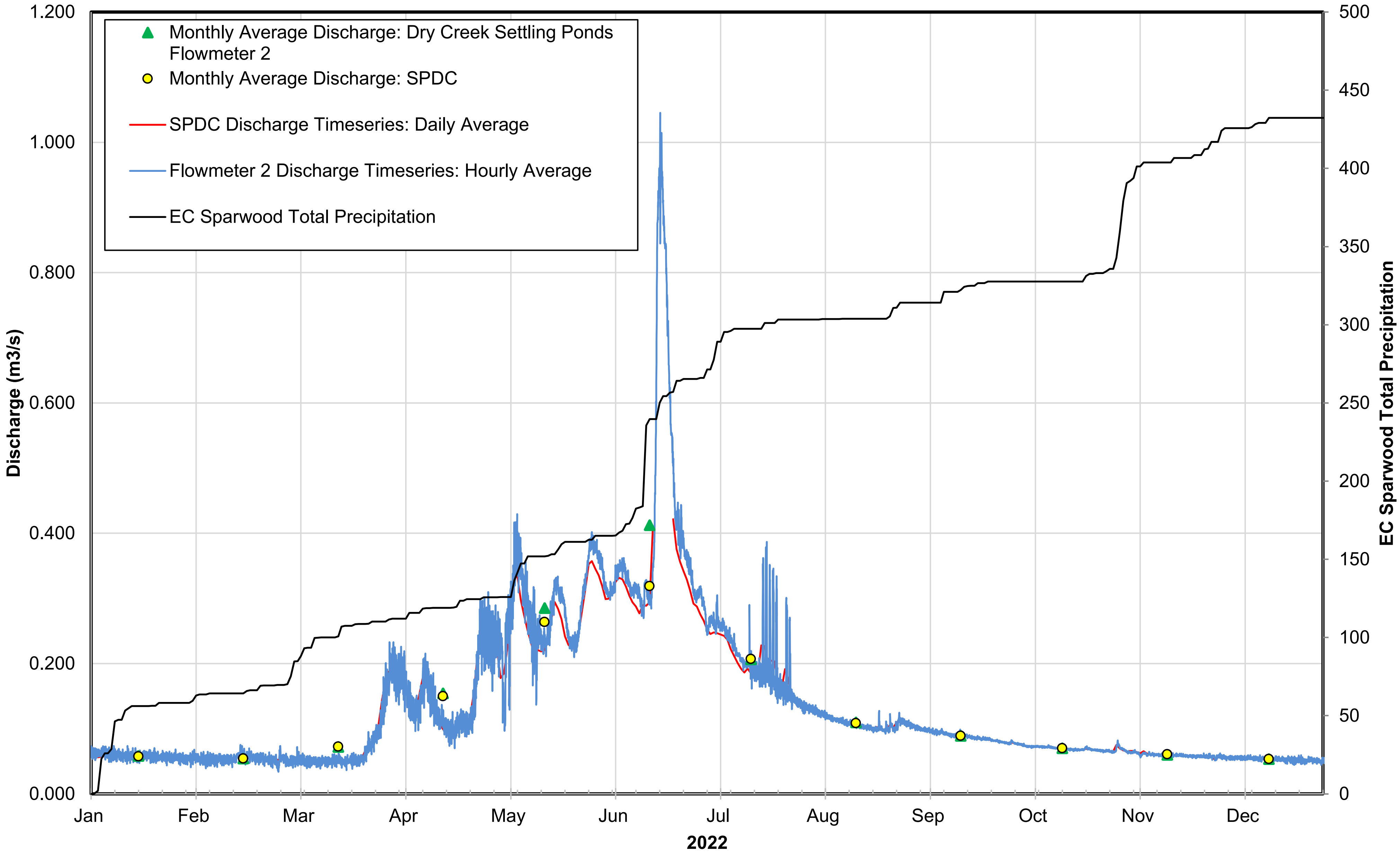
Data Quality Assessment - Continuous Data		
Data Range	**Data Quality Assessment Grade***	**Description**
SPDC Flowmeter		
January 1 - June16, 2022	B	Station operating as expected (Area-Velocity sensor)
June 17 - 21, 2022	M	Flowmeter flatlines at maximum flowrate (0.5 m^3/s), data removed
June 22 - December 31, 2022	B	Station operating as expected (Area-Velocity sensor)
Flowmeter 2		
January 1 - December 31, 2022	A	Station operating as expected (in-pipe electromagnetic flowmeter)

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Monthly Average Discharge: SPDC Flowmeter (m^3/sec)											
January	February	March	April	May	June*	July	August	September	October	November	December
0.057	0.054	0.072	0.150	0.264	0.319	0.207	0.108	0.089	0.070	0.060	0.053

Monthly Average Discharge: Flowmeter 2 (m^3/sec)											
January	February	March	April	May	June	July	August	September	October	November	December
0.058	0.054	0.072	0.154	0.285	0.412	0.206	0.110	0.089	0.070	0.060	0.053

LC_SPDC 2022 - Yearly Hydrograph



* period of peak flow removed due to flowmeter flatlining at maximum flowrate

Appendix L

LC_DCDS

Station Details			
Station Name:	**Dry Creek downstream of sedimentation ponds**	**Reporting Year:**	**2022**
Site ID:	**LC_DCDS**	**Station Type:**	Year-Round Continuous Data
EMS:	**E295210**	**Teck Mine:**	Line Creek Operation
Station Description:	The Dry Creek Downstream of Settling Ponds (DCDS) site is located immediately downstream of the Dry Creek Settling Ponds. This location captures flow from DCEF, the Dry Creek Settling Ponds and any flow bypassing the settling ponds via the head pond spillway.		
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol		
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B		
Rationale for Data Grade Recommendation (RSFMP)	Governed by WQ sampling data use.		

Data Quality Assessment - Continuous Data		
Data Range	**Data Quality Assessment Grade***	**Description**
January 1 - April 19, 2022	E	Station operated as expected, potential ice in channel.
April 20 - June 15, 2022	B	Station operated as expected.
June 16 - June 22, 2022	E	Station operated as expected. Above 2x limit of maximum applicability.
June 23 - October 31, 2022	B	Station operated as expected.
November 1 - December 21, 2022	E	Station operated as expected, potential ice in channel
December 21 - 24, 2022	M	Ice affected data removed
December 24 - 31, 2022	E	Station operated as expected, potential ice in channel

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 5, 2022	0.084	-	E	0.076	-	-	Calculated Discharge
January 12, 2022	0.070	-	E	0.059	-	-	Calculated Discharge
January 19, 2022	0.078	-	E	0.069	-	-	Calculated Discharge
January 26, 2022	0.076	-	E	0.066	-	-	Calculated Discharge
February 1, 2022	0.080	-	E	0.071	-	-	Calculated Discharge
February 9, 2022	0.065	-	E	0.054	-	-	Calculated Discharge
February 22, 2022	0.080	-	E	0.071	-	-	Calculated Discharge
March 1, 2022	0.070	-	E	0.059	-	-	Calculated Discharge
March 8, 2022	0.070	-	E	0.059	-	-	Calculated Discharge
March 15, 2022	0.070	-	E	0.059	-	-	Calculated Discharge
March 23, 2022	0.075	-	E	0.065	-	-	Calculated Discharge
March 29, 2022	0.168	0.190	B	-	-	-	KWL Measurement, 27 panels, Max 9%, potential for ice in channel
March 30, 2022	0.154	-	E	0.205	-	-	Calculated Discharge
April 6, 2022	0.140	-	E	0.173	-	-	Calculated Discharge
April 12, 2022	0.135	-	E	0.162	-	-	Calculated Discharge
April 17, 2022	0.120	-	E	0.133	-	-	Calculated Discharge
April 24, 2022	0.140	-	B	0.173	-	-	Calculated Discharge
May 2, 2022	0.161	0.194	U	0.222	-0.028	-14.4%	Lotic Measurement. No measurement info.
May 3, 2022	0.182	0.329	U	0.279	0.050	15.2%	Lotic Measurement. No measurement info.
May 3, 2022	0.180	-	B	0.273	-	-	Calculated Discharge
May 4, 2022	0.212	0.383	U	0.375	0.008	2.1%	Lotic Measurement. No measurement info.
May 11, 2022	0.215	0.405	U	0.386	0.019	4.8%	Lotic Measurement. No measurement info.
May 11, 2022	0.215	-	B	0.386	-	-	Calculated Discharge
May 12, 2022	0.209	0.320	U	0.365	-0.045	-14.0%	Lotic Measurement. No measurement info.
May 12, 2022	0.169	0.214	U	0.243	-0.029	-13.4%	Lotic Measurement. No measurement info.
May 13, 2022	0.202	0.329	U	0.341	-0.012	-3.7%	Lotic Measurement. No measurement info.
May 17, 2022	0.230	-	B	0.441	-	-	Calculated Discharge
May 24, 2022	0.190	-	B	0.303	-	-	Calculated Discharge
May 31, 2022	0.270	-	B	0.613	-	-	Calculated Discharge
June 7, 2022	0.290	-	B	0.713	-	-	Calculated Discharge
June 14, 2022	0.320	-	B	0.880	-	-	Calculated Discharge
June 21, 2022	0.350	-	E	1.069	-	-	Calculated Discharge

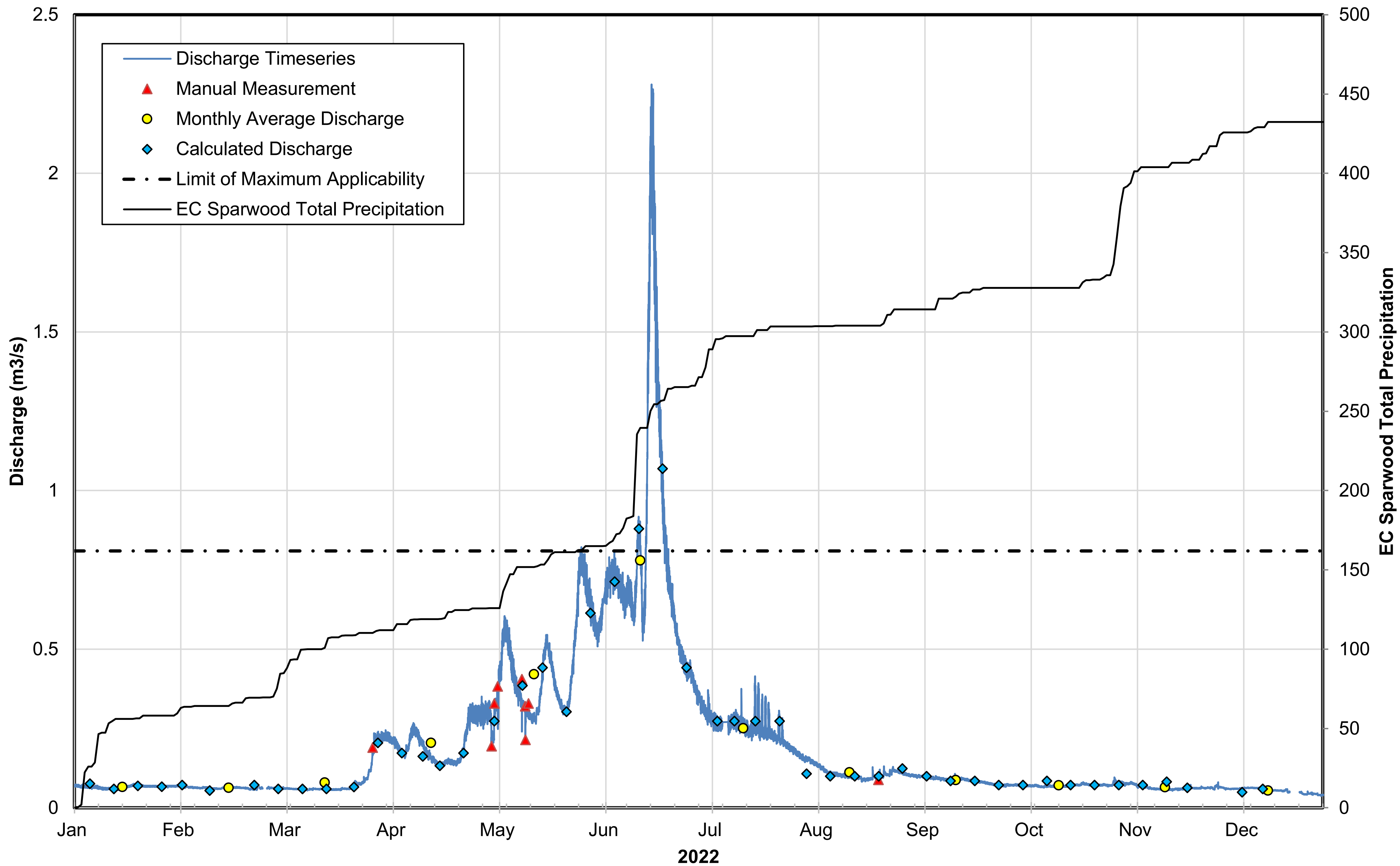
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
June 28, 2022	0.230	-	B	0.441	-	-	Calculated Discharge
July 7, 2022	0.180	-	B	0.273	-	-	Calculated Discharge
July 12, 2022	0.180	-	B	0.273	-	-	Calculated Discharge
July 18, 2022	0.180	-	B	0.273	-	-	Calculated Discharge
July 25, 2022	0.180	-	B	0.273	-	-	Calculated Discharge
August 2, 2022	0.105	-	B	0.107	-	-	Calculated Discharge
August 9, 2022	0.100	-	B	0.099	-	-	Calculated Discharge
August 16, 2022	0.100	-	B	0.099	-	-	Calculated Discharge
August 23, 2022	0.091	0.088	B	0.086	0.002	2.6%	KWL Measurement, 21 Panels, Max 9.8%
August 23, 2022	0.100	-	B	0.099	-	-	Calculated Discharge
August 30, 2022	0.115	-	B	0.124	-	-	Calculated Discharge
September 6, 2022	0.100	-	B	0.099	-	-	Calculated Discharge
September 13, 2022	0.090	-	B	0.084	-	-	Calculated Discharge
September 20, 2022	0.090	-	B	0.084	-	-	Calculated Discharge
September 27, 2022	0.080	-	B	0.071	-	-	Calculated Discharge
October 4, 2022	0.080	-	B	0.071	-	-	Calculated Discharge
October 11, 2022	0.090	-	B	0.084	-	-	Calculated Discharge
October 18, 2022	0.080	-	B	0.071	-	-	Calculated Discharge
October 25, 2022	0.080	-	B	0.071	-	-	Calculated Discharge
November 1, 2022	0.080	-	E	0.071	-	-	Calculated Discharge
November 8, 2022	0.080	-	E	0.071	-	-	Calculated Discharge
November 15, 2022	0.088	-	E	0.082	-	-	Calculated Discharge
November 21, 2022	0.073	-	E	0.063	-	-	Calculated Discharge
December 7, 2022	0.060	-	E	0.049	-	-	Calculated Discharge
December 13, 2022	0.070	-	E	0.059	-	-	Calculated Discharge
December 20, 2022	0.110	-	E	0.115	-	-	Calculated Discharge
December 29, 2022	0.160	-	E	0.219	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

* Grades A, B, C, E and U based on the BC RISC Standards Document.

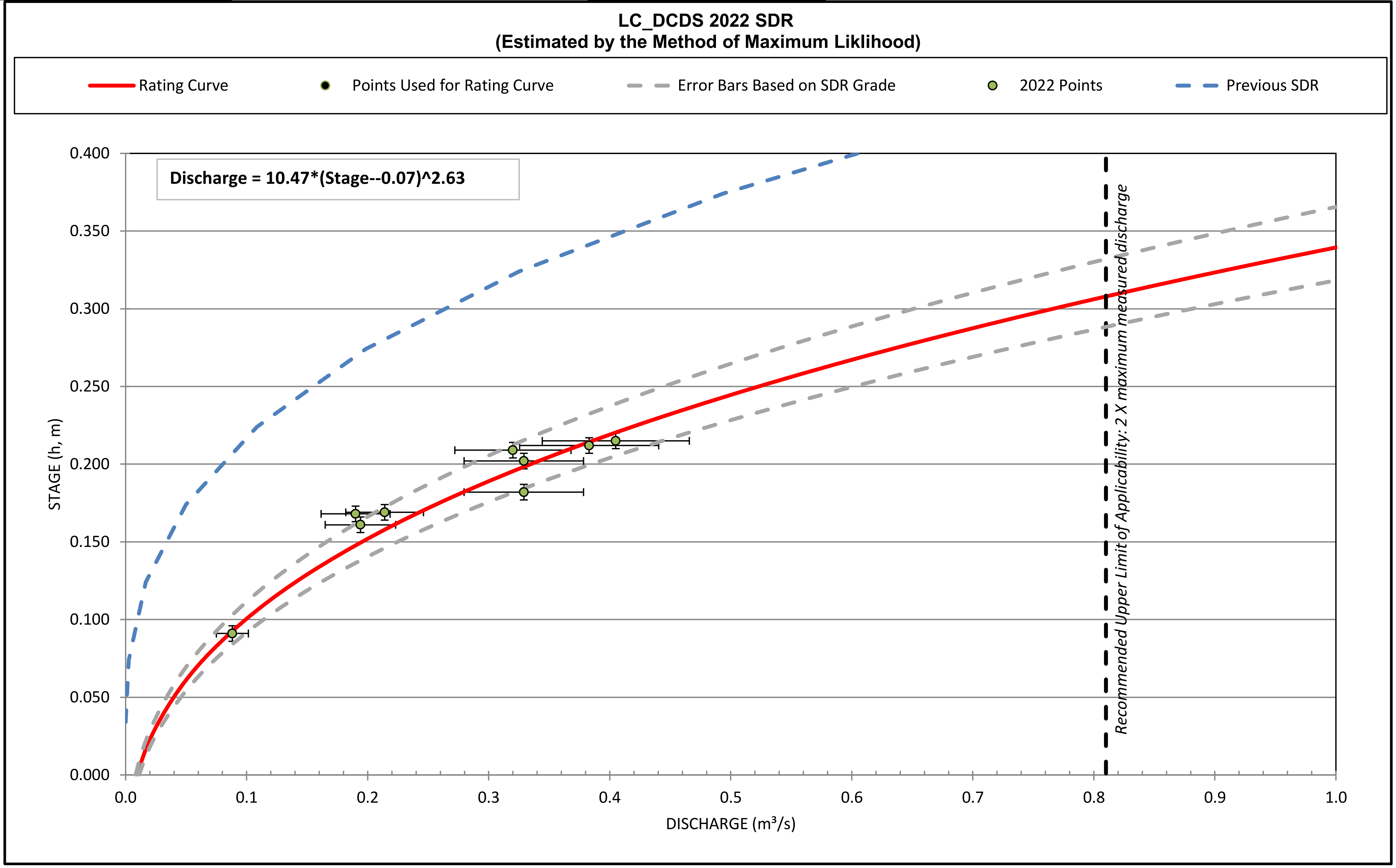
Monthly Average Discharge m³/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.066	0.063	0.080	0.205	0.421	0.780	0.251	0.111	0.087	0.071	0.065	0.055

LC_DCDS 2022 - Yearly Hydrograph



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2022	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	B
Reason For Change	New Station	**Data Grade Rational:**	Grade B measurements confirm new curve. New curve references readings from new staff gauge, hence SDR change.		



LC_DCDS
Summary Report
Year: 2022
Measurement: Final Discharge 2022 (m3/s)

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.069	0.067 PK	0.061	0.223	0.298	0.596	0.363	0.157 PK	0.103	0.071	0.080 PK	0.064 PK
2	0.068	0.065	0.061	0.222	0.287	0.556	0.337	0.153	0.101	0.072	0.079	0.061
3	0.067	0.065	0.061	0.213	0.305	0.593	0.314	0.150	0.100	0.071	0.075	0.060
4	0.066	0.064	0.060	0.208	0.369	0.682	0.303	0.143	0.099	0.070	0.076	0.059
5	0.065	0.063	0.060	0.191	0.469	0.707	0.286	0.136	0.098	0.069	0.077	0.060
6	0.065	0.063	0.059	0.174	0.558	0.736	0.276	0.129	0.096	0.070	0.072	0.060
7	0.065	0.063	0.059	0.173	0.531	0.736	0.264	0.121	0.094	0.070	0.068	0.061
8	0.062	0.063	0.059	0.201	0.458	0.716	0.264	0.113	0.094	0.070	0.070	0.063
9	0.061	0.061	0.058	0.239	0.401	0.689	*	0.109	0.094	0.067	0.066	0.063
10	0.060	0.061	0.059	0.243	0.360	0.661	0.260	0.108	0.092	0.067	0.062	0.063
11	0.060	0.060	0.059	0.223	0.330	0.679	0.270	0.105	0.090	0.068	0.060	0.063
12	0.058	0.060	0.059	0.202	0.298	0.646	0.274	0.103	0.089	0.068	0.059	0.062
13	0.058	0.063	0.059	0.180	0.294	0.651	0.268	0.100	0.091	0.067	0.059	0.059
14	0.060	0.067	0.059	0.162	0.284	0.854	0.268	0.098	0.094 PK	0.067	0.057	0.055
15	0.063	0.065	0.059	0.152	0.286	0.675	0.254	0.097	0.095	0.068	0.057	0.055
16	0.066	0.064	0.058	0.142	0.325	0.728	0.245	0.096	0.092	0.068	0.057	0.055
17	0.069	0.064	0.057	0.138	0.426	1.590	0.246	0.095	0.090	0.068	0.058	0.055
18	0.072 PK	0.063	0.058	0.140	0.512	2.069 PK	0.282 PK	0.091	0.088	0.071	0.059	0.054
19	0.069	0.062	0.058	0.145	0.483	1.630	0.282	0.089	0.087	0.072	0.059	0.053
20	0.069	0.061	0.060	0.146	0.431	1.266	0.258	0.090	0.084	0.072	0.059	0.054
21	0.068	0.059	0.060	0.142	0.372	1.005	0.257	0.096	0.082	0.074	0.060	0.049
22	0.068	0.060	0.061	0.142	0.336	0.816	0.254	0.097	0.082	0.076	0.062	*
23	0.068	0.060	0.071	0.154	0.313	0.715	0.230	0.100	0.079	0.074	0.062	*
24	0.068	0.061	0.076	0.197	0.311	0.638	0.222	0.101	0.077	0.072	0.062	0.048
25	0.067	*	0.076	0.250	0.358	0.559	0.238	0.109	0.075	0.072	0.063	0.043
26	0.068	0.063	0.085	0.291	0.471	0.503	0.222	0.105	0.073	0.072	0.062	0.044
27	0.069	0.062	0.098	0.295	0.610	0.467	0.200	0.115	0.071	0.071	0.063	0.045
28	0.068	0.062	0.129	0.292	0.760 PK	0.441	0.191	0.115	0.071	0.072	0.063	0.044
29	0.068		0.201	0.294 PK	0.757	0.430	0.183	0.113	0.070	0.070	0.063	0.042
30	0.068		0.221 PK	0.296	0.685	0.395	0.174	0.109	0.071	0.072	0.068	0.041
31	0.069		0.221		0.635		0.166	0.106		0.085 PK		0.041
Mean	**0.066**	**0.063**	**0.080**	**0.202**	**0.429**	**0.781**	**0.255**	**0.111**	**0.087**	**0.071**	**0.065**	**0.054**
Maximum	**0.072**	**0.067**	**0.221**	**0.296**	**0.760**	**2.069**	**0.363**	**0.157**	**0.103**	**0.085**	**0.080**	**0.064**
Minimum	**0.058**	**0.059**	**0.057**	**0.138**	**0.284**	**0.395**	**0.166**	**0.089**	**0.070**	**0.067**	**0.057**	**0.041**
Peak 5-Minute	**0.076**	**0.070+**	**0.241**	**0.351**	**0.822**	**2.280**	**0.415**	**0.169**	**0.107**	**0.096**	**0.084**	**0.066**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix M

LC_DC4

Station Details			
Station Name:	**Dry Creek LC_DC4**	**Reporting Year:**	**2022**
Site ID:	**LC_DC4**	**Station Type:**	Year-Round Continuous Data
EMS:	**#N/A**	**Teck Mine:**	Line Creek Operation

Station Description:	DC4 is located on Dry Creek between DCDS and DC1.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	#N/A
Rationale for Data Grade Recommendation (RSFMP)	#N/A

Data Quality Assessment - Continuous Data

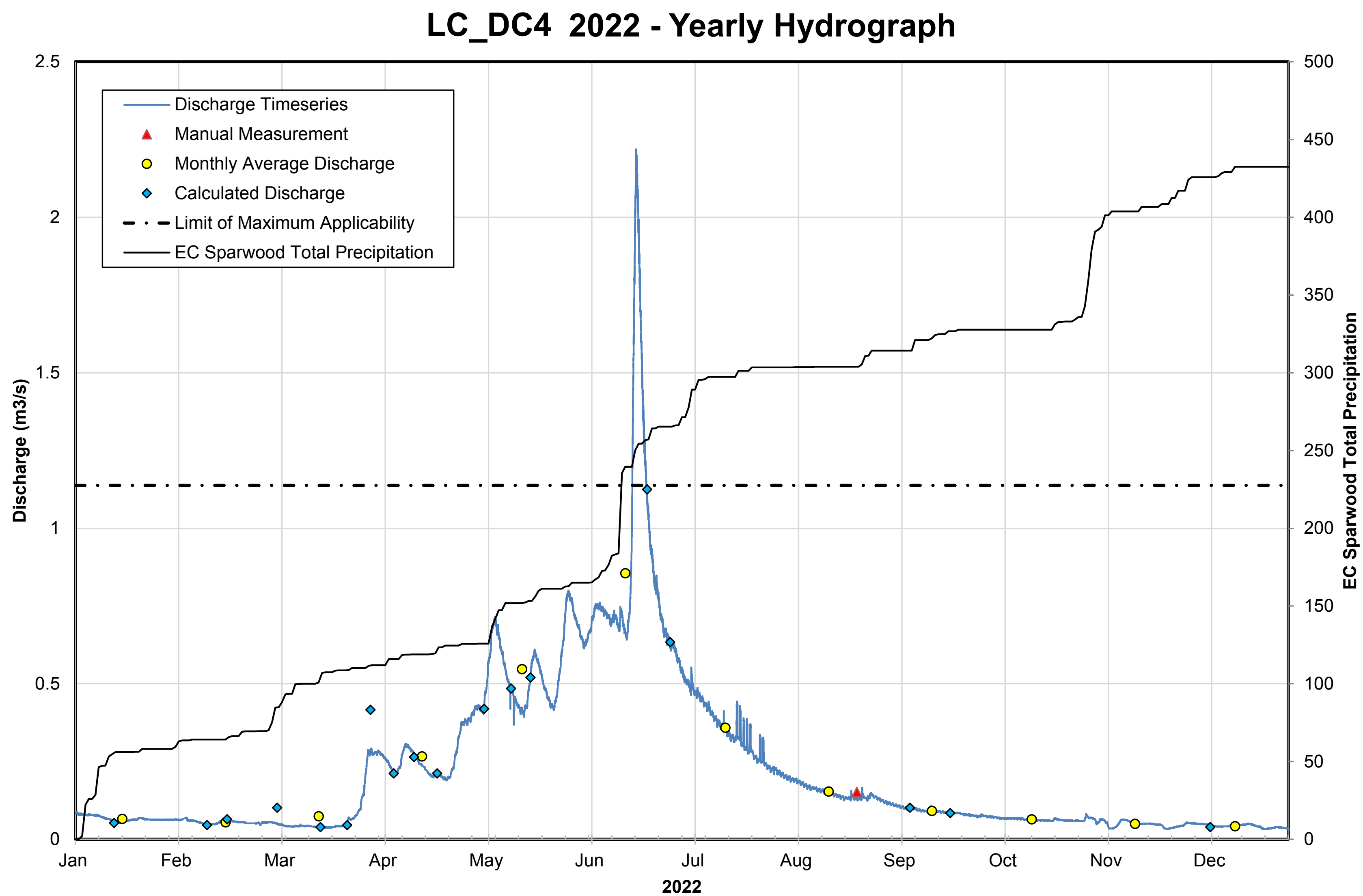
Data Range	Data Quality Assessment Grade*	Description
January 1- February 21, 2022	E	Station operated as expected, ice in channel possible
February 21 - 23, 2022	M	Ice affected data removed
February 23 - April 19, 2022	E	Station operated as expected, ice in channel possible
April 20 - June 17, 2022	C	Station operated as expected
June 17 - 21, 2022	E	Continuous data above the upper limit of applicability: 2x the maximum discharge
June 21 - November 1, 2022	C	Station operated as expected
November 1- December 31, 2022	E	Station operated as expected, ice in channel possible

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 5, 2022	0.900	-	E	4.726	-	-	Calculated Discharge, potential ice in channel
January 12, 2022	0.070	-	E	0.053	-	-	Calculated Discharge, potential ice in channel
February 9, 2022	0.065	-	E	0.046	-	-	Calculated Discharge, potential ice in channel
February 15, 2022	0.078	-	E	0.065	-	-	Calculated Discharge, potential ice in channel
March 2, 2022	0.100	-	E	0.102	-	-	Calculated Discharge. Staff gauge reading confirmed with photos. Photos indicate backwater effect from ice.
March 15, 2022	0.060	-	E	0.039	-	-	Calculated Discharge, potential ice in channel
March 23, 2022	0.065	-	E	0.046	-	-	Calculated Discharge, potential ice in channel
March 30, 2022	0.220	-	E	0.416	-	-	Calculated Discharge. Staff gauge reading confirmed with photos. Photos indicate backwater effect from ice.
April 6, 2022	0.150	-	E	0.212	-	-	Calculated Discharge, potential ice in channel
April 12, 2022	0.170	-	E	0.265	-	-	Calculated Discharge, potential ice in channel
April 19, 2022	0.150	-	E	0.212	-	-	Calculated Discharge, potential ice in channel
May 3, 2022	0.221	-	C	0.420	-	-	Lotic Measurement
May 11, 2022	0.240	-	C	0.485	-	-	Calculated Discharge
May 17, 2022	0.250	-	C	0.520	-	-	Calculated Discharge
June 21, 2022	0.390	-	E	1.125	-	-	Calculated Discharge
June 28, 2022	0.280	-	C	0.634	-	-	Calculated Discharge
August 23, 2022	0.113	0.152	C	0.128	0.025	16.2%	KWL Measurement, 22 Panels, Max 13%, no obvious reason for deviation from SDR
September 8, 2022	0.100	-	C	0.102	-	-	Calculated Discharge
September 20, 2022	0.090	-	C	0.084	-	-	Calculated Discharge
December 7, 2022	0.060	-	E	0.039	-	-	Calculated Discharge, potential ice in channel
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

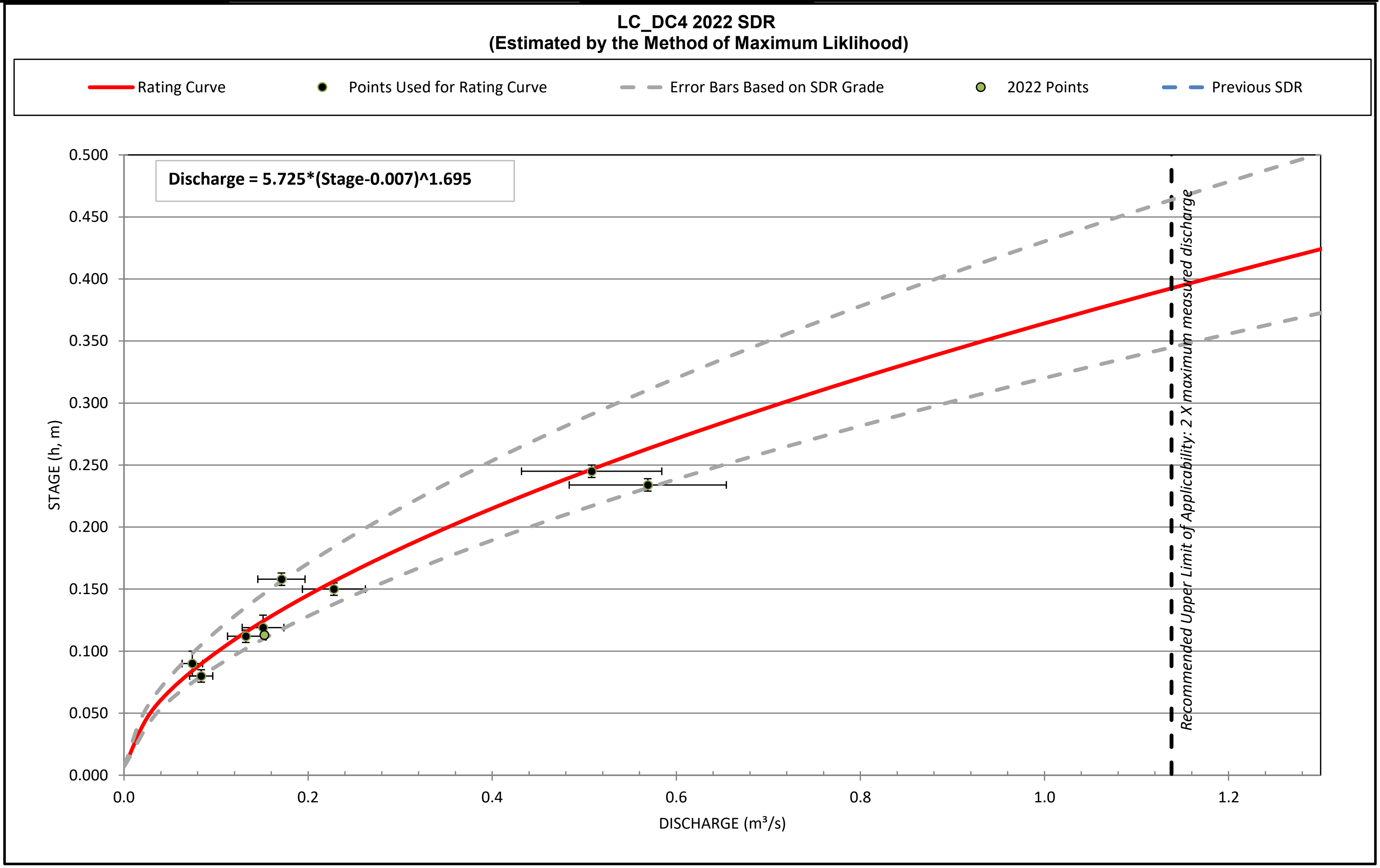
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m³/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.066	0.055	0.074	0.267	0.547	0.855	0.359	0.154	0.091	0.064	0.050	0.043



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2019	**Updated from Previous Year:**	No	**SDR Data Grade:**	C
Reason For Change		**Data Grade Rational:**	Possible shift, not enough measurements to meet Grade B RISC Standard		



LC_DC4

Summary Report
Year: 2022
Measurement: Final Discharge (m3/s)

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.083 PK	0.062	0.053	0.279	0.424	0.663	0.558 PK	0.205 PK	0.118 PK	0.074	0.069 PK	0.052 PK
2	0.080	*	0.050	0.276	0.419	0.629	0.527	0.199	0.115	0.073	0.067	0.051
3	0.080	0.063 PK	0.047	0.265	0.425	0.640	0.507	0.195	0.111	0.072	0.054	0.050
4	0.079	0.060	0.045	0.253	0.508	0.674	0.497	0.191	0.108	0.068	0.060	0.049
5	0.079	0.059	0.042	0.233	0.609	0.722	0.486	0.188	0.105	0.068	0.063	0.049
6	0.077	0.057	0.041	0.216	0.693	0.750	0.471	0.183	0.102	0.067	0.052	0.048
7	0.077	0.054	0.042	0.216	0.681	0.746	0.455	0.177	0.099	0.067	0.036	0.044
8	0.073	0.050	0.042	0.241	0.627	0.734	0.442	0.171	0.097	0.067	0.036	0.042
9	0.069	0.048	0.042	0.286	0.576	0.722	0.427	0.166	0.099	0.067	0.042	0.041
10	0.066	0.048	0.043	0.301	0.524	0.704	0.416	0.165	0.096	0.067	0.056	0.041
11	0.063	0.048	0.043	0.290	0.487	0.716	0.395	0.161	0.094	0.066	0.063	0.041
12	0.056	0.051	0.042	0.277	0.451	0.702	0.379	0.157	0.092	0.065	0.061	0.041
13	0.054	0.056	0.040	0.252	0.437	0.707	0.369	0.155	0.090	0.063	0.057	0.043
14	0.053	0.062	0.039	0.236	0.418	0.690	0.362	0.151	0.092	0.063	0.053	0.045
15	0.056	0.060	0.038	0.217	0.411	0.666	0.347	0.149	0.094	0.062	0.051	0.044
16	0.059	0.058	0.038	0.216	0.438	0.793	0.332	0.145	0.091	0.061	0.050	0.045
17	0.061	0.057	0.038	0.207	0.518	1.534	0.325	0.141	0.089	0.061	0.050	0.047
18	0.064	0.056	0.038	0.203	0.588	2.104 PK	0.360	0.137	0.087	0.061	0.051	0.049
19	0.065	0.055	0.039	0.208	0.583	1.747	0.350	0.133	0.087	0.060	0.051	0.049
20	0.067	0.055	0.042	0.205	0.545	1.357	0.318	0.133	0.087	0.060	0.049	0.046
21	0.066	0.052	0.042	0.197	0.499	1.120	0.312	0.135	0.085	0.062	0.047	0.042
22	0.065	*	0.043	0.195	0.466	0.964	0.309	0.135	0.084	0.065	0.046	0.039
23	0.064	0.051	0.052	0.206	0.437	0.861	0.271	0.132	0.083	0.063	0.040	0.034
24	0.063	0.052	0.065	0.238	0.427	0.806	0.258	0.132	0.080	0.061	0.034	0.033
25	0.063	0.050	0.068	0.292	0.469	0.736	0.278	0.141	0.079	0.060	0.035	0.035
26	0.062	0.054	0.081	0.350	0.555	0.680	0.263	0.131	0.078	0.060	0.037	0.037
27	0.063	0.054	0.105	0.374	0.651	0.653	0.236	0.140	0.076	0.059	0.040	0.039
28	0.063	0.054	0.156	0.379	0.771 PK	0.631	0.228	0.139	0.074	0.060	0.042	0.038
29	0.063		0.249	0.388	0.779	0.621	0.224	0.133	0.075	0.059	0.045	0.037
30	0.063		0.280 PK	0.409 PK	0.736	0.590	0.219	0.128	0.076	0.059	0.052	0.035
31	0.063		0.276		0.697		0.212	0.123		0.074 PK		0.031
Mean	**0.066**	**0.055**	**0.073**	**0.264**	**0.544**	**0.855**	**0.359**	**0.154**	**0.091**	**0.064**	**0.050**	**0.043**
Maximum	**0.083**	**0.063**	**0.280**	**0.409**	**0.779**	**2.104**	**0.558**	**0.205**	**0.118**	**0.074**	**0.069**	**0.052**
Minimum	**0.053**	**0.048**	**0.038**	**0.195**	**0.411**	**0.590**	**0.212**	**0.123**	**0.074**	**0.059**	**0.034**	**0.031**
Peak 5-Minute	**0.088**	**0.070+**	**0.291**	**0.426+**	**0.799+**	**2.219**	**0.583+**	**0.214+**	**0.122**	**0.082+**	**0.072**	**0.053+**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix N

LC_DC1

Station Details			
Station Name:	**Dry Creek near mouth**	**Reporting Year:**	**2022**
Site ID:	**LC_DC1**	**Station Type:**	Year-Round Continuous Data
EMS:	**E288270**	**Teck Mine:**	Line Creek Operation

Station Description:	The Dry Creek (DC1) hydrometric station is located upstream of the confluence of Dry Creek and the Fording River. This station was installed to monitor the flow regime of Dry Creek prior to development of mine operations in the headwaters of the watershed.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	Governed by RWQM data use.

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - March 14, 2022	M	Ice affected data removed.
March 15 - April 11, 2022	E	Station operated as expected, potential ice in channel.
April 12 - 17, 2022	M	Erroneous data removed
April 17 - 19, 2022	E	Station operated as expected, potential ice in channel.
April 20 - May 31, 2022	B	Station operated as expected, Grade B SDR.
June 1 - June 18, 2022	E	Station operated as expected. Uncertainty as to when channel changes over freshset.
June 18 - November 5, 2022	E	Station operated as expected. Grade E SDR.
November 6 - 23, 2022	M	Ice affected data removed.
November 23 - December 31, 2022	E	Station operated as expected, potential ice in channel.

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 5, 2022	0.340	-	E	0.079	-	-	Calculated Discharge
January 12, 2022	0.324	-	E	0.038	-	-	Calculated Discharge
January 19, 2022	0.312	-	E	0.015	-	-	Calculated Discharge
January 26, 2022	0.320	-	E	0.029	-	-	Calculated Discharge
February 2, 2022	0.320	-	E	0.029	-	-	Calculated Discharge
February 9, 2022	0.318	-	E	0.025	-	-	Calculated Discharge
February 15, 2022	0.320	-	E	0.029	-	-	Calculated Discharge
February 22, 2022	0.320	-	E	0.029	-	-	Calculated Discharge
March 2, 2022	0.310	-	E	0.012	-	-	Calculated Discharge
March 7, 2022	0.310	-	E	0.012	-	-	Calculated Discharge
March 15, 2022	0.310	-	E	0.012	-	-	Calculated Discharge
March 23, 2022	0.320	-	E	0.029	-	-	Calculated Discharge
March 30, 2022	0.380	-	E	0.232	-	-	Calculated Discharge
April 6, 2022	0.370	-	E	0.187	-	-	Calculated Discharge
April 19, 2022	0.370	-	E	0.187	-	-	Calculated Discharge
April 24, 2022	0.345	-	B	0.095	-	-	Calculated Discharge. Suspect staff gauge.
May 3, 2022	0.420	-	B	0.444	-	-	Calculated Discharge
May 3, 2022	-	0.412	U	-	-	-	Lotic Measurement, No flow info. Staff gauge unreliable.
May 11, 2022	-	0.412	U	-	-	-	Lotic Measurement, No flow info. Staff gauge unreliable.
May 12, 2022	-	0.332	U	-	-	-	Lotic Measurement, No flow info. Staff gauge unreliable.
May 13, 2022	0.410	-	B	0.386	-	-	Calculated Discharge
May 17, 2022	0.460	-	B	0.710	-	-	Calculated Discharge
May 24, 2022	0.440	-	B	0.571	-	-	Calculated Discharge
May 31, 2022	0.480	-	B	0.861	-	-	Calculated Discharge
June 7, 2022	0.510	-	E	1.110	-	-	Calculated Discharge
June 14, 2022	0.480	-	E	0.861	-	-	Calculated Discharge
June 21, 2022	0.560	-	E	1.086	-	-	Calculated Discharge
June 28, 2022	0.500	-	E	0.619	-	-	Calculated Discharge
July 7, 2022	0.480	-	E	0.488	-	-	Calculated Discharge
July 12, 2022	0.480	-	E	0.488	-	-	Calculated Discharge
July 18, 2022	0.470	-	E	0.427	-	-	Calculated Discharge
July 28, 2022	0.450	-	E	0.316	-	-	Calculated Discharge

* Grades A, B, C, E and U based on the BC RISC Standards Document.

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
August 2, 2022	0.450	-	E	0.316	-	-	Calculated Discharge
August 9, 2022	0.420	-	E	0.175	-	-	Calculated Discharge
August 18, 2022	0.420	-	E	0.175	-	-	Calculated Discharge
August 23, 2022	0.414	0.151	C	0.151	0.000	-0.3%	KWL Measurement, 23 Panels, Max 12%
August 30, 2022	0.430	-	E	0.218	-	-	Calculated Discharge
September 8, 2022	0.420	-	E	0.175	-	-	Calculated Discharge
September 13, 2022	0.400	-	E	0.101	-	-	Calculated Discharge
September 20, 2022	0.410	-	E	0.136	-	-	Calculated Discharge
September 27, 2022	0.420	-	E	0.175	-	-	Calculated Discharge
October 4, 2022	0.420	-	E	0.175	-	-	Calculated Discharge
October 12, 2022	0.410	-	E	0.136	-	-	Calculated Discharge
October 18, 2022	0.430	-	E	0.218	-	-	Calculated Discharge
October 25, 2022	0.410	-	E	0.136	-	-	Calculated Discharge
November 1, 2022	0.420	-	E	0.175	-	-	Calculated Discharge
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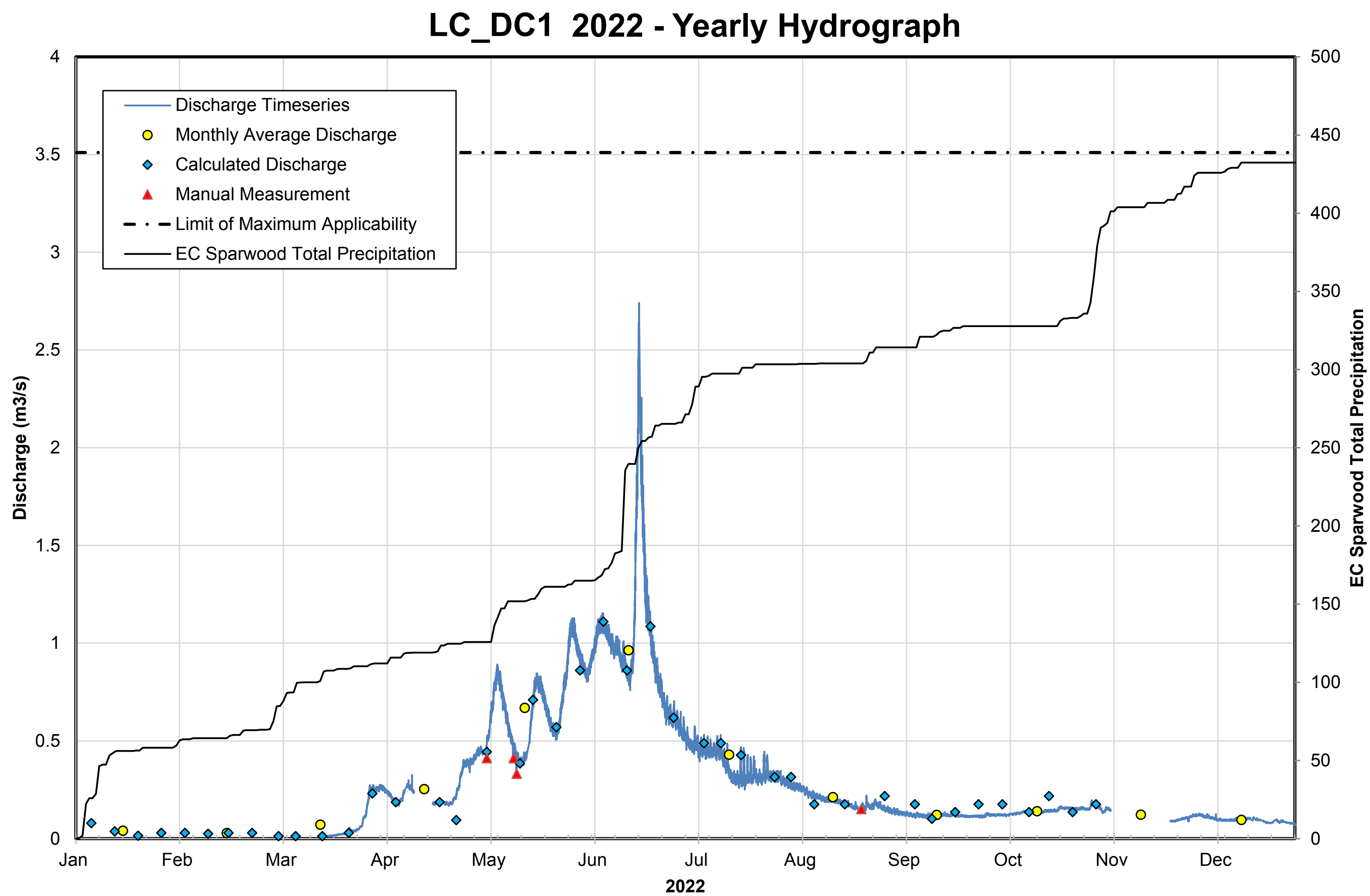
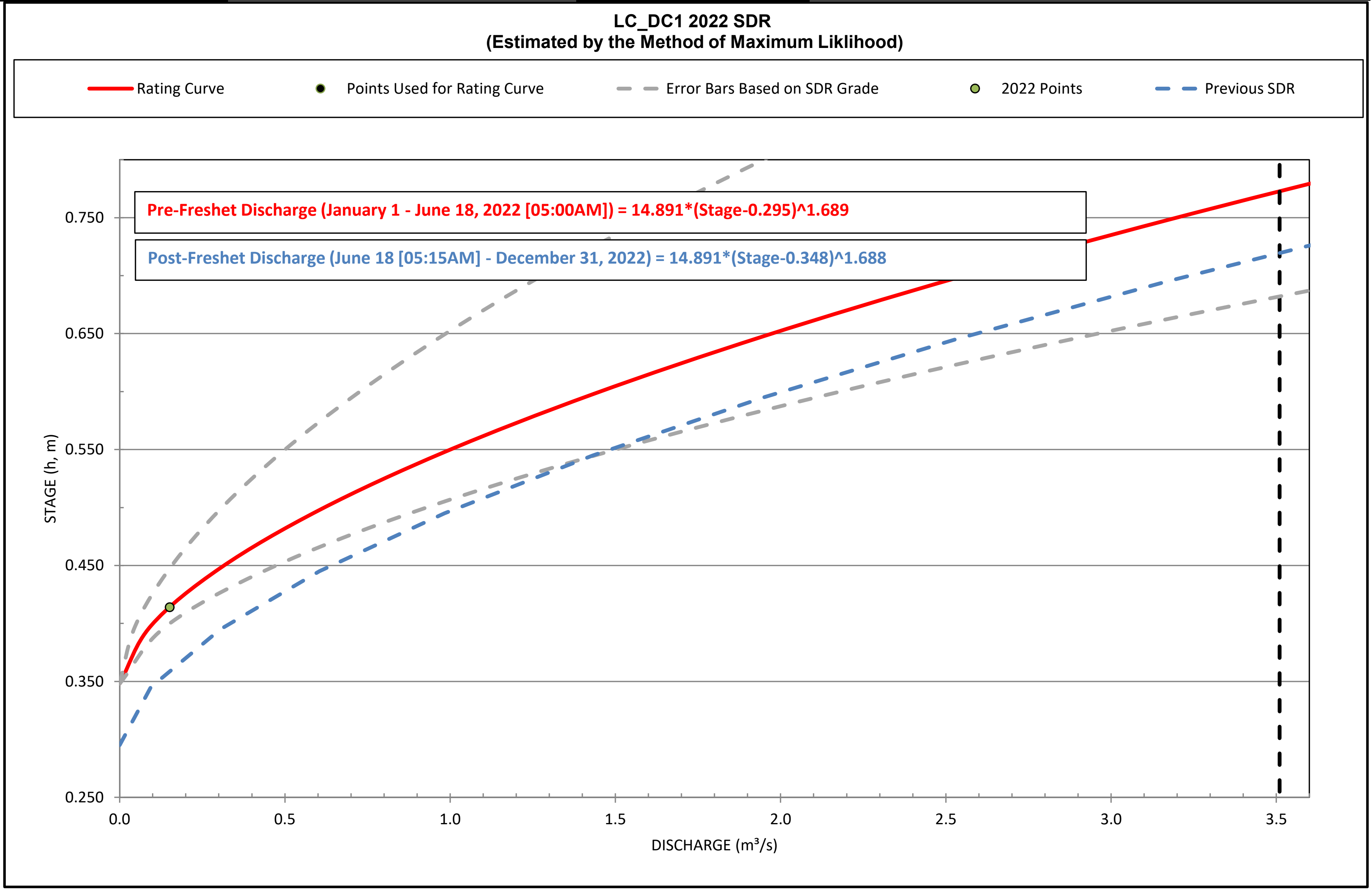
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m^3/sec											
January*	February*	March*	April	May	June	July*	August*	September	October	November	December
0.04	0.03	0.07	0.25	0.67	0.96	0.42	0.21	0.12	0.14	0.12	0.10



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2021	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	E
Reason For Change	Hydraulic Control Shift During Freshet	**Data Grade Rational:**	Pre-freshet measurements confirm 2021 curve, post freshet shift with one measurement warrants Grade E.		



LC_DC1

Summary Report
Year: 2022
Measurement: Final Discharge 2022 (m3/s)

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	*	*	*	0.259	0.445	0.886	0.540 PK	0.283 PK	0.140 PK	0.121	0.170 PK	0.119
2	*	*	*	0.258	0.445	0.843	0.514	0.274	0.138	0.121	0.160	0.122 PK
3	*	*	*	0.245	0.479	0.883	0.482	0.267	0.134	0.122	0.141	0.114
4	*	*	*	0.231	0.561	0.950	0.485	0.264	0.131	0.121	0.147	0.113
5	*	*	*	0.206	0.696	1.038	0.475	0.258	0.128	0.120	0.151	0.110
6	*	*	*	0.185	0.821	1.095	0.457	0.249	0.125	0.122	*	0.105
7	*	*	*	0.185	0.814	1.099	0.461	0.236	0.121	0.125	*	0.099
8	*	*	*	0.211	0.724	1.061	0.456	0.225	0.120	0.127	*	0.096
9	*	*	*	0.244	0.637	1.022	0.448	0.218	0.122	0.130	*	0.094
10	*	*	*	0.269	0.549	0.983	0.449	0.214	0.118	0.134	*	0.094
11	*	*	*	0.254	0.482	0.985	0.456	0.208	0.115	0.136	*	0.094
12	*	*	*	*	0.418	0.937	0.448	0.202	0.119	0.135	*	0.095
13	*	*	*	*	0.394	0.926	0.407	0.199	0.118	0.134	*	0.098
14	*	*	*	*	0.404	0.861	0.379	0.196	0.122	0.136	*	0.099
15	*	*	0.012	*	0.420	0.833	0.322	0.194	0.127	0.137	*	0.097
16	*	*	0.012	*	0.559	0.994	0.306	0.191	0.123	0.137	*	0.101
17	*	*	0.013	0.179	0.693	1.764	0.303	0.188	0.122	0.140	*	0.103
18	*	*	0.015	0.182	0.797	2.255 PK	0.337	0.184	0.119	0.142	*	0.101
19	*	*	0.017	0.191	0.790	1.588	0.338	0.175	0.121	0.143	*	0.100
20	*	*	0.021	0.188	0.742	1.215	0.328	0.167	0.120	0.143	*	0.096
21	*	*	0.023	0.181	0.668	1.076	0.326	0.162	0.117	0.151	*	*
22	*	*	0.026	0.179	0.606	0.941	0.336	0.153	0.117	0.158	*	*
23	*	*	0.035	0.190	0.555	0.844	0.312	0.152	0.115	0.155	0.090	*
24	*	*	0.040	0.222	0.543	0.776	0.309	0.157	0.113	0.155	0.089	*
25	*	*	0.041	0.282	0.606	0.700	0.343	0.179	0.115	0.153	0.092	*
26	*	*	0.051	0.360	0.740	0.649	0.341	0.161	0.114	0.152	0.097	*
27	*	*	0.077	0.386	0.854	0.628	0.317	0.177	0.114	0.152	0.102	*
28	*	*	0.126	0.387	1.029	0.618	0.316	0.171	0.113	0.156	0.106	*
29	*		0.221	0.398	1.070 PK	0.597	0.316	0.161	0.117	0.151	0.104	*
30	*		0.255 PK	0.426 PK	1.000	0.563	0.305	0.153	0.122	0.152	0.116	*
31	*		0.251		0.936		0.292	0.146		0.181 PK		*
Mean	**---**	**---**	**0.073**	**0.252**	**0.661**	**0.987**	**0.384**	**0.199**	**0.121**	**0.140**	**0.120**	**0.102**
Maximum	**---**	**---**	**0.255**	**0.426**	**1.070**	**2.255**	**0.540**	**0.283**	**0.140**	**0.181**	**0.170**	**0.122**
Minimum	**---**	**---**	**0.012**	**0.179**	**0.394**	**0.563**	**0.292**	**0.146**	**0.113**	**0.120**	**0.089**	**0.094**
Peak 5-Minute	**---**	**---**	**0.274+**	**0.455**	**1.128+**	**2.741**	**0.622**	**0.309**	**0.158**	**0.195+**	**0.179+**	**0.128+**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix O

LC_GRCK

Station Details			
Station Name:	**Grace Creek upstream of the CP rail tracks**	**Reporting Year:**	**2022**
Site ID:	**LC_GRCK**	**Station Type:**	Manual Measurements
EMS:	**E288275**	**Teck Mine:**	Line Creek Operation

Station Description:	The Grace Creek staff gauge is located approximately 1.5km up the Grace Creek FSR (accessed via Fording Mine Road FSR) upstream of the CP rail tracks.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	Governed by WQ sampling data use.

Summary Table of Yearly Discharge Measurements

Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
April 28, 2022	0.020	0.037	B	0.037	0.000	-0.7%	LCO measurement , 22 panels, Max 9%
May 11, 2022	0.660	-	E	1.386	-	-	Calculated Discharge
June 23, 2022	0.220	-	E	0.407	-	-	Calculated Discharge
July 6, 2022	0.130	-	E	0.230	-	-	Calculated Discharge
August 9, 2022	0.050	0.073	B	0.086	-0.013	-18.1%	LCO Measurement, 19 Panels, Max 9.8%
September 8, 2022	0.010	-	E	0.023	-	-	Calculated Discharge
October 27, 2022	0.010	0.048	B	0.023	0.025	52.8%	LCO Measurement, 23 Panels, Max 10%. Measurement reviewed, no explanation for deviation from SDR.
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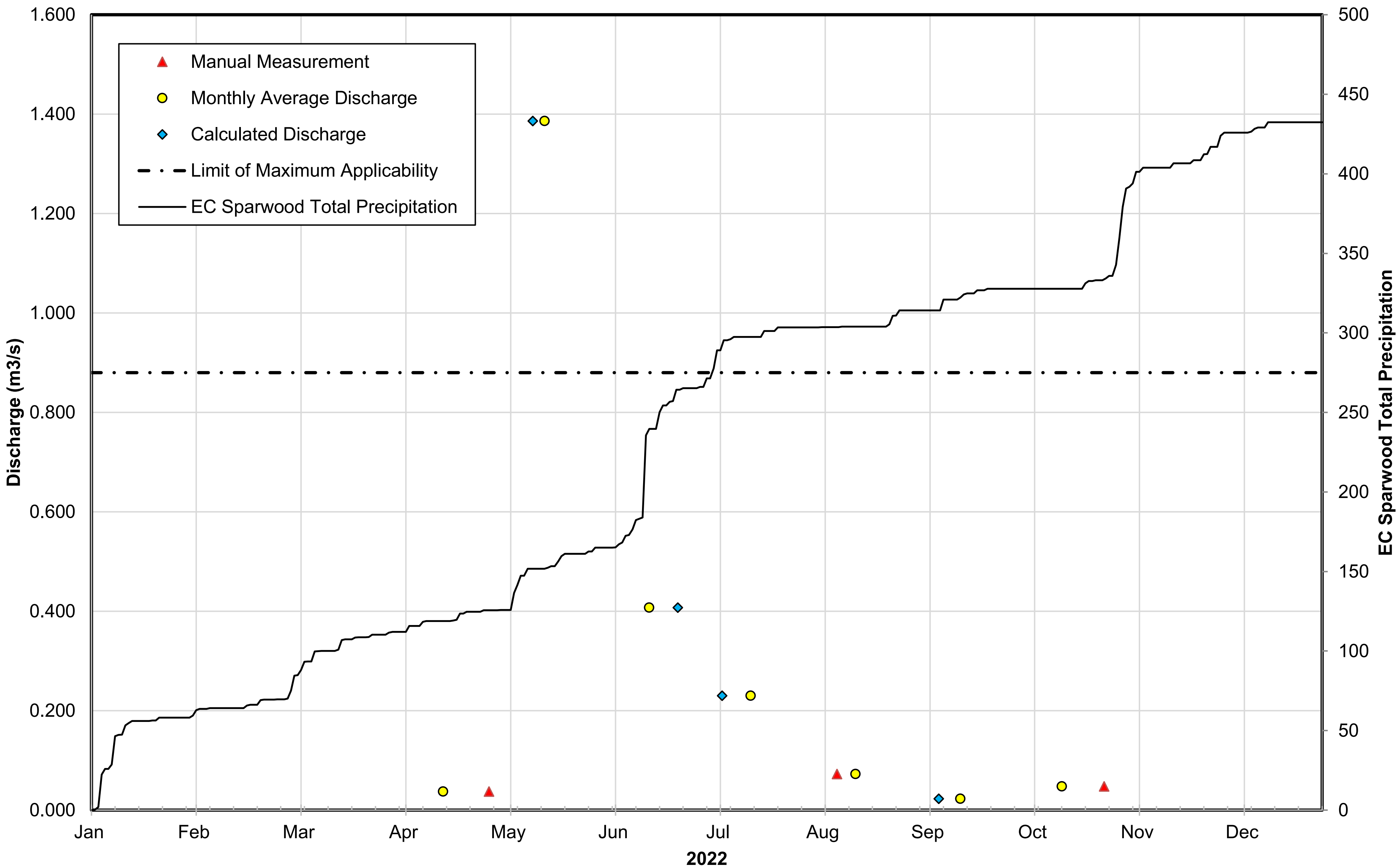
* Grades A, B, C, E and U based on the BC RISC Standards Document.

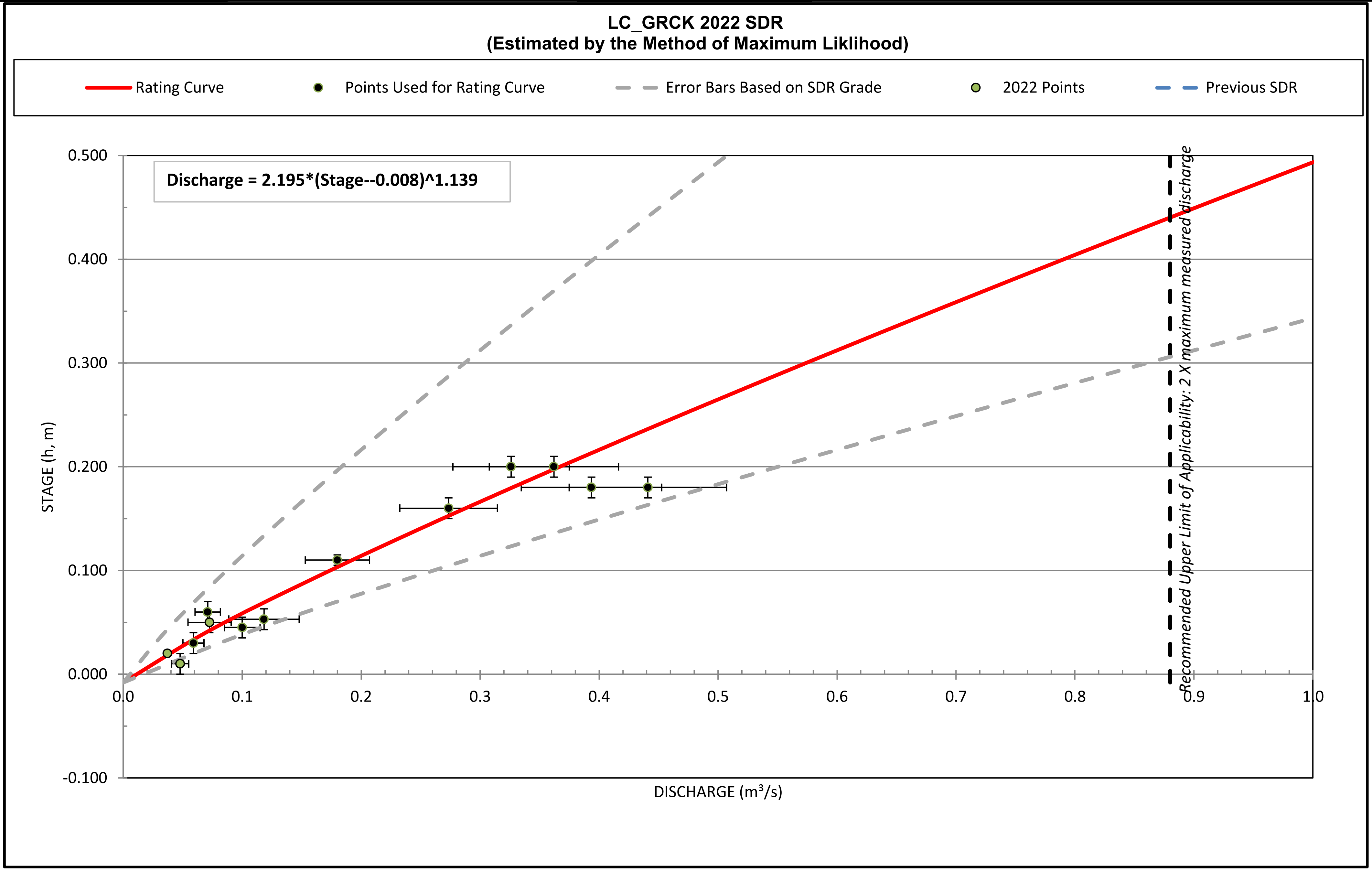
Monthly Average Discharge m^3/sec											
January	February	March	April*	May*	June*	July*	August*	September*	October*	November	December
#N/A	#N/A	#N/A	0.037	1.386	0.407	0.230	0.073	0.023	0.048	#N/A	#N/A

LC_GRCK 2022 - Yearly Hydrograph



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2019	**Updated from Previous Year:**	No	**SDR Data Grade:**	E
Reason For Change		**Data Grade Rational:**	Limited number of measurements in 2022, all occurring at low end of curve and substantial measurement scatter warrant Grade E.		



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Appendix P

LC_UC

Station Details

Station Name:	**Unnamed Creek**	**Reporting Year:**	**2022**
Site ID:	**LC_UC**	**Station Type:**	Manual Measurements
EMS:	**E295213**	**Teck Mine:**	Line Creek Operation

Station Description:	The Unnamed Creek (UC) staff gauge is located approximately 670m south from the Fording River Road along the Fording Mine Road FSR.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	Governed by WQ sampling data use.

Summary Table of Yearly Discharge Measurements

Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
February 16, 2022	0.080	0.000	E	-	-	-	LCO Volumetric Flow, 3 trials, 2s average
March 30, 2022	0.000	0.000	E	-	-	-	LCO Volumetric Flow, 3 trails, 2.5s average. No staff gauge reading.
April 29, 2022	0.090	0.003	U	-	-	-	LCO Volumetric Flow, no flow info
May 12, 2022	0.000	0.001	E	-	-	-	LCO Volumetric Flow, 3 trails, 0.93s average. No staff gauge reading.
June 23, 2022	0.120	0.004	E	-	-	-	LCO Volumetric Flow, 3 trials, 1.36s average
July 6, 2022	0.120	0.035	U	-	-	-	LCO Volumetric Flow, no flow info
August 9, 2022	0.080	0.001	E	-	-	-	LCO Volumetric Flow, 3 trials, 2.23s average
September 8, 2022	0.080	0.001	C	-	-	-	LCO Volumetric Flow, 3 trials, 5s average
November 17, 2022	0.109	0.001	E	-	-	-	LCO Volumetirc Flow, 4 trials, 3.83s average
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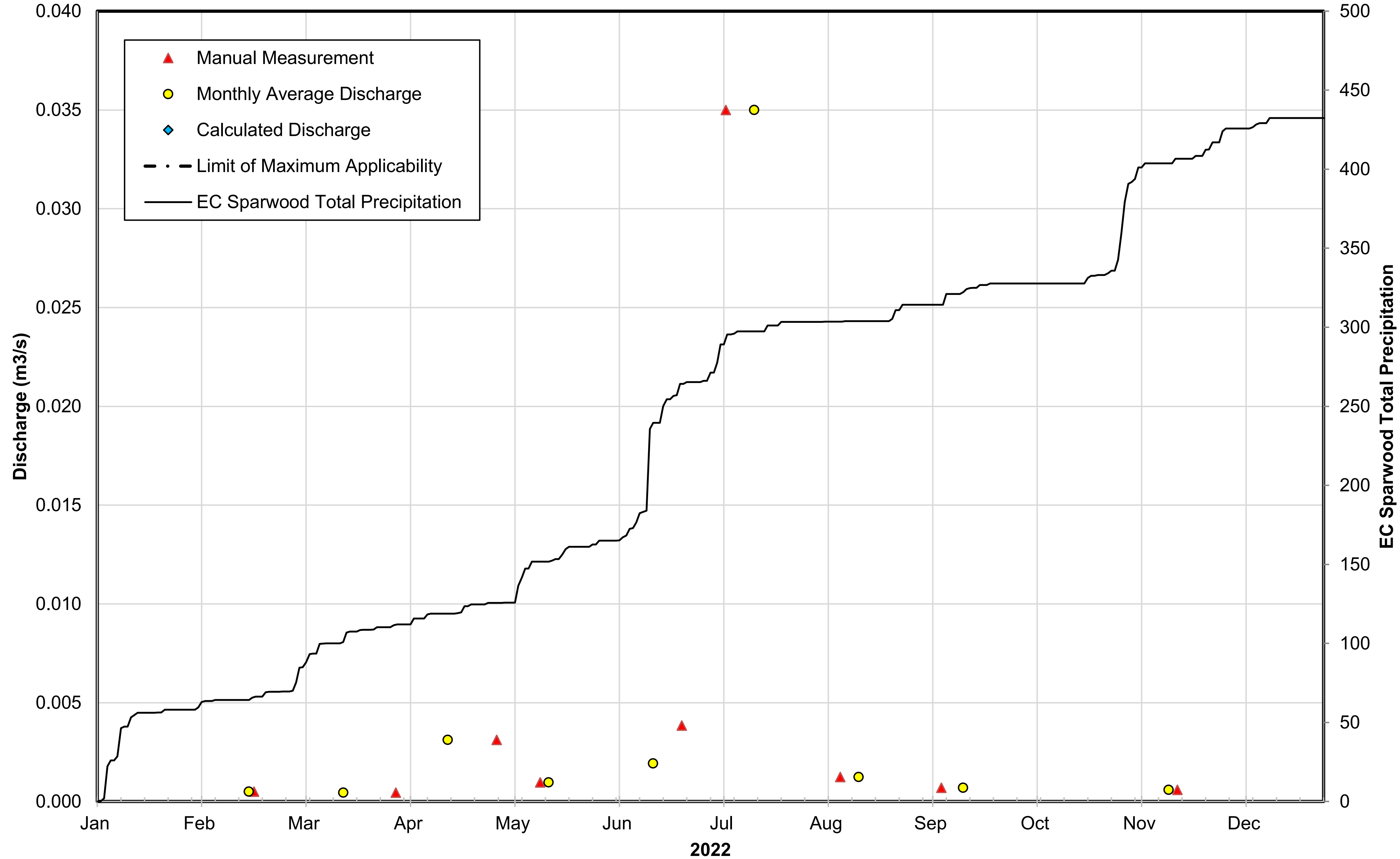
	-	-	-	-	-	-	
	-	-	-	-	-	-	

* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m^3/sec											
January	February	March	April	May	June	July	August	September	October	November	December
#N/A	0.0005	0.0005	0.0031	0.0010	0.0019	0.0350	0.0012	0.0007	#N/A	0.0006	#N/A

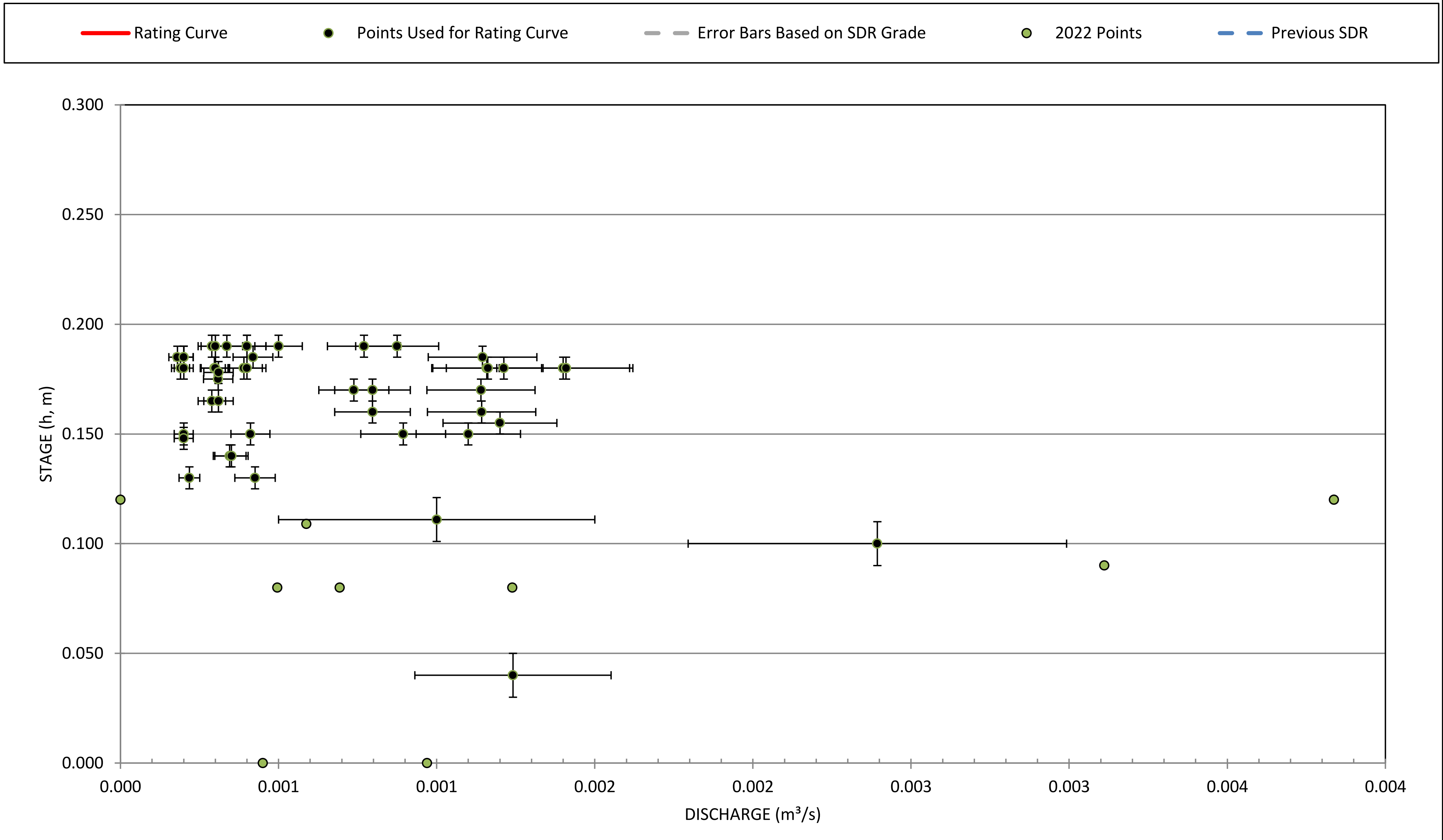
LC_UC 2022 - Yearly Hydrograph



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	N/A	**Updated from Previous Year:**	N/A	**SDR Data Grade:**	N/A
Reason For Change		**Data Grade Rational:**	SDR creation not possible due to excessive scatter in measurement points.		

LC_UC 2022 SDR
(Estimated by the Method of Maximum Liklihood)



9.10 Appendix J – Memo MSA North Ponds Statistical Evaluation and 2022 Temporary Paired Sampling

Memorandum

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Line Creek Operations
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Teck

To:	Mark Hall, MOE **SENT VIA EMAIL**	Date:	30th October 2015
From:	Kevin Podrasky, Line Creek Operations	Cc:	-

Subject: Statistical evaluation (T-Test) regarding the MSAN MSX Short Dump LC7 (E216142) and 'LC7 alternate' sampling location.

The Mine Services Area North Pond (MSAN) System (identified in Section 1.4 of PE5353 (June 2015) is a series of three separate cells which are used to settle suspended sediment in mine impacted water from the MSAN Pit. Line Creek Operations plans to implement a mine optimization opportunity that involves backfilling of the MSAN Pit with a short dump (MSX Short Dump) which comprises approximately 7.1 Million BCM of waste rock. The runout zone of the Short Dump has the potential to limit access to the Pond System and therefore may limit Line Creek Operations ability to meet compliance monitoring obligations as specified within the permit, unless the sample can be obtained from within the safe zone.

Line Creek Operations propose that for the duration of the spoil development, that compliance samples will be obtained where possible at the current discharge location E216142 and when access is restricted, that sampling is obtained from the '*LC_7 alternate location*' (LC_LC7DSTF).

In support of the request to sample an alternate location, the water quality and physical characteristics at the MSAN Pond discharge (E216142 (LC_7)) and the '*LC_7 alternate location*' (LC_LC7DSTF) were compared. An evaluation of standard deviation and coefficient of variation were applied to the dataset and submitted to MOE on 5th October 2015, concluding that there was a low degree of variation between the datasets. Following review of this submission, the MOE requested (14th October, 2015) that additional statistical evaluation was conducted, to determine the significance of any difference between the datasets from the two locations.

A t-test statistical analysis was undertaken on the original MSAN Pond discharge (E216142 (LC_7)) and the *LC7_alternate* dataset, to verify the hypothesis that no significant difference exists between them. For the purpose of hypothesis testing, the following assumptions applied to the analysis:

- Both datasets exhibit a normal distribution with equal variance
- The direction of difference is unable to be determined (two-tailed test)
- Significance level (α) of 0.05, 95% confidence

1 - Navidi, William. *Statistics for Engineers and Scientists*. New York: McGraw-Hill, 2006.

Values below detection were not utilized to conduct the t-test analysis as their value is undeterminable and would misconstrue the normal distribution.

The t-test assesses whether the means of two groups are statistically different from each other. In order to conduct the t-test analysis, a P value (or t-value in some references) was calculated for the distributions of parameter values from the two locations, within the assessed dataset (Table 1). To determine the critical P-value (or critical t-value in some references), the degree of freedom was determined for each parameter, by summing the number of samples (N) from LC7 (n_1) and *LC7_alternate* (n_2) as follows:

$$N = n_1 + n_2$$
$$degree\ of\ freedom = N - 2$$

Once the degree of freedom and the significance level were identified, the critical P-value was determined from t-test tables[1]. The T-test identifies that, where the calculated P-value exceeds the critical P-value, the two datasets are deemed to be significantly different.

In this case, the t-test was applied to a dataset of 86 water quality analytes, sampled from both the MSAN Pond discharge (E216142 (LC_7)) and the *'LC_7 alternate'* location. The parameters tested are listed in Table 1 and included mining constituents of concern, anions and nutrients (eg. nitrate, nitrite, ammonia and sulphate), total and dissolved metals (eg. selenium and cadmium) and Total Suspended Solids, etc. Data was obtained on 46 sampling events at the MSAN Pond discharge (E216142 (LC_7)) and 16 sampling events at the *'LC_7 alternate location'* (LC_LC7DSTF), throughout 2013.

Although the degrees of freedom varied for each parameter, the calculated P-values of all analytes collectively ranged from 0.0175 to 0.998 and critical P-values collectively ranged from 2.021 to 4.303. In all cases the P-value was less than the corresponding critical P-value, which verifies acceptance of the hypothesis that no significant difference exists between the two datasets.

The findings of this statistical comparison of water quality at the MSAN pond discharge and the *'LC_7 alternate'* location support the initial hypothesis that the water quality ~400 m downstream of the current sampling location (in the safe sampling zone), is not markedly different than the MSAN Pond Outlet (LC_LC7). The t-test results align with the initial statistical evaluations (submitted to MOE on 5th October) which concluded that there was a low degree of variation between the datasets at each location. Both analyses support the LCO proposal to obtain representative compliance samples where safe to do so at the discharge location (E216142 (LC_7)) and when access is restricted due to safety concerns, that sampling is obtained from the *'LC_7 alternate'* location.

Should you have any questions or comments regarding this report, please feel free to contact Kevin Podrasky, Superintendent Environment, at 250-425-3169, or via email at Kevin.Podrasky@teck.com.

Kevin Podrasky
Superintendent Environment - Line Creek Operations

Table 1. T-Test results for *LC7_alternate* as compared to LC7 (E216142) for all analytes

Analyte	P-value	Sample Count (N)	Degree of Freedom (N-2)	Alpha	Critical P-Value	ACCEPT or REJECT Null Hypothesis
ALUMINUM (D)	0.574	16	14	0.05	2.145	ACCEPT
ALUMINUM (T)	0.831	37	35	0.05	2.042	ACCEPT
ANTIMONY (D)	0.315	37	35	0.05	2.042	ACCEPT
ANTIMONY (T)	0.345	37	35	0.05	2.042	ACCEPT
ARSENIC (D)	0.967	34	32	0.05	2.042	ACCEPT
ARSENIC (T)	0.902	37	35	0.05	2.042	ACCEPT
BARIUM (D)	0.958	37	35	0.05	2.042	ACCEPT
BARIUM (T)	0.818	37	35	0.05	2.042	ACCEPT
BERYLLIUM (D)		0	*	0.05		N/A
BERYLLIUM (T)	0.404	4	2	0.05	4.303	ACCEPT
BISMUTH (D)		0	*	0.05		N/A
BISMUTH (T)		0	*	0.05		N/A
BORON (D)	0.211	32	30	0.05	2.042	ACCEPT
BORON (T)	0.337	37	35	0.05	2.042	ACCEPT
BROMIDE (D)		0	*	0.05		N/A
CADMIUM (D)	0.548	37	35	0.05	2.042	ACCEPT
CADMIUM (T)	0.814	37	35	0.05	2.042	ACCEPT
CALCIUM (T)	0.486	38	36	0.05	2.042	ACCEPT
CARBON, DISSOLVED ORGANIC (D)	0.347	35	33	0.05	2.042	ACCEPT
CHLORIDE (D)	0.304	24	22	0.05	2.074	ACCEPT
CHLORIDE (N)		2	0	0.05		N/A
CHROMIUM (D)	0.782	20	18	0.05	2.101	ACCEPT
CHROMIUM (T)	0.796	37	35	0.05	2.042	ACCEPT
COBALT (D)	0.362	35	33	0.05	2.042	ACCEPT
COBALT (T)	0.697	37	35	0.05	2.042	ACCEPT
CONDUCTIVITY, FIELD (N)	0.216	38	36	0.05	2.042	ACCEPT
CONDUCTIVITY, LAB (N)	0.812	37	35	0.05	2.042	ACCEPT
COPPER (D)	0.220	15	13	0.05	2.16	ACCEPT
COPPER (T)	0.702	22	20	0.05	2.086	ACCEPT
DISSOLVED OXYGEN, FIELD (N)	0.134	38	36	0.05	2.042	ACCEPT
FLUORIDE (D)	0.933	32	30	0.05	2.042	ACCEPT
Hardness, Total or Dissolved CaCO3 (N)	0.998	38	36	0.05	2.042	ACCEPT
IRON (D)		0	*	0.05		N/A
IRON (T)	0.546	26	24	0.05	2.064	ACCEPT
LEAD (D)		0	*	0.05		N/A
LEAD (T)	0.676	24	22	0.05	2.074	ACCEPT
LITHIUM (D)	0.319	37	35	0.05	2.042	ACCEPT
LITHIUM (T)	0.506	37	35	0.05	2.042	ACCEPT
MAGNESIUM (T)	0.694	38	36	0.05	2.042	ACCEPT
MANGANESE (D)	0.223	37	35	0.05	2.042	ACCEPT

Analyte	P-value	Sample Count (N)	Degree of Freedom (N-2)	Alpha	Critical P-Value	ACCEPT or REJECT Null Hypothesis
MANGANESE (T)	0.967	37	35	0.05	2.042	ACCEPT
MERCURY (D)		0	*	0.05		N/A
MERCURY (T)		0	*	0.05		N/A
MOLYBDENUM (D)	0.226	37	35	0.05	2.042	ACCEPT
MOLYBDENUM (T)	0.346	37	35	0.05	2.042	ACCEPT
NICKEL (D)	0.436	37	35	0.05	2.042	ACCEPT
NICKEL (T)	0.593	37	35	0.05	2.042	ACCEPT
NITRATE NITROGEN (NO3), AS N (N)	0.659	38	36	0.05	2.042	ACCEPT
NITRITE NITROGEN (NO2), AS N (N)	0.278	35	33	0.05	2.042	ACCEPT
NITROGEN, AMMONIA (AS N) (N)	0.051	32	30	0.05	2.042	ACCEPT
NITROGEN, AMMONIA (AS N) (T)	0.757	5	3	0.05	3.182	ACCEPT
ORTHO-PHOSPHATE (D)		2	*	0.05		N/A
ORTHO-PHOSPHATE (N)	0.691	22	20	0.05	2.086	ACCEPT
pH, Field (N)	0.845	38	36	0.05	2.042	ACCEPT
pH, LAB (N)	0.035	38	36	0.05	2.042	ACCEPT
PHOSPHORUS (N)	0.409	7	5	0.05	2.571	ACCEPT
PHOSPHORUS (T)	0.933	18	16	0.05	2.12	ACCEPT
POTASSIUM (T)	0.319	15	13	0.05	2.16	ACCEPT
SELENIUM (D)	0.556	37	35	0.05	2.042	ACCEPT
SELENIUM (T)	0.574	37	35	0.05	2.042	ACCEPT
SILVER (D)		0	*	0.05		N/A
SILVER (T)	0.804	10	8	0.05	2.306	ACCEPT
SODIUM (T)	0.525	33	31	0.05	2.042	ACCEPT
STRONTIUM (D)	0.399	37	35	0.05	2.042	ACCEPT
STRONTIUM (T)	0.244	37	35	0.05	2.042	ACCEPT
SULFATE (AS SO4) (D)	0.571	38	36	0.05	2.042	ACCEPT
TEMPERATURE, FIELD (N)	0.288	38	36	0.05	2.042	ACCEPT
THALLIUM (D)	0.671	13	11	0.05	2.201	ACCEPT
THALLIUM (T)	0.929	18	16	0.05	2.12	ACCEPT
TIN (D)		0	*	0.05		ACCEPT
TIN (T)		0	*	0.05		ACCEPT
TITANIUM (D)		2	0	0.05		N/A
TITANIUM (T)	0.679	14	12	0.05	2.179	ACCEPT
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	0.834	31	29	0.05	2.043	ACCEPT
TOTAL KJELDAHL NITROGEN (N)	0.322	34	32	0.05	2.042	ACCEPT

Analyte	P-value	Sample Count (N)	Degree of Freedom (N-2)	Alpha	Critical P-Value	ACCEPT or REJECT Null Hypothesis
TOTAL ORGANIC CARBON (T)	0.934	36	34	0.05	2.042	ACCEPT
TOTAL SUSPENDED SOLIDS, LAB (T)		1	*	0.05		ACCEPT
TURBIDITY, LAB (N)	0.548	57	55	0.05	2.021	ACCEPT
URANIUM (D)	0.542	37	35	0.05	2.042	ACCEPT
URANIUM (T)	0.664	37	35	0.05	2.042	ACCEPT
VANADIUM (D)		0	*	0.05		N/A
VANADIUM (T)	0.470	9	7	0.05	2.635	ACCEPT
ZINC (D)	0.017	25	23	0.05	2.069	ACCEPT
ZINC (T)	0.530	33	31	0.05	2.042	ACCEPT

* All sample results remained below detection limits for both sample locations

Analyte	P-value	Sample Count	Degree of Freedom	Alpha	Critical P-Value	ACCEPT/REJECT Null Hypothesis
ALUMINUM (D)	0.375	38	36	0.05	2.042	ACCEPT
ALUMINUM (T)	0.795	60	58	0.05	2.021	ACCEPT
ANTIMONY (D)	0.972	60	58	0.05	2.021	ACCEPT
ANTIMONY (T)	0.994	60	58	0.05	2.021	ACCEPT
ARSENIC (D)	0.813	57	55	0.05	2.021	ACCEPT
ARSENIC (T)	0.770	60	58	0.05	2.021	ACCEPT
BARIUM (D)	0.459	60	58	0.05	2.021	ACCEPT
BARIUM (T)	0.560	60	58	0.05	2.021	ACCEPT
BERYLLIUM (D)	0.886	28	26	0.05	2.056	ACCEPT
BERYLLIUM (T)	0.895	32	30	0.05	2.042	ACCEPT
BISMUTH (D)	*					
BISMUTH (T)	*					
BORON (D)	1.000	56	54	0.05	2.021	ACCEPT
BORON (T)	0.977	60	58	0.05	2.021	ACCEPT
CADMIUM (D)	0.992	60	58	0.05	2.021	ACCEPT
CADMIUM (T)	0.949	60	58	0.05	2.021	ACCEPT
CALCIUM	0.839	24	22	0.05	2.074	ACCEPT
CALCIUM (T)	0.834	60	58	0.05	2.021	ACCEPT
CARBON, DISSOLVED ORGANIC (D)	0.505	58	56	0.05	2.021	ACCEPT
CHROMIUM (D)	0.741	48	46	0.05	2.021	ACCEPT
CHROMIUM (T)	0.823	49	47	0.05	2.021	ACCEPT
COBALT (D)	0.939	58	56	0.05	2.021	ACCEPT
COBALT (T)	0.928	60	58	0.05	2.021	ACCEPT
CONDUCTIVITY, LAB (N)	0.988	60	58	0.05	2.021	ACCEPT
COPPER (D)	0.680	39	37	0.05	2.042	ACCEPT
COPPER (T)	0.681	45	43	0.05	2.021	ACCEPT
DISSOLVED OXYGEN, FIELD (N)	0.223	57	55	0.05	2.021	ACCEPT
FLUORIDE (D)	0.438	54	52	0.05	2.021	ACCEPT
Hardness, Total or Dissolved CaCO3 (N)	0.995	60	58	0.05	2.021	ACCEPT
IRON (T)	0.939	49	47	0.05	2.021	ACCEPT
LEAD (D)	0.345	27	25	0.05	2.06	ACCEPT
LEAD (T)	0.803	45	43	0.05	2.021	ACCEPT
LITHIUM (D)	0.823	60	58	0.05	2.021	ACCEPT
LITHIUM (T)	0.967	60	58	0.05	2.021	ACCEPT
MAGNESIUM (D)	0.992	60	58	0.05	2.021	ACCEPT
MAGNESIUM (T)	0.967	60	58	0.05	2.021	ACCEPT
MANGANESE (D)	0.934	60	58	0.05	2.021	ACCEPT
MANGANESE (T)	0.377	60	58	0.05	2.021	ACCEPT
MERCURY (D)	*					
MERCURY (T)	0.409	16	14	0.05	2.145	ACCEPT
MOLYBDENUM (T)	0.759	58	56	0.05	2.021	ACCEPT
NICKEL (T)	0.944	60	58	0.05	2.021	ACCEPT
NITRATE NITROGEN (NO3), AS N (N)	0.979	60	58	0.05	2.021	ACCEPT
NITRITE NITROGEN (NO2), AS N (N)	0.837	58	56	0.05	2.021	ACCEPT
NITROGEN, AMMONIA (AS N) (N)	0.581	53	51	0.05	2.021	ACCEPT
ORTHO-PHOSPHATE (N)	0.689	47	45	0.05	2.021	ACCEPT
pH, Field (N)	0.810	57	55	0.05	2.021	ACCEPT
pH, LAB (N)	0.043	60	58	0.05	2.021	ACCEPT
Potassium	0.456	24	22	0.05	2.074	ACCEPT
POTASSIUM (T)	0.801	41	39	0.05	2.042	ACCEPT
SELENIUM (D)	0.969	60	58	0.05	2.021	ACCEPT
SELENIUM (T)	0.994	60	58	0.05	2.021	ACCEPT
SILICON	0.430	24	22	0.05	2.074	ACCEPT
SILICON	0.968	24	22	0.05	2.074	ACCEPT
SILVER (D)	*					
SILVER (T)	0.942	33	31	0.05	2.042	ACCEPT
SODIUM	0.710	26	24	0.05	2.064	ACCEPT
STRONTIUM (D)	0.973	60	58	0.05	2.021	ACCEPT
STRONTIUM (T)	0.787	60	58	0.05	2.021	ACCEPT
SULFATE (AS SO4) (D)	0.891	60	58	0.05	2.021	ACCEPT
TEMPERATURE, FIELD (N)	0.672	55	53	0.05	2.021	ACCEPT
THALLIUM (D)	0.343	35	33	0.05	2.042	ACCEPT
THALLIUM (T)	0.922	39	37	0.05	2.042	ACCEPT
The sum of extractable petroleum hydrocarbons C	1.000	24	22	0.05	2.074	ACCEPT
TIN (D)	0.327	26	24	0.05	2.064	ACCEPT
TIN (T)	1.000	28	26	0.05	2.056	ACCEPT
TITANIUM (D)	0.849	30	28	0.05	2.048	ACCEPT
TITANIUM (T)	0.873	38	36	0.05	2.042	ACCEPT
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABL	0.828	54	52	0.05	2.021	ACCEPT
TOTAL KJELDAHL NITROGEN (N)	0.215	55	53	0.05	2.021	ACCEPT
TOTAL ORGANIC CARBON (T)	0.886	58	56	0.05	2.021	ACCEPT
TOTAL SUSPENDED SOLIDS, LAB (T)	0.459	29	27	0.05	2.052	ACCEPT
TURBIDITY, LAB (N)	0.960	60	58	0.05	2.021	ACCEPT
URANIUM (D)	0.979	60	58	0.05	2.021	ACCEPT
URANIUM (T)	0.883	60	58	0.05	2.021	ACCEPT
VANADIUM (D)	0.421	28	26	0.05	2.056	ACCEPT
VANADIUM (T)	0.950	36	34	0.05	2.042	ACCEPT
ZINC (D)	0.319	51	49	0.05	2.021	ACCEPT
ZINC (T)	0.951	57	55	0.05	2.021	ACCEPT

*All sample results remained below detection limits for both sample locations.

9.11 Appendix K – 2022 ERX Data Compared Against B.C. Water Quality Guidelines for Wildlife

Sample Site	Sample Date	Chemical Name	Reporting Detection Limit	Result Units	BCWQG for Protection of Wildlife*	DISSOLVED Results	N/A Results	TOTAL Results
LC_ERX	6/16/2022	ALUMINUM	0.0010	mg/l		0.0034		
LC_ERX	6/16/2022	ALUMINUM	0.0030	mg/l	**5**			0.0140
LC_ERX	6/16/2022	ARSENIC	0.00010	mg/l	**0.025**	0.00029		0.00030
LC_ERX	6/16/2022	BORON	0.010	mg/l	**5**	0.088		0.080
LC_ERX	6/16/2022	CHLORIDE	0.50	mg/l	**600**	415		
LC_ERX	6/16/2022	COPPER	0.00020	mg/l		0.00231		
LC_ERX	6/16/2022	COPPER	0.00050	mg/l	**300**			0.00086
LC_ERX	6/16/2022	FLUORIDE	0.100	mg/l	**1.0**		0.143	
LC_ERX	6/16/2022	LEAD	0.000050	mg/l	**0.00005**	< 0.000050		< 0.000050
LC_ERX	6/16/2022	MOLYBDENUM	0.000050	mg/l	**0.00005**	0.0456		0.00981
LC_ERX	6/16/2022	NITRATE NITROGEN (NO3), AS N	0.0250	mg/l	**100**		2.02	
LC_ERX	6/16/2022	NITRITE NITROGEN (NO2), AS N	0.0050	mg/l	**100**		0.0424	
LC_ERX	6/16/2022	NITROGEN, AMMONIA (AS N)	0.0050	mg/l	**100**			0.0956
LC_ERX	6/16/2022	SELENIUM	0.050	ug/l	**2**	3.58		3.64
LC_ERX	9/16/2022	ALUMINUM	0.0020	mg/l		< 0.0020		
LC_ERX	9/16/2022	ALUMINUM	0.0060	mg/l	**5**			< 0.0060
LC_ERX	9/16/2022	ARSENIC	0.00020	mg/l	**0.025**	0.00025		0.00027
LC_ERX	9/16/2022	BORON	0.020	mg/l	**5**	0.086		0.095
LC_ERX	9/16/2022	CHLORIDE	0.50	mg/l	**600**	279		
LC_ERX	9/16/2022	COPPER	0.00040	mg/l		0.00066		
LC_ERX	9/16/2022	COPPER	0.00100	mg/l	**300**			< 0.00100
LC_ERX	9/16/2022	FLUORIDE	0.100	mg/l	**1.0**		0.190	
LC_ERX	9/16/2022	LEAD	0.000100	mg/l	**0.00005**	< 0.000100		< 0.000100
LC_ERX	9/16/2022	MOLYBDENUM	0.000100	mg/l	**0.00005**	0.00794		0.00809
LC_ERX	9/16/2022	NITRATE NITROGEN (NO3), AS N	0.0250	mg/l	**100**		0.877	
LC_ERX	9/16/2022	NITRITE NITROGEN (NO2), AS N	0.0050	mg/l	**100**		0.0147	
LC_ERX	9/16/2022	NITROGEN, AMMONIA (AS N)	0.0250	mg/l	**100**			0.674
LC_ERX	9/16/2022	SELENIUM	0.100	ug/l	**2**	1.39		1.22

9.12 Appendix L – 2022 TSS Determination Report

Total Suspended Solids Determination Method- Updated Report

March 31, 2023

Teck

Introduction

This report is submitted to satisfy additional and amended conditions related to the Total Suspended Solids Determination Method. The original report was submitted by Teck Coal Limited, Line Creek Operations (LCO) to the British Columbia Ministry of Environment and Climate Change Strategy (ENV) on January 22, 2015, as required by Section 2.3 of Permit PE-5353 and Section 4.6 of Permit PE-106907. It was accepted by Ministry of Environment and Climate Change Strategy (ENV) on May 1, 2015, based on some additional conditions. Further discussion and correspondence regarding these conditions occurred throughout 2015. On November 16, 2015, ENV amended condition 5 of the May 1, 2015, letter.

Amended approval condition 5 from the ENV letter dated November 16, 2015, states:

> *Teck LCO must provide an updated report following the completion of the 2015 field season. Report to be provided by February 29th, 2016. All field monitoring data collected for the TSS/Turbidity correlation can be submitted together in one submission with the updated report. The updated report must include the following.*
>
> - *Measured field turbidity values (2015 data) plotted against estimated TSS value from the provided linear correlations (data from 2012-2014).*
> - *Measured field turbidity values plotted against lab TSS values (2015 lab results),*
> - *Where available, flow data should be plotted against measured field turbidity values (measurements must be taken on the same day),*
> - *Updated TSS/turbidity linear correlations including all data from 2012 to the end of 2015,*
> - *Proposal for refined turbidity triggers for sampling of TSS based on the linear relationships of the outlet-only data.*

An updated report was submitted to ENV on February 29, 2016, to satisfy the above conditions. On July 7, 2016, the ENV provided an assessment of the approach; there were some additional questions but stated "this is a well-defined approach to guide additional field data collection needs" and encouraged Teck to "continue collecting the required field data needed to improve all the correlation curves and strengthen confidence in the trigger values".

On October 29, 2018, ENV provided a letter approving the proposed TSS Determination Method for West Line Creek Active Water Treatment Facility. In addition, an amendment to Section 2.3 of Permit 5353 was implemented that clarified some of the wording and requirements.

As of July 22, 2021, the permit conditions and requirements previously specified under EMA Permit 106970 (with respect to TSS sampling and determination method), have been moved to Permit 5353, which now includes the Dry Creek drainage.

Table 1 – History of TSS determination submissions and approvals

Date of Submission	Submission Title	Due Date	Authorization
January 22, 2015	Total Suspended Solids Determination Method		PE 5353 & 106970
November 24, 2015	Summary Update of LCO Actions Taken in 2015 related to the TSS/Turbidity Determination Methodology	December 1, 2015	May 1, 2015 & November 16, 2015, Approval Letters
February 29, 2016	Total Suspended Solids Determination Method – Updated Report	February 29, 2016	November 16, 2015, Approval Letter
March 31, 2017	Total Suspended Solids Determination Method – Updated Report	March 31, 2017 (submitted with annual reports for Permit 5353 and 106970)	None received
April 30, 2018	Total Suspended Solids Determination Method – Updated Report	March 31, 2018 (submitted with Q1 2018 Elk Valley Regional Water Quality Report)	October 29, 2018, Approval Letter
March 30, 2019	Total Suspended Solids Determination Method – Updated Report	March 31, 2019 (submitted with annual reports for Permit 5353 and 106970)	None received
March 31, 2020	Total Suspended Solids Determination Method – Updated Report	March 31, 2020 (submitted with annual reports for Permit 5353 and 106970)	None received
March 31, 2021	Total Suspended Solids Determination Method – Updated Report	March 31, 2021 (submitted with annual report for Permit 5353 and 106970)	None received
March 31, 2022	Total Suspended Solids Determination Method – Updated Report	March 31, 2022 (submitted with annual report for Permit 5353)	None received

This report updates previously submitted correlations with 2022 data. The authorized discharges addressed in this report are listed in Table 2.

Table 2 – Authorized discharge monitoring locations with TSS-Turbidity correlations

Permit	ENV EMS Number	LCO Station Code	Location Description
PE-5353	E216144	LC_LC7	Discharge of effluent from a spillway from MSA North Ponds to Line Creek
PE-5353	E219411	LC_LC8	Discharge of effluent from a Contingency Treatment System to Line Creek

Permit	ENV EMS Number	LCO Station Code	Location Description
PE-5353	E221268	LC_LC9	Discharge of effluent from a spillway from the No Name Creek Diversion and Sediment Pond to the Line Creek Rock Drain
PE-5353	E308147	LC_HSP	Discharge of stored pit water from Horseshoe Pit
PE-5353	E295211	LC_SPDC	Discharge of effluent from a return channel from the Dry Creek Sedimentation Ponds to Dry Creek

Those locations that have not had correlations developed are listed in the Teck letter dated January 22, 2015, including the rationale for each site. The exception is location E308146 (LC_HSP), which has been included in this report since the 2020 reporting year. Discharge of stored pit water from HSP is from an inactive pit (Horseshoe Ridge Pit) that is pumped to the Line Creek rock drain via pumps and pipeline and is managed in accordance with the Horseshoe Ridge Pit (HSP) Dewatering Plan. Turbidity monitoring and sampling for TSS will continue to be conducted throughout 2023 to continue to develop the TSS determinations from field turbidity at these locations where possible.

Methodology

Discussion with ENV resulted in minor changes to the methodology used in the original TSS Determination Method, submitted 22nd January 2015. The below updated methodology was submitted to ENV February 29, 2016.

All field turbidity results are paired with the corresponding lab TSS value taken on the same date and time. Any field reading not accompanied by a lab TSS result is omitted from the analyses. In addition, field results above the turbidity meter's capability (3000 NTU for the currently used meter; 1000 FNU for an older turbidity meter. Note that NTU and FNU are equivalent units) are omitted. Field duplicate results are not included in the correlation. Non-detect lab results are taken at the method detection limit (for example, a lab TSS result of <1 mg/L TSS is taken as 1 mg/L) to allow for statistical analysis and graphing.

Corresponding data sets are graphed, and a linear correlation is established. As a linear function is used, the equation is:

y = ax + b

where:

y is a functional variable of x, and is the field inferred TSS value
x is the measured field turbidity
a and **b** are equation coefficients determined by plotting site-specific datasets; **a** is the slope of the line and **b** is the y-intercept

For the purpose of this methodology, linear correlations with a coefficient of determination $R^2 \geq 0.7$ are considered to be strong correlations. Any value below 0.7 is considered to be a weak correlation.

Analysis

Development of New Correlations for Pre-settled Inflows

Correlations for authorized discharges were submitted January 22, 2015. New correlations for pre-settled inflows to Authorized Discharges (ponds) were submitted February 29, 2016, in the updated report. Samples at pre-settled inflow locations were monitored in the field for turbidity and sampled for laboratory analysis of TSS in 2016 as possible. However, there was no inflow into the No Name Creek Pond during 2016 and limited access to the MSA North Ponds due to the short dump project in MSX pit.

The next five numbered sections of this report are in response to the list of five items (under Amended Approval Condition #5) which the November 16, 2015, ENV letter indicates must be included, and have been amended to incorporate comparison of 2022 data.

1. Field Turbidity Values (2022 data) and Estimated TSS Values from the provided Linear Correlations

Correlations for authorized discharges were submitted March 31, 2022, including for the locations summarized in Table 3. Data from 2017 to 2022 was omitted for MSA North Ponds to improve the correlation (R^2). Data from 2022 had minor reduction the correlation for Dry Creek Settling Ponds by further developing the TSS/Turbidity dataset (n=56) over the multi-year record (2015-2022). No update to the correlation occurred for the Contingency Treatment System and No Name Creek Pond as it was not utilized in 2018-2021 and did not discharge in 2022 (no data).

Table 3 – Previous year's (2021) TSS-Turbidity linear correlations

Location	MOE EMS Number	Teck Station Code	Coefficient of Determination (R^2)	Linear Function Equation
MSA North Ponds Effluent to Line Creek	E216144	LC_LC7	0.9525	TSS-F = 0.3988*(Turb-F) + 1.0126
Contingency Treatment System Effluent to Line Creek	E219411	LC_LC8	0.8454	TSS-F = 1.5837*(Turb-F) + 8.4018
No Name Pond Effluent to Line Creek	E221268	LC_LC9	0.7296	TSS-F = 0.2936*(Turb-F) + 3.23
Dry Creek Sedimentation Ponds Effluent to Dry Creek[1]	E295211	LC_SPDC	0.7449	TSS-F = 0.2882*(Turb-F) + 1.4625
Discharge from Horseshoe Ridge Pit[2]	E308146	LC_HSP	0.187 (very weak)	Refer to HSP Dewatering Plan TARP

1. Not in operation in 2014; no 2012 – 2014 data
2. No previous correlation developed for E308147.

Where:

TSS-F is the inferred field total suspended solids.

Turb-F is the turbidity as measured in the field.

Figures 1 through 5 show 2022 field turbidity data plotted to estimate TSS values based on the correlations from the previous year (Table 3). In situations where the measured range of field turbidity values was limited (all values below 15 NTU), the correlation linear function may cross the x-axis; TSS values cannot actually be lower than zero. At the point where the line crosses the x-axis is assumed to be where TSS would be below method detection limits.

As noted in the 2021 TSS Determination Report from March 2022, the equation provided in Table 3 for the MSA North Ponds (E216144) references the 2016 TSS/Turbidity correlation as it was deemed a stronger correlation and had a more protective reportable trigger value (compared to the correlation based on 2017-2020 data). Inlet data for the MSA North Ponds (E216144) is limited from 2017 to 2021 due to access safety restrictions (MSX Short Dump).

The Contingency Treatment System (E219411) was not utilized from 2017 to 2022 and did not discharge during that period. In the 2018 Determination Report (March 2019), the correlation for E219411 was updated to include data from the 2017 effluent spike testing, which improved the correlation at this location.

Additionally, No Name Creek Pond (E221268) did not discharge in 2015, 2016, and 2019-2022, but did discharge for a short period in 2017 (March 16 – April 5) and 2018 (March 12 – March 28). Therefore, the inferred TSS values used field turbidity values collected in 2017/2018 for those periods and are provided in Figure 3.

For Dry Creek Sedimentation Ponds (E295211), TSS was inferred using the 2020 correlation equation, and plotted against 2022 field turbidity (Figure 4). The resulting linear trend shows a much stronger correlation ($R^2 \geq 0.7$) compared to previous years. It is expected that this correlation should continue to improve as future data is incorporated and the equation is updated.

Horseshoe Ridge Pit or HSP (E308146) was not included in previous reports and therefore no TSS-turbidity correlation exists. EMA Permit 5353 (August 12, 2019) includes an amendment to Section 2.3 which states:

> "T*he Permittee must develop and validate, at a minimum, on an annual basis, a method for field determination of total suspended solids (TSS) value and procedures for additional TSS sampling for discharges referenced in Section 1 of this permit and any effluent discharge to surface water from the mine property*".

To comply with this condition, HSP was included in last years report (March 2021) based on 2020 data. However, the correlation was very weak (as shown in Table 3), likely due to the lack of TSS concentrations above 30 mg/L and field turbidity readings above 35 NTU. This was attributed to the depth of water typically present in HSP and the residence time between inflow of the majority of water to the pit (May – June) and the historical timing of discharge (September to April). For completeness, TSS was inferred using the 2020 correlation equation and plotted against 2021 turbidity (Figure 5).

Figures 6 through 10 show the actual 2022 Lab TSS results against the field turbidity results. The figures show several values equal to 1 mg/L TSS, the lab method detection limit (MDL). As stated in the 2015 methodology (Section 2.2) lab results below detection are used in the correlation as values equal to the MDL. Negative results in are assumed to be values below detection limits.

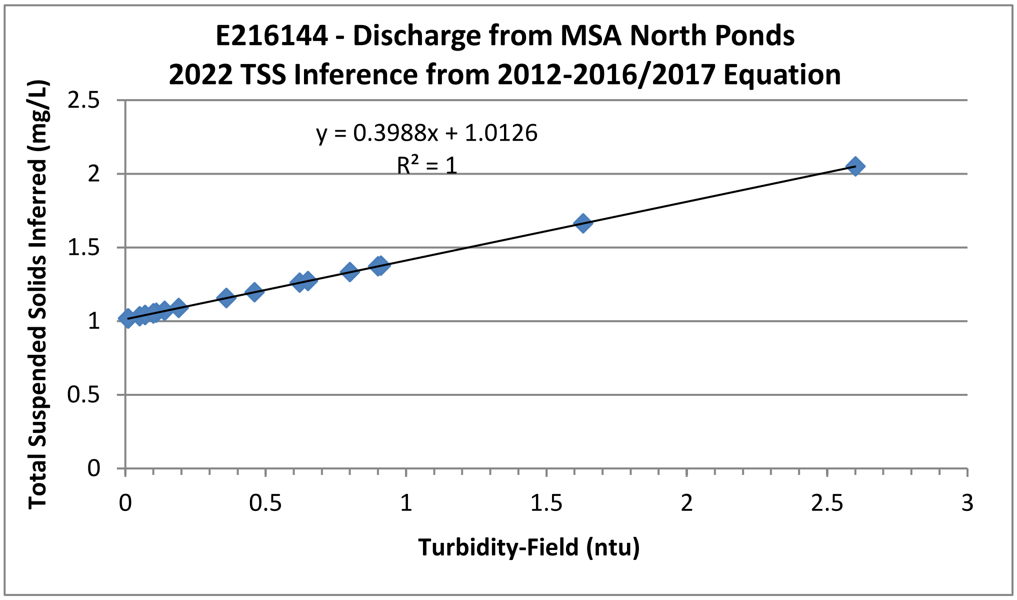

Figure 1 – E216144 – 2022 TSS Inference from 2012-2016 TSS/Turbidity Curve

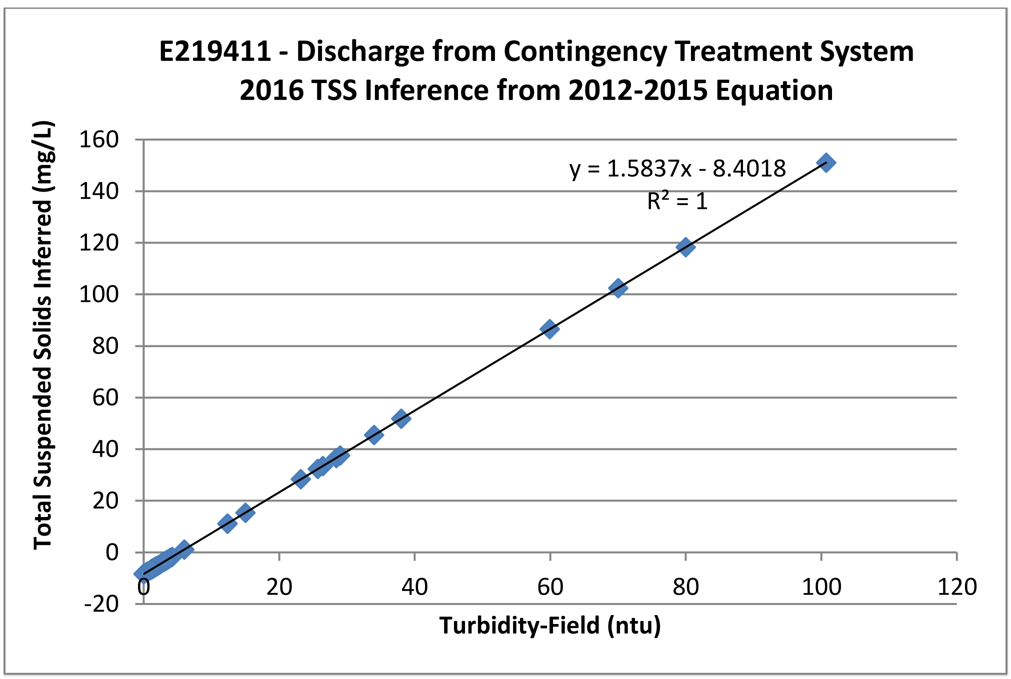

Figure 2 – E219411 – 2016 TSS Inference from 2012-2014 TSS/Turbidity Curve (Not updated from March 2022 report as no discharge in 2022)

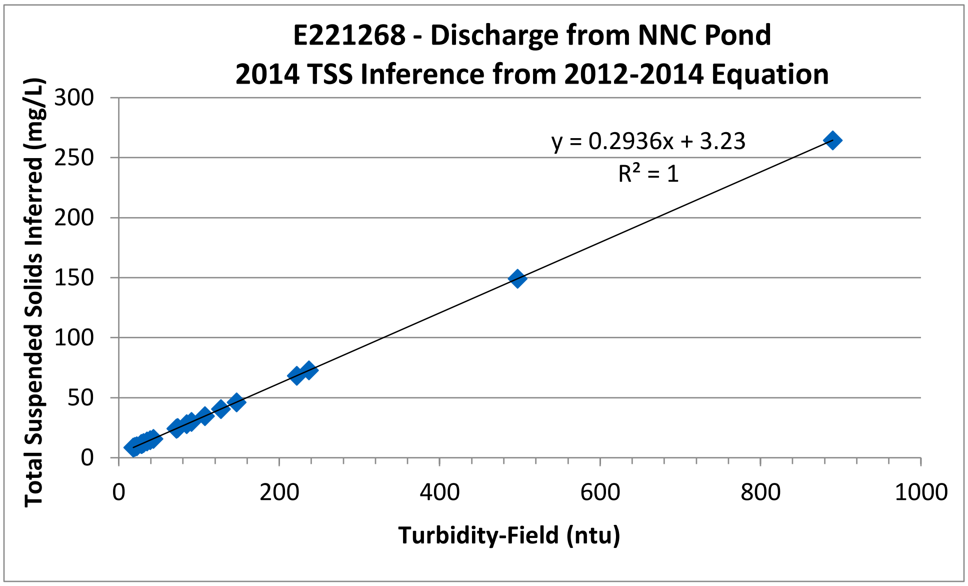

Figure 3 – E2212681 – 2018 TSS Inference from 2014 TSS/Turbidity Curve (Not updated from March 2022 report as no discharge in 2022)

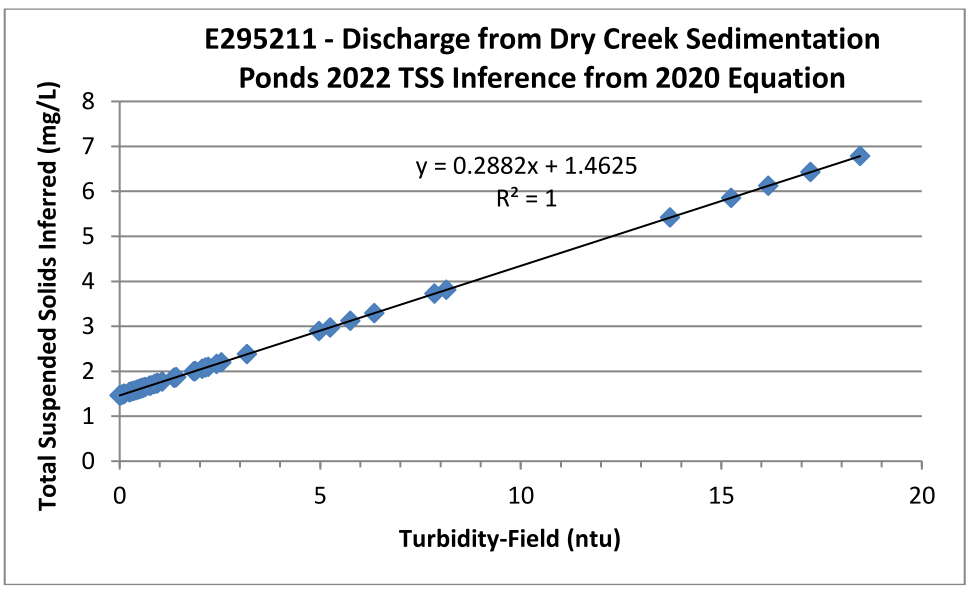

Figure 4 – E295211 – 2022 TSS Inference from 2020 TSS/Turbidity Curve

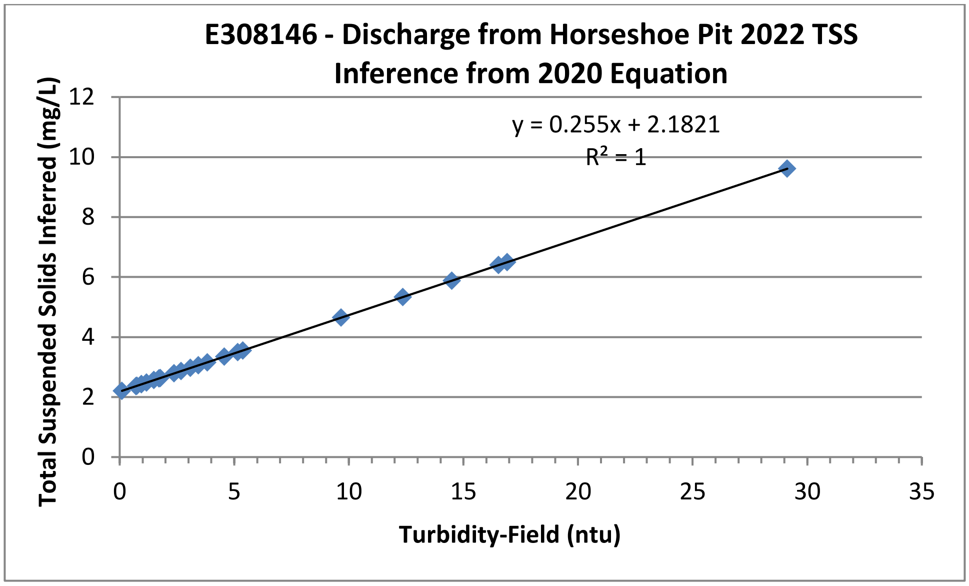

Figure 5 – E308146 – 2022 TSS Inference from 2020 TSS/Turbidity Curve

2. Field Turbidity Values and Laboratory TSS Values (2022 Lab Results)

Field turbidity values were measured in 2022, along with collection of samples for laboratory analysis of TSS, at four locations: E216144 (discharge from MSA North Ponds), the inflow to the Contingency Treatment System, E295211 (discharge from the Dry Creek Sedimentation Ponds), and E308146 (discharge of stored pit water from the Horseshoe Pit). The inflow to the Contingency Ponds is provided although flow was not diverted into the ponds in 2022. E219411 (discharge from the Contingency Treatment System) and E221268 (discharge from the No Name Creek Ponds) did not discharge in 2022. See Figures 7 to 11 below. There is limited 2022 data for inflows to the MSA North Ponds, as operational mining upstream up these ponds had been reduced. Additionally, downstream monitoring in 2022 did not show results that indicate need for increases to inflow data collection. As there was no discharge from the No Name Creek Ponds in 2022, there was no 2022 data was available for analysis. Graphs are not provided for these locations because of the limited data set.

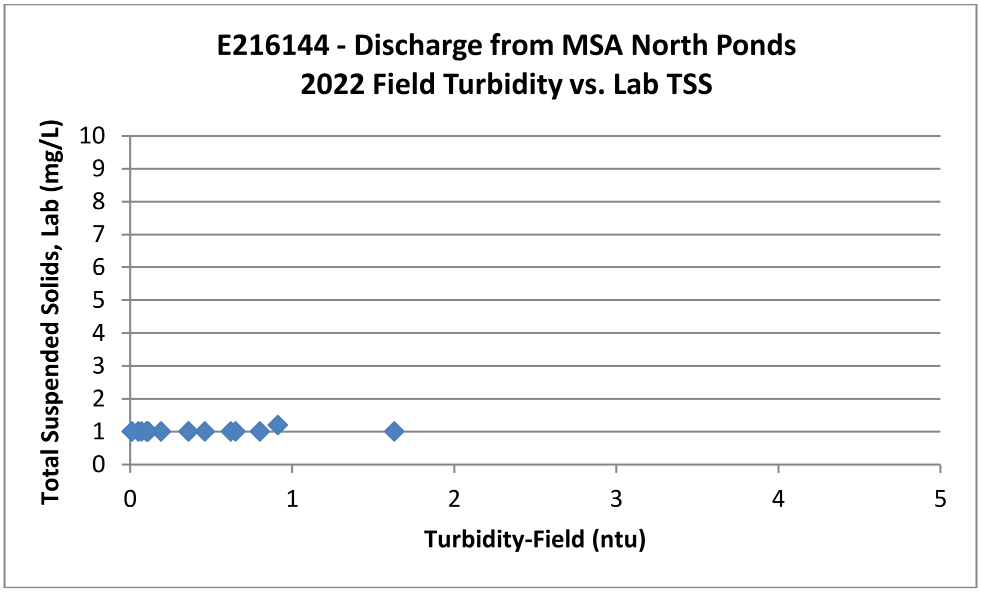

Figure 6 – E216144 – 2022 Field Turbidity versus Lab TSS

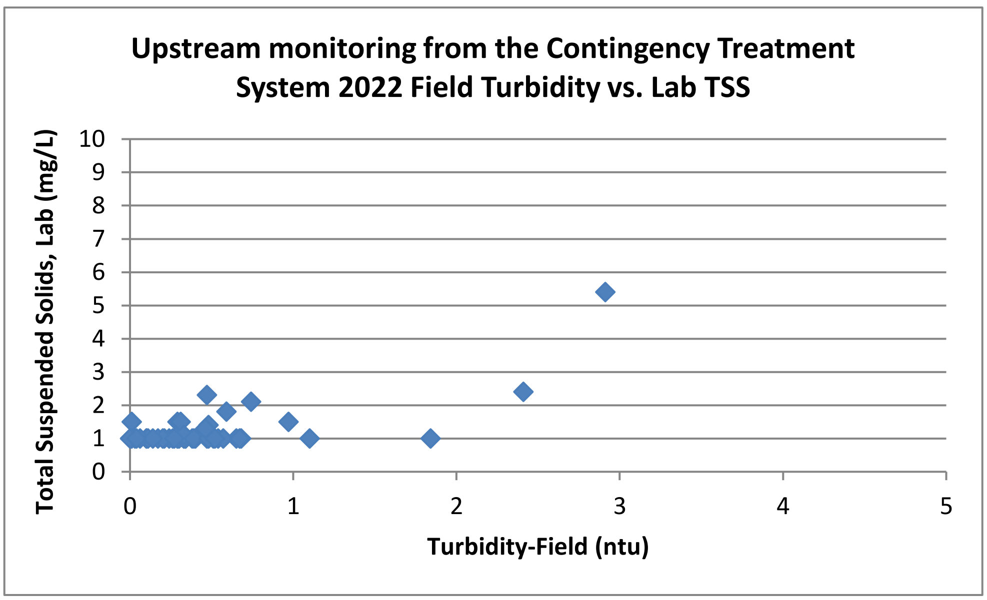

Figure 7 –Upstream monitoring of the Contingency Treatment System – 2022 Field Turbidity versus Lab TSS

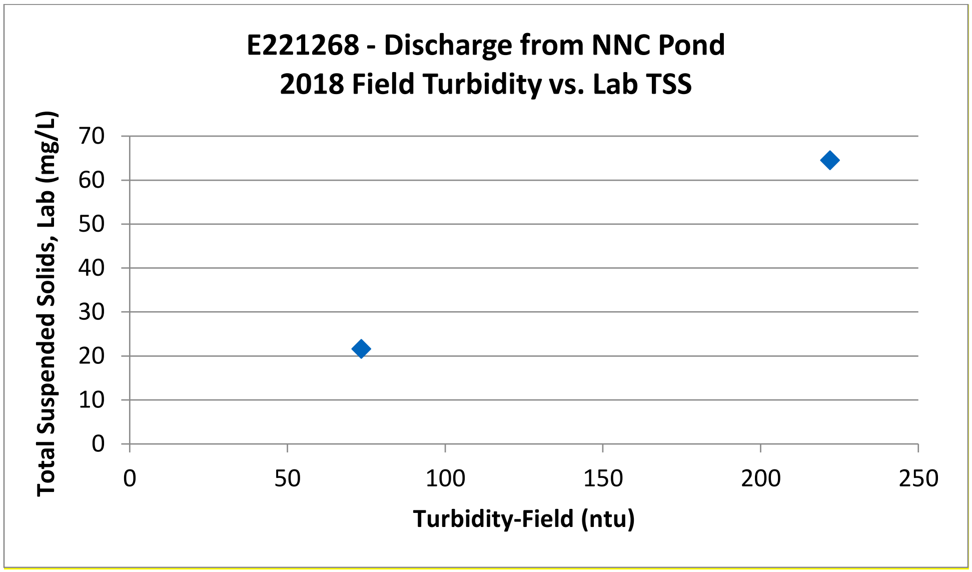

Figure 8 – E221268 – 2018 Field Turbidity versus Lab TSS – No data from 2019 -2022

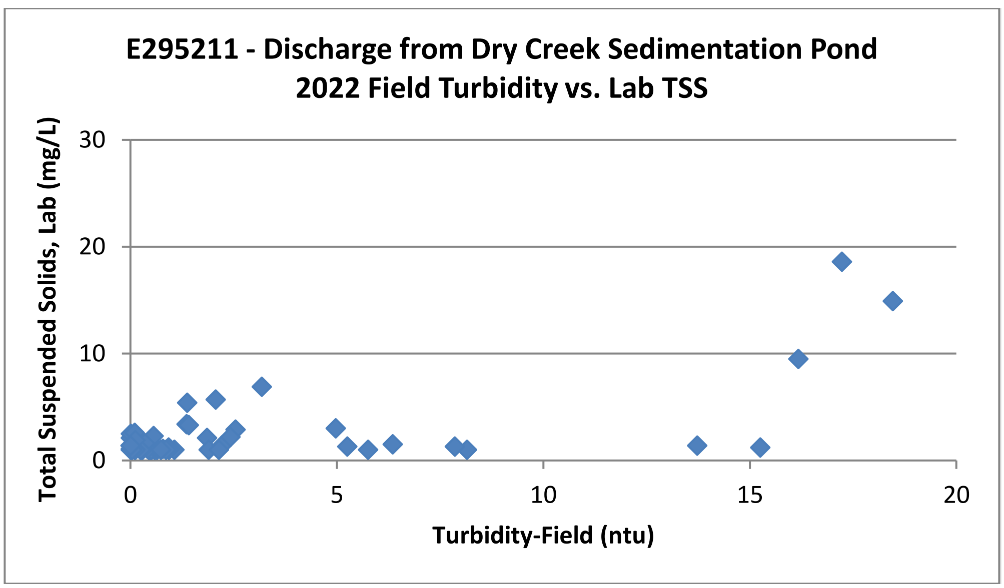

Figure 9 – E295211 – 2022 Field Turbidity versus Lab TSS

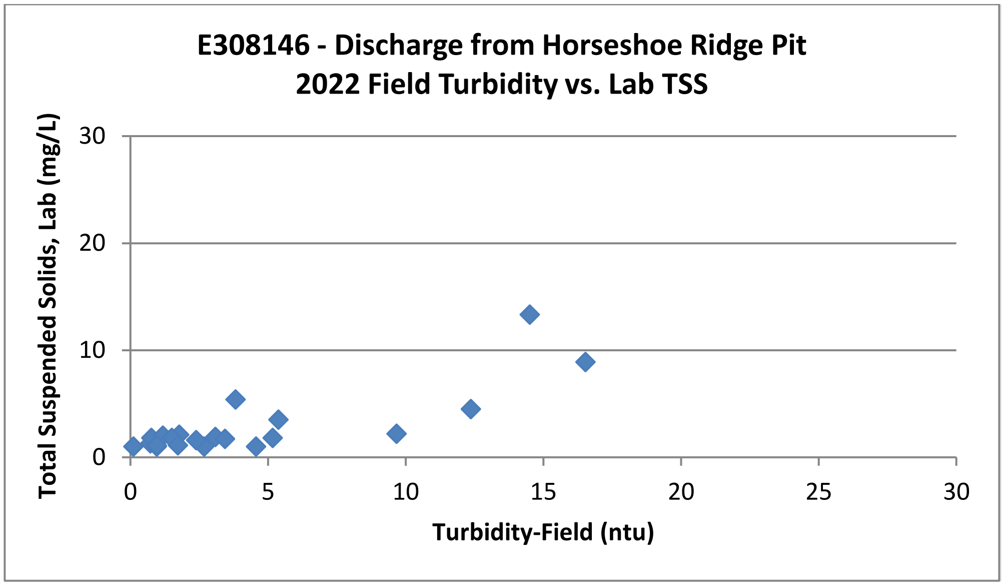

Figure 10 – E308146 –2022 Field Turbidity versus Lab TSS

3. Flow Data and Field Turbidity

Where possible, flow results were plotted with field turbidity measurements.

MSA NORTH PONDS (E216144) (LC7)

Flow numbers at the MSA North Ponds are based on a weir formula stage-discharge-relationship (SDR). The SDR only applies to the authorized discharge point of the MSA North Ponds. Due to a slough in 2012, the MSA North Ponds currently treat water from two inflows. Flow values for these inflows have not been measured and are therefore, not compared to field turbidity results. Figure 11 shows calculated flow results as compared to measured field turbidity measurements taken on the same day.

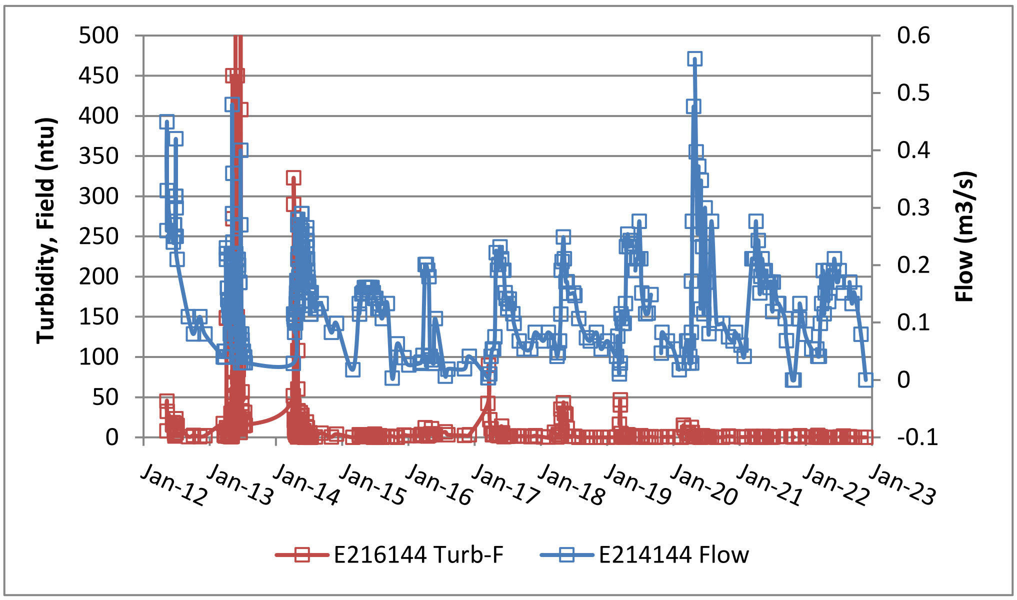

Figure 11 – E216144 (LC7) – Flow to Field Turbidity Comparison

CONTINGENCY TREATMENT SYSTEM PONDS (E219411) (LC8)

Flow numbers at the Contingency Pond outlet are based on a weir formula SDR. The SDR only applies to the authorized discharge point of the Contingency Ponds. Inlet flow data is obtained from a continuous flow monitoring station located upstream at Line Creek downstream of West Line Creek (EMS 0200337) (LC_LC3). Figure 12 and Figure 13 shows flow results as compared to field turbidity measurements taken on the same day.

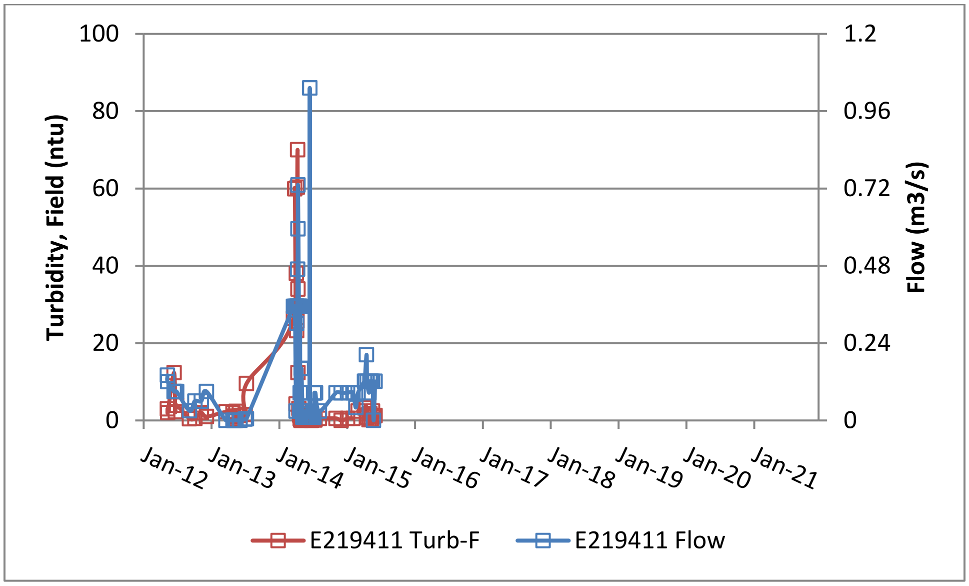

Figure 12 – E219411 (LC8) – Flow to Field Turbidity Comparison

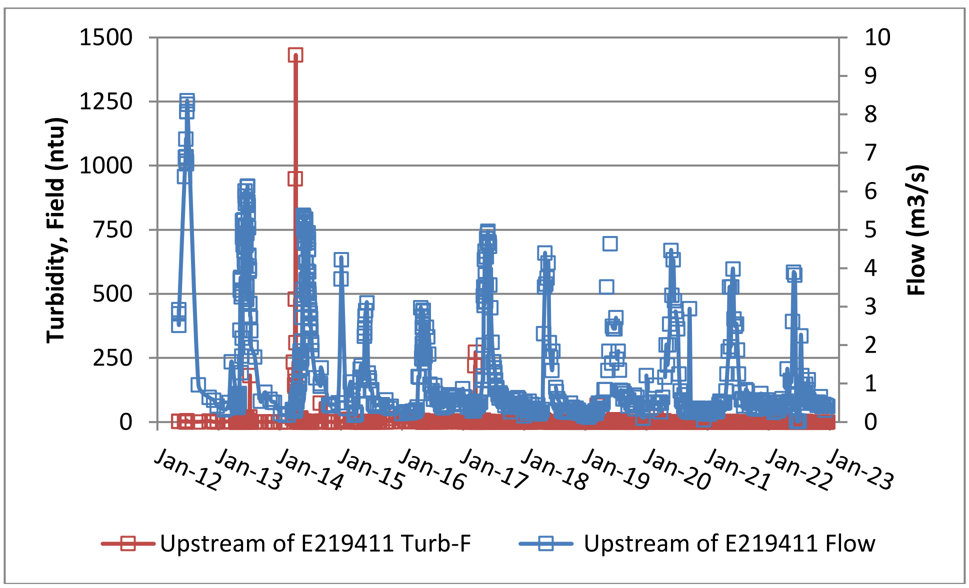

Figure 13 – Upstream monitoring of Contingency Treatment System – Flow to Field Turbidity Comparison

NO NAME CREEK PONDS (E221268)

Flow numbers at No Name Creek Pond outlet are based on manual flow measurements. Inlet flow data for the No Name Creek Ponds was based on a continuous flow monitoring location. This location was decommissioned in 2013 and only provides a limited dataset. E221268 (LC9) did not discharge in 2022. Figure 14 and 15 shows flow results as compared to the field turbidity measurements taken on the same day in previous years.

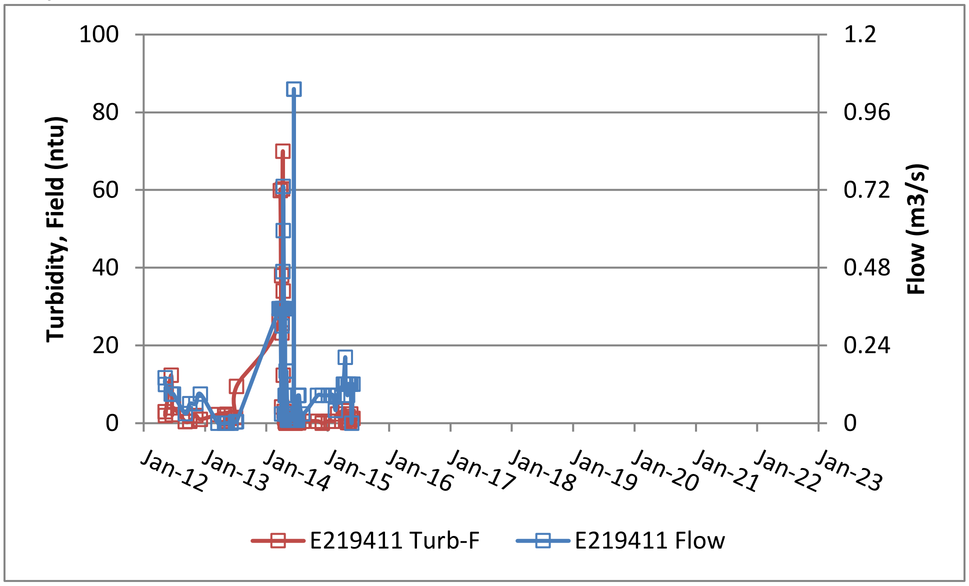

Figure 14 – E221268 (LC9) – Flow to Field Turbidity Comparison

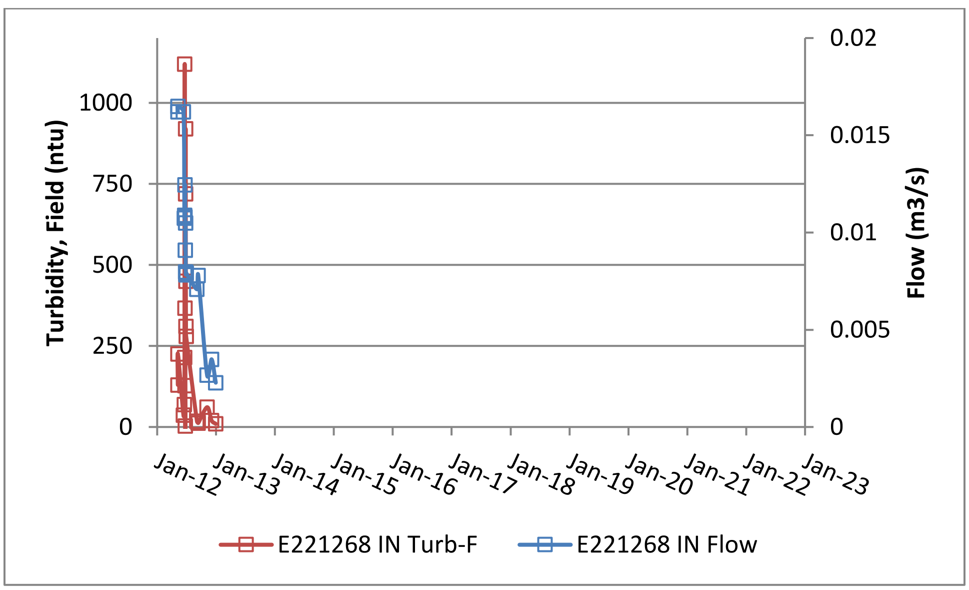

Figure 15 – Inflow to No Name Creek Pond – Flow to Inlet Field Turbidity Comparison

DRY CREEK SEDIMENTATION PONDS (E295211)

The Dry Creek Sedimentation Ponds were commissioned in 2014 and flows are captured using a continuous flow monitoring system, verified with manual measurements and Quality Assured/Controlled by a third-party consultant. In 2019 and 2020, infrastructure for the Dry Creek Sedimentation Ponds was undergoing upgrades and continuous monitoring was not possible. Flows at E288273 (DC3) are provided for this period as E288273 is located immediately upstream the Dry Creek Sedimentation Ponds and provides a surrogate for the inflows into the Dry Creek Sedimentation Ponds. Figure 16 shows flow results as compared to field turbidity measurements.

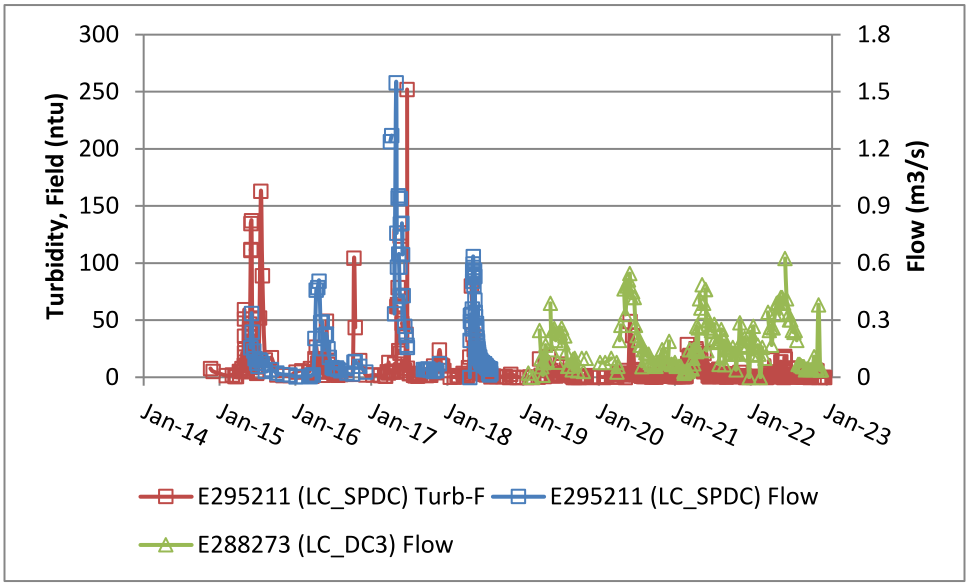

Figure 16 – E295211 (SPDC) – Flow to Field Turbidity Comparison

HORSESHOE PIT (E308146)

Water from HSP does not discharge directly to the receiving environment but rather is conveyed (by pipe) to an inlet of the Line Creek rock drain located below the discharge point for No Name Creek Diversion and Sediment Pond (E221268, LC_LC9). Water then flows through the rock drain for approximately 3 km before discharging into Line Creek (from the outlet of the rock drain) immediately upstream of the closest receiving environment monitoring location (E293369, LC_LCUSWLC). Flow data is measured with inline flow meters that provided a digital display of flow. Figure 17 shows flow results as compared to field turbidity measurements of the discharge from Horseshoe Pit.

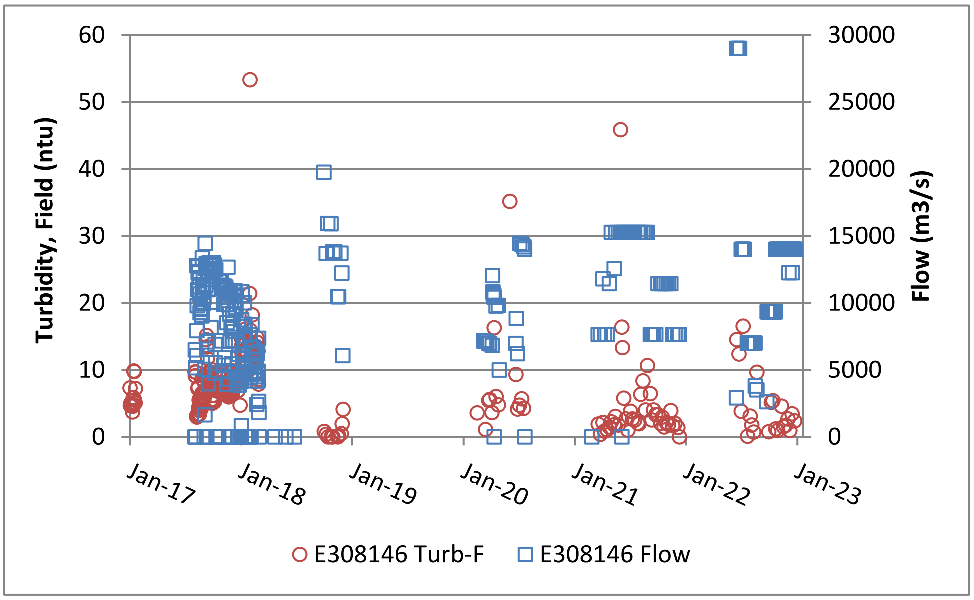

Figure 17 – E308146 (HSP) – Flow to Field Turbidity Comparison

4. Updated TSS/Turbidity Linear Correlations

In accordance with the updated calculation methodology (see Methodology section above), the February 2016 TSS Determination Report included a complete review of the dataset from 2012 to 2014 of any missed data points (as discussed in the memo to the MOE dated April 10, 2015) and provided updated TSS/Turbidity correlations with 2015 monitoring data. In subsequent years the Determination Reports were updated with the monitoring data from the previous year. Expanding on that dataset, monitoring data for 2022 has been included and used in calculating each correlation for the authorized discharge points. Table 4 provides a summary of the correlations for each discharge. Correlation graphs are shown in Figures 18 to 25.

Table 4: Summary of updated TSS-Turbidity linear correlations for authorized discharges (2012-2022)

Location	MOE EMS Number	Teck Station Code	Coefficient of Determination (R2)	Linear Function Equation
MSA North Ponds Effluent to Line Creek	E216144	LC7	0.6894	TSS-F = 0.2885*(Turb-F) + 3.30
Dry Creek Sedimentation Ponds Effluent to Dry Creek	E295211	SPDC	0.6555	TSS-F = 0.29*(Turb-F) + 1.9793
Discharge from Horseshoe Pit	E308146	LC_HSP	0.3743	TSS-F = 0.4195*(Turb-F) + 0.1891

*The No Name Creek Ponds and the Contingency Treatment system did not discharge in 2022 and are removed from the table.

As presented in Table 4, none of the discharge locations that discharged in 2022 shows strong correlations ($R^2 \geq 0.7$). The correlations for MSA North Ponds and Dry Creek Sedimentation Pond have become weaker compared to previous years. The Contingency Treatment System and No Name Creek Pond did not change as there was no effluent released from the ponds in 2022. In addition, the slopes are reduced from previous year (2016), indicating that for a given field turbidity, the corresponding calculated TSS would be less than previous correlations. In-order to use the strongest correlations and ensure a more protective reportable trigger value is used, LCO will continue to reference the 2016 TSS/Turbidity correlations for MSA North Ponds and No Name Creek Pond for the duration of 2023 (Table 5).

As noted in Section 1, Horseshoe Ridge Pit or HSP (E308146) was first included in the 2020 reports, and therefore this is only the third time a linear correlation has been evaluated for this location. TSS and field turbidity records from discharge samples were used to create the correlation. However, the correlation is very weak, likely due to the lack of TSS concentrations above 30 mg/L and field turbidity readings above 35 NTU. This can be attributed to the depth (and volume) of water typically present in HSP, thereby influencing the residence time and settling of suspended sediment (prior to discharge). An additional factor may also be the time between initial inflow and discharge. Typically, the majority of inflow of water to the pit occurs in May and June, while the historical timing of discharge has often occurred later (September to April). One notable change in 2022 was that dewatering of HSP took place over the second half of the year (starting June 19 and continued into March 2023).

As presented below in Table 5, by omitting the 2017-2022 data for MSA North Ponds and No Name Creek Pond, and thereby defaulting back to the 2016 equation, three of five discharges show strong correlations. Although there was no discharge from No Name Creek Pond in 2015, 2016, and 2019- 2022, strong correlation exists likely due to the number of data points (N=72) over the period assessed (2012-2014). For the Contingency Treatment System, the equation developed using the 2017 spike test data shows a much stronger correlation (see Section 5), and the applicable equation is provided in Table 5.

As outlined in the 2020 annual water report for permit 106970 maintenance of works in late 2020 included removal of the drainage channel and conveying water directly into Dry Creek. From this infrastructure upgrade, the monitoring location has moved, and sample conditions may have varied (e.g., collecting Dry Creek Sedimentation Pond discharge directly from pipe outfall rather than the discharge channel). With that, the TSS-Turbidity correlation for 2022 reviewed data from the date of completion of the maintenance of works (i.e., October 17, 2020) to present. From this update, the correlation in TSS and Turbidity at the Dry Creek Sedimentation Ponds sees a decrease in the R^2 value (i.e., 0.7449 in 2020 to 0.7379 in 2022). However, as this updated correlation remains above 70%, and provides a more conservative prediction of TSS related to turbidity, as further discussed in section 6, LCO will use only the 2020 to 2022 data in the correlation for best representation of conditions following the 2020 maintenance of works.

With respect to HSP, as the correlation (R^2 value) is very weak, LCO will instead reference the field turbidity triggers detailed in the Trigger Action Response Plan (TARP) provided in the Horseshoe Ridge Pit Dewatering Plan.

Table 5: Revised TSS-Turbidity linear correlations for authorized discharges

Location	MOE EMS Number	Teck Station Code	Coefficient of Determination (R2)	Linear Function Equation	Equation Referenced
MSA North Ponds Effluent to Line Creek (2016 data)	E216144	LC7	0.9525	TSS-F = 0.3988*(Turb-F) + 1.0126	2016
Contingency Treatment System to Effluence to Line Creek	E219411	LC8	0.8454	TSS-F = 1.5837*(Turb-F) – 8.4018	2017 (with spike testing)
No Name Creek Pond Effluence to Line Creek (2016 data)	E221268	LC9	0.7296	TSS-F = 0.2936*(Turb-F) + 3.23	2016
Dry Creek Sedimentation Ponds Effluent to Dry Creek	E295211	SPDC	0.7379	TSS-F = 0.9516*(Turb-F) + 3904	2022
Discharge from Horseshoe Pit	E308146	LC_HSP	0.3743 (Very weak)	Equation is not applicable	Refer to HSP Dewatering Plan TARP

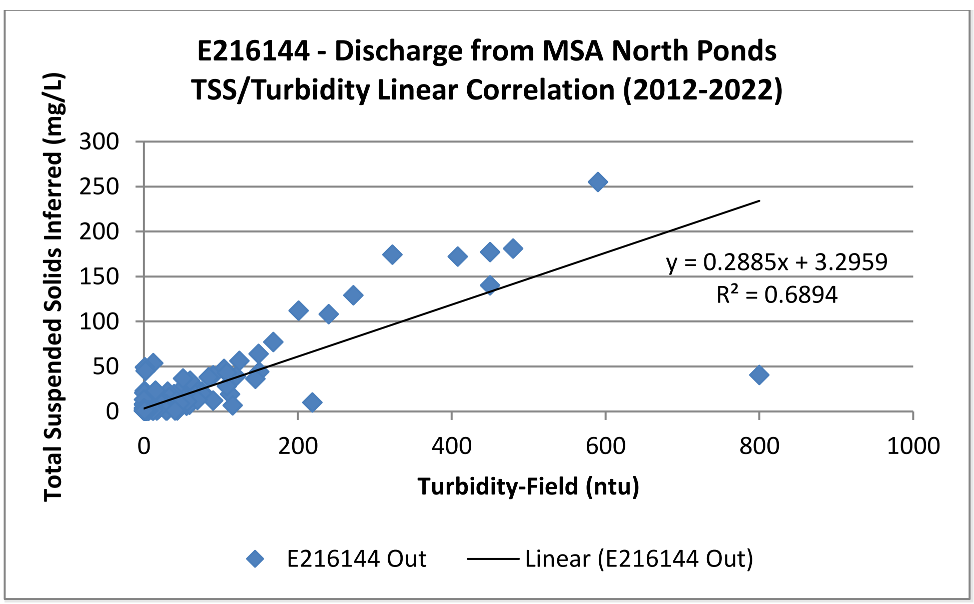

Figure 18 – E216144 (LC7) 2012-2022 TSS/Turbidity Correlation

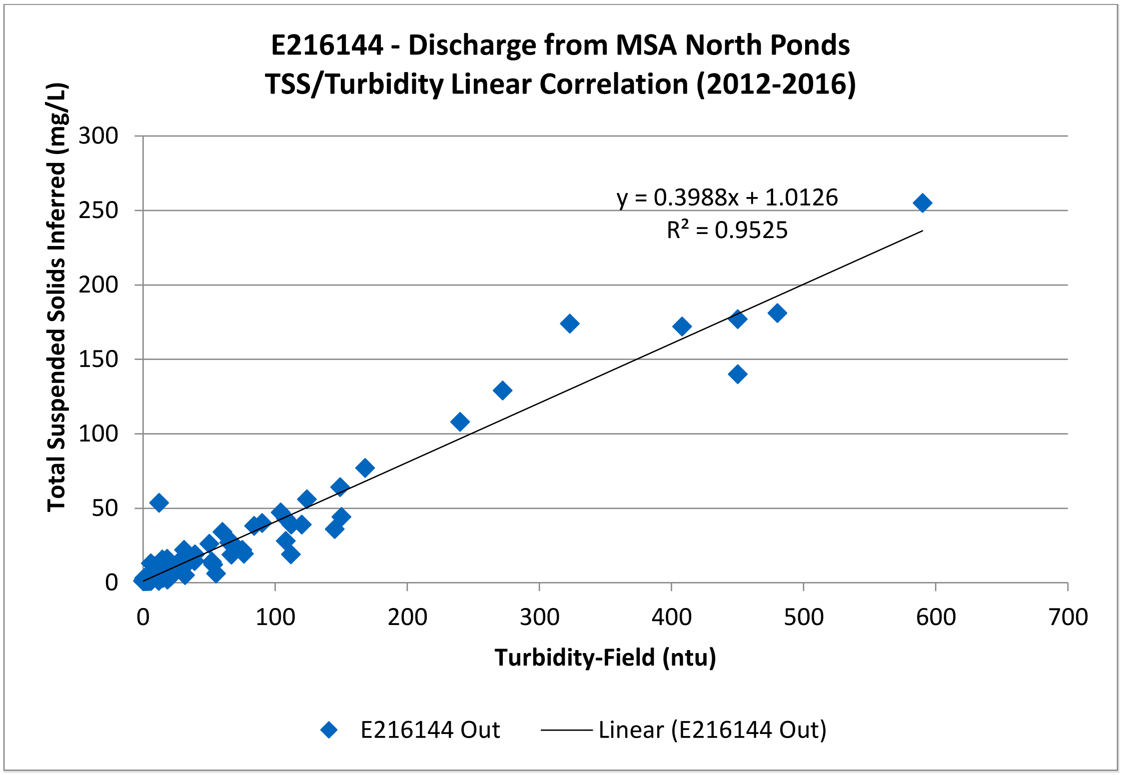

Figure 19 – E216144 (LC7) 2012-2016 TSS/Turbidity Correlation (no 2017-2022 data)

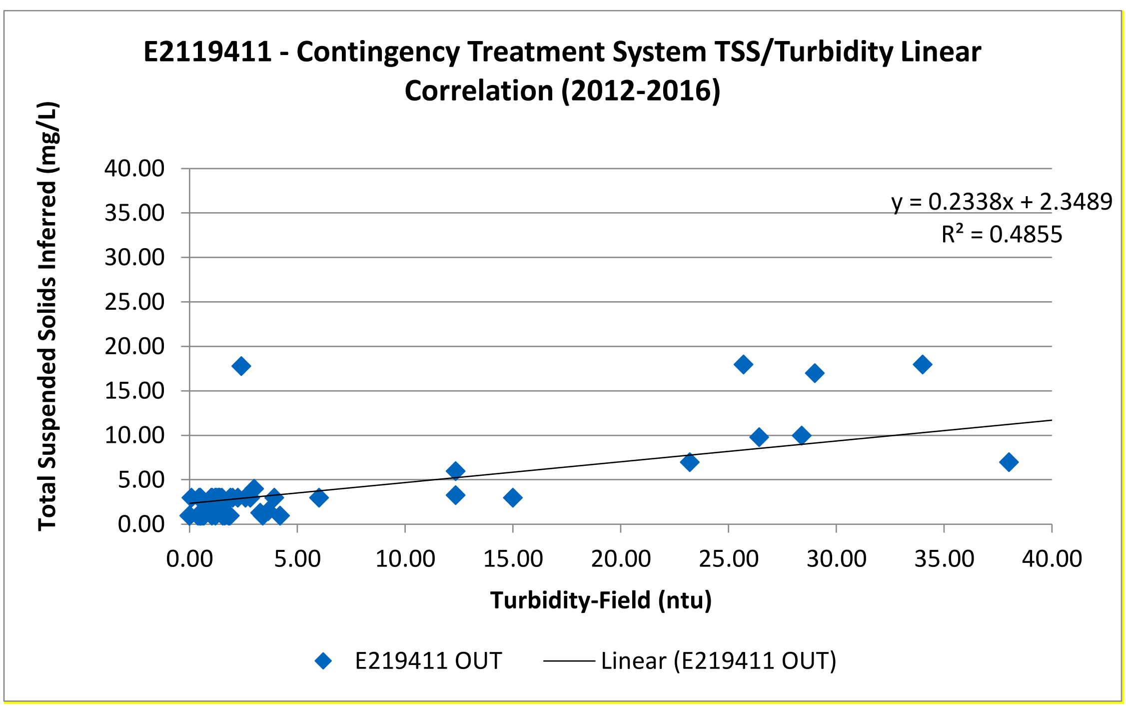

Figure 20 – E219411 (LC8) 2012-2016 TSS/Turbidity Correlation (no 2017-2022 data)

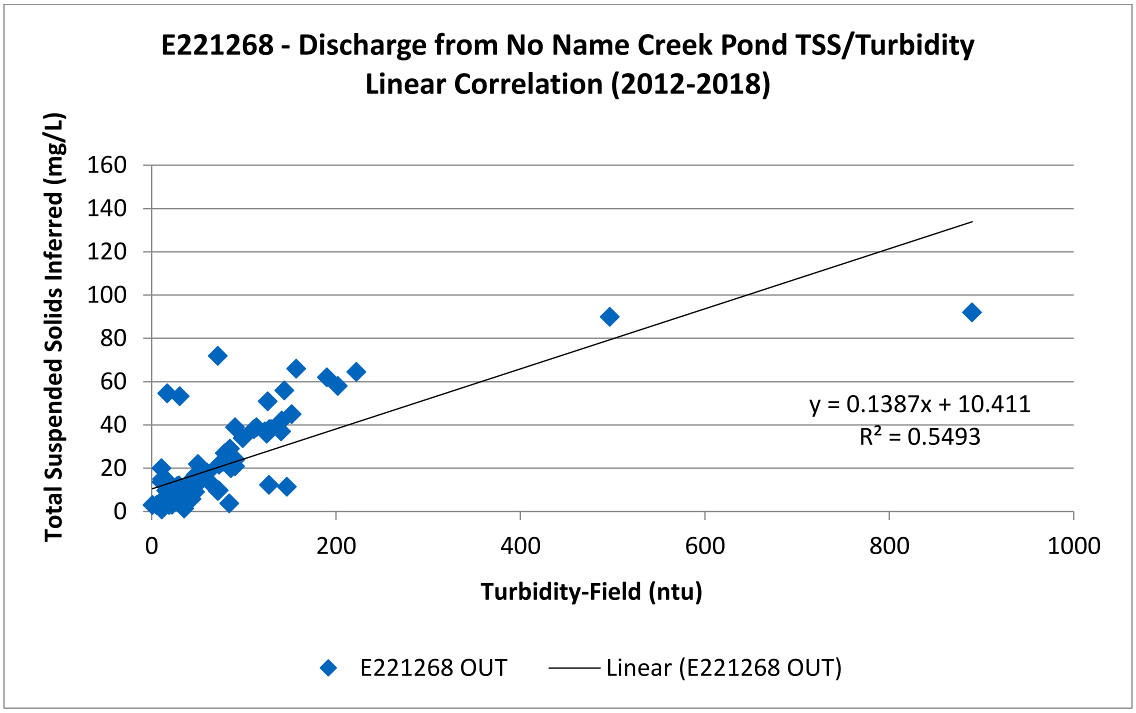

Figure 21 – E221268 (LC9) 2012-2018 TSS/Turbidity Correlation (no 2019-2022 data)

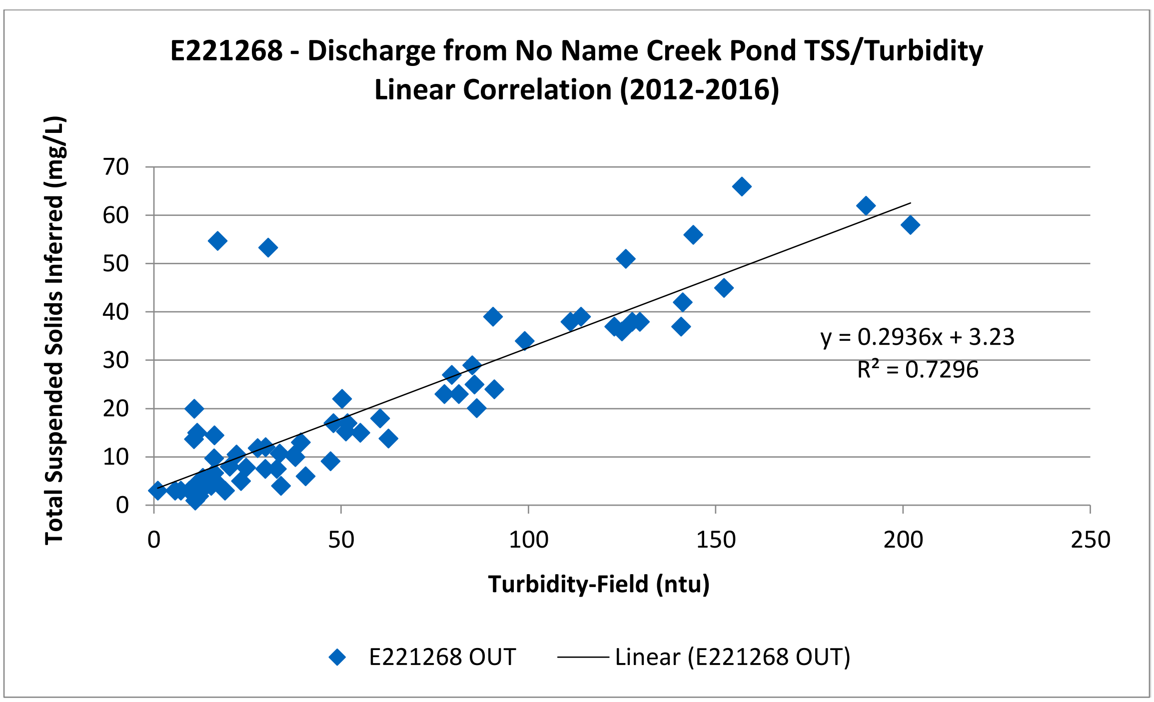

Figure 22 – E221268 (LC9) 2012-2016 TSS/Turbidity Correlation (no 2017-2022 data)

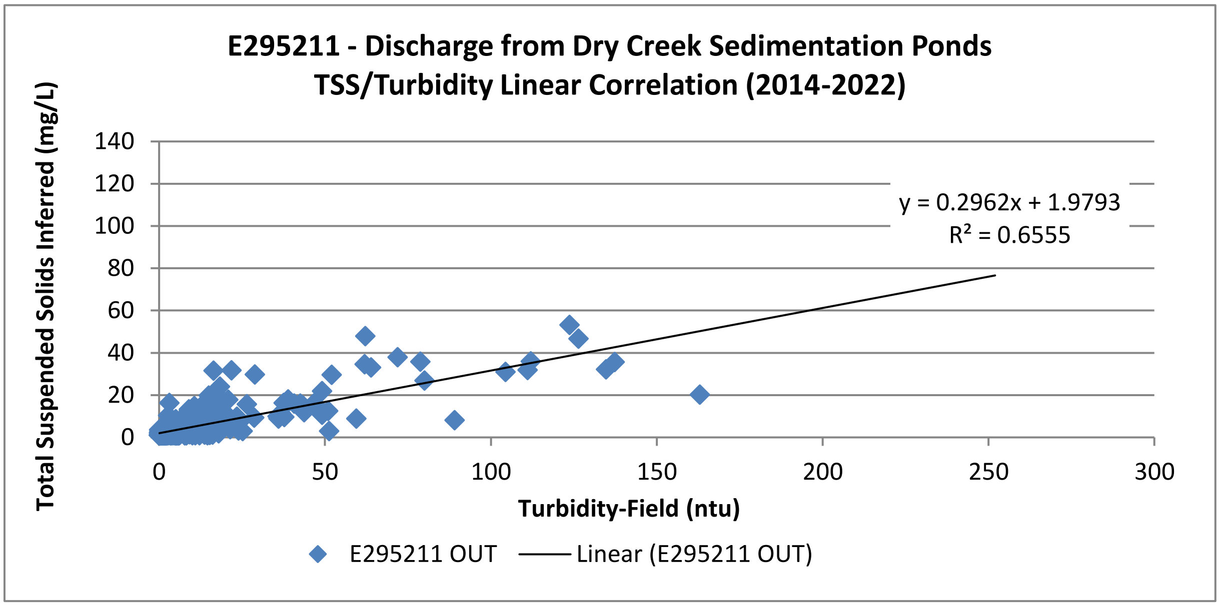

Figure 23 – E295211 (SPDC) 2014-2022 TSS/Turbidity Correlation

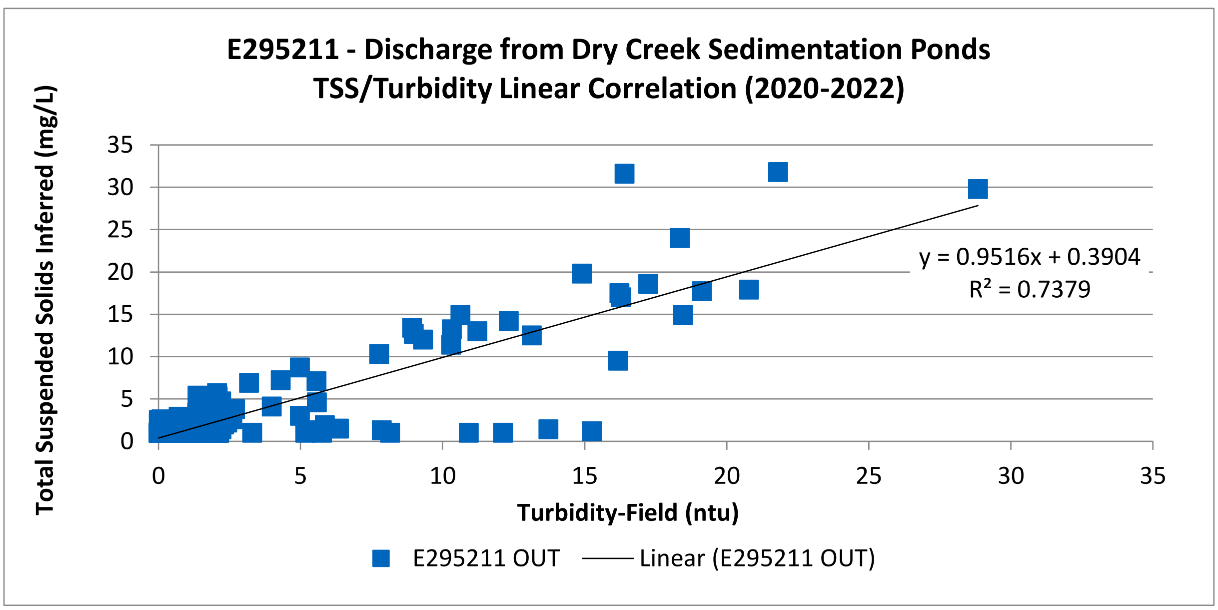

Figure 24 – E295211 (SPDC) TSS/Turbidity Correlation 2020-2022 (following maintenance of works of the Dry Creek Sedimentation Ponds discharge – October 2020)

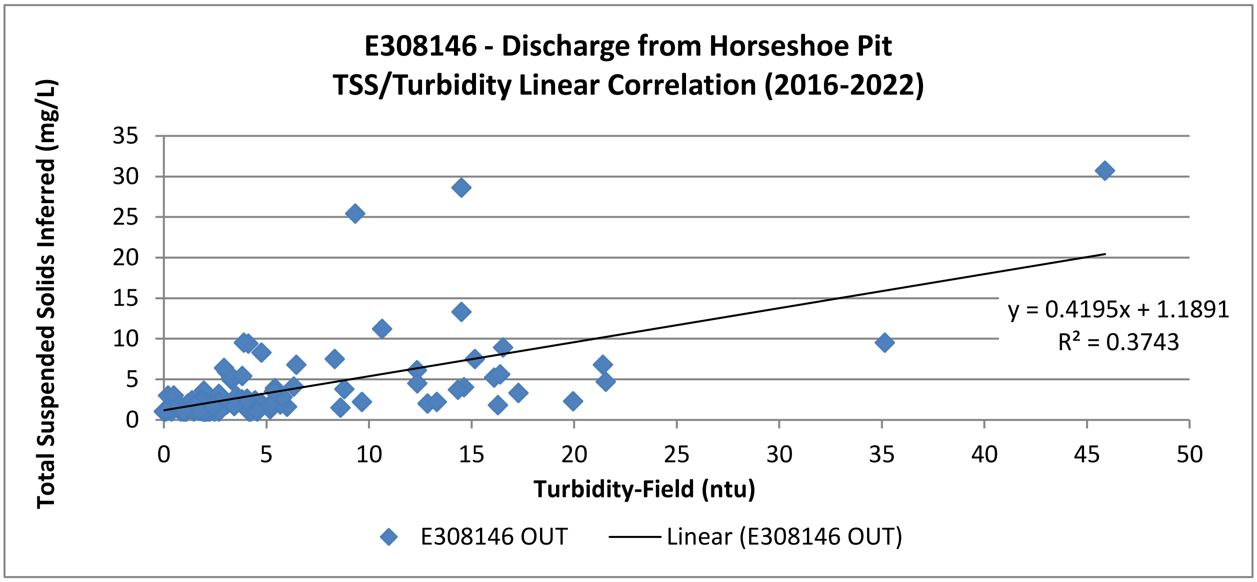

Figure 25 – E308146 (HSP) 2016-2022 TSS/Turbidity Correlation

5. Effluent Spike Testing

As discussed in the March 2018 TSS Determination Report, LCO conducted a series of spike tests in 2017 for MSA North Ponds, No Name Creek Pond, and Contingency Treatment System. The tests involved the collection of sediment and water from the pond systems and mixing of the materials together by the lab to create samples with specific TSS values (approximately 100, 200, 300, 400, and 500 mg/L). Field turbidity readings were then measured using the samples with a known TSS value. The intent was to improve the TSS/turbidity correlation by increasing the number of high TSS values in the dataset.

For MSA North Ponds and No Name Creek Pond, the resulting correlation became weaker with the spike test data added to the existing dataset. The correlation for Contingency Treatment System, however, showed a stronger correlation (R^2 = 0.8454 with the spike test data versus R^2 = 0.4855 without). Based on this, LCO will continue to reference the 2016 correlations for MSA North Ponds and No Name Creek Pond but will utilize the 2017 correlation with the spike test data for the Contingency Treatment System.

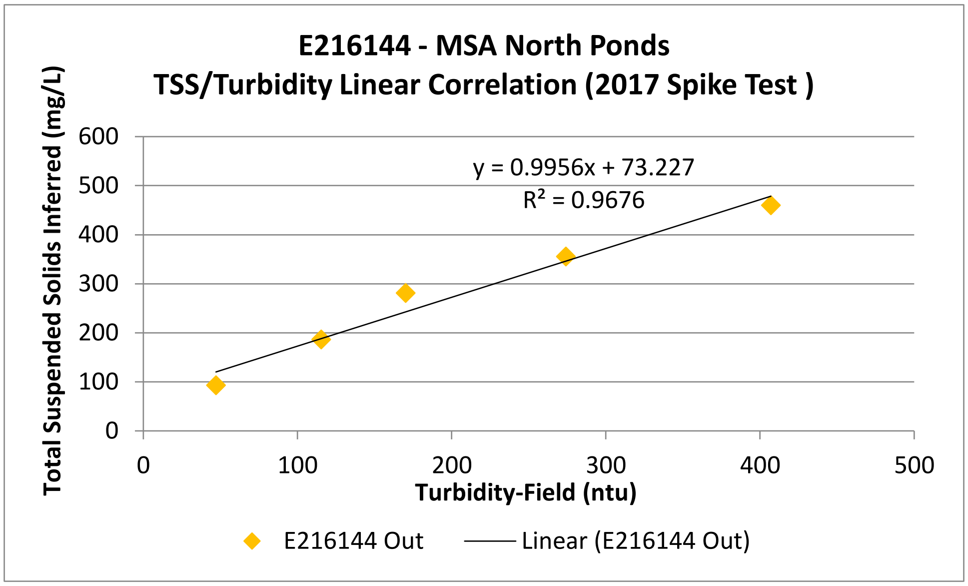

Figure 26 – E216144 (LC7) 2012-2017 TSS/Turbidity Spike Test Correlation

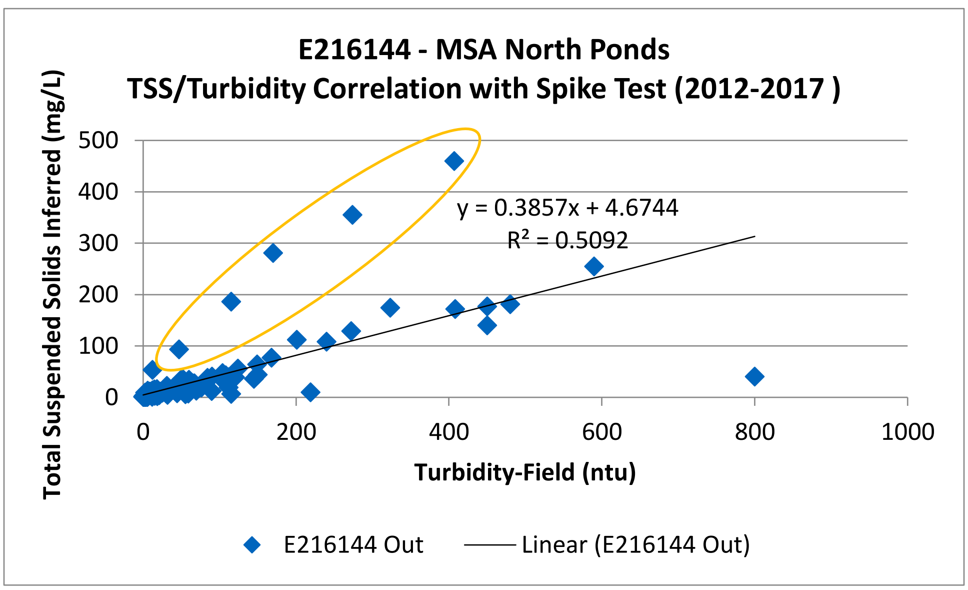

Figure 27 – E216144 (LC7) 2012-2017 TSS/Turbidity Correlation with Spike Test Data

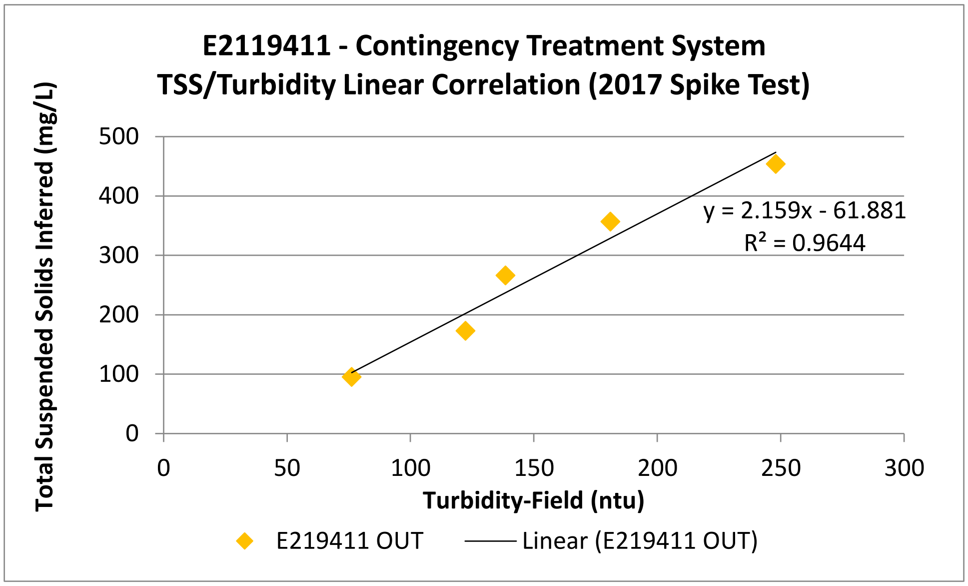

Figure 28 – E219411 (LC8) 2012-2016 TSS/Turbidity Spike Test Correlation

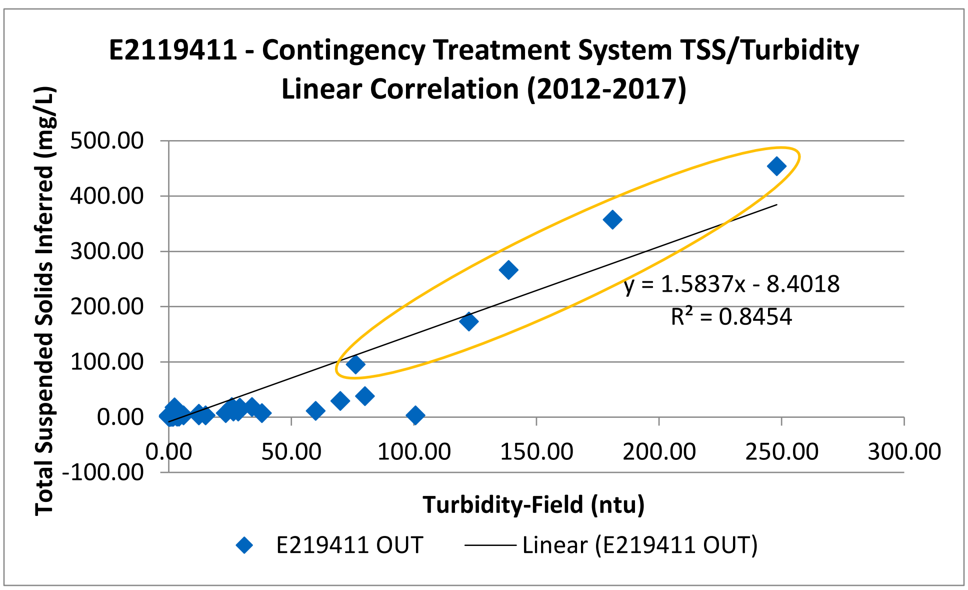

Figure 29 – E219411 (LC8) 2012-2017 TSS/Turbidity Correlation with Spike Test Data

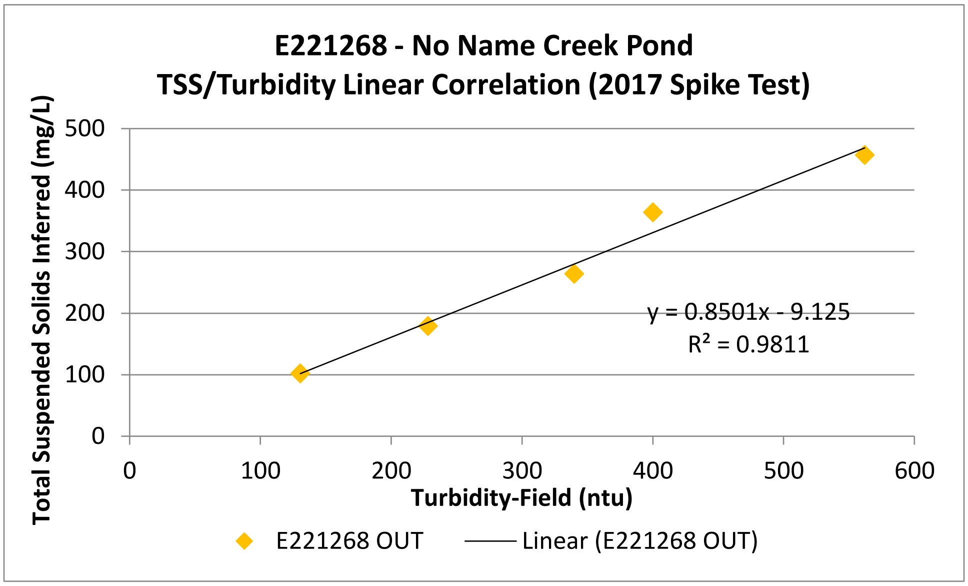

Figure 30 – E221268 (LC9) 2012-2017 TSS/Turbidity Spike Test Correlation

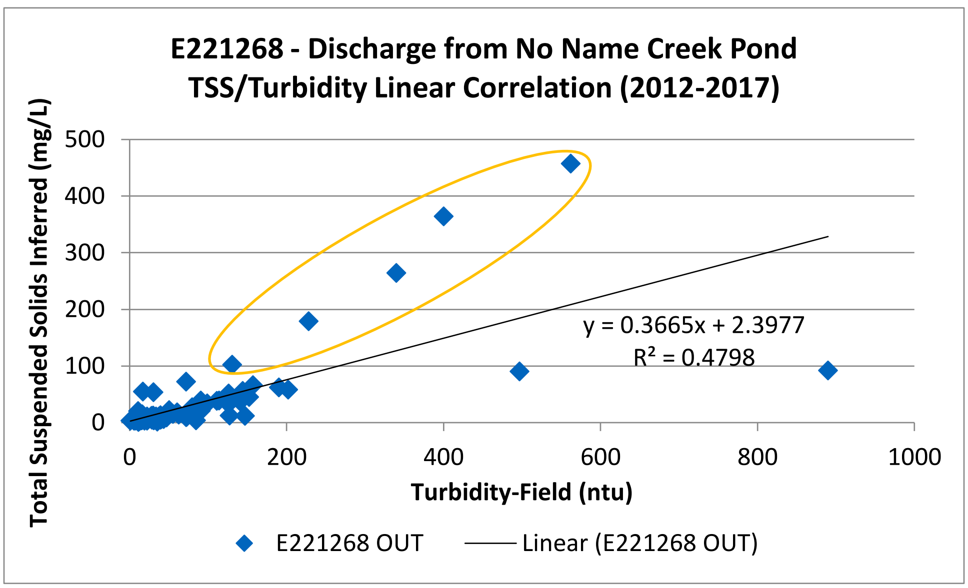

Figure 31 – E221268 (LC9) 2012-2017 TSS/Turbidity Correlation with Spike Test Data

6. Proposed Refined Turbidity Triggers Requiring Collection of TSS Samples

In accordance with permit requirements, this TSS determination method will be utilized as a method for real time field analysis of TSS values for authorized discharges. It is expected that use of the methodology will improve real time TSS determination and/or estimation to better inform management decisions and agency reporting. In addition, it is recognized that each correlation should be continued to be strengthened. As such, the proposed triggers for reporting and additional sampling collection are identified in Table 6.

Table 6: Turbidity trigger values for collecting TSS samples and reporting potential non-compliances.

Location	Min NTU	Max NTU	Turb-F at which TSS-F = 50 mg/L	Reportable trigger value (NTU)	Sample trigger value (NTU)
MSA North Ponds Effluent to Line Creek (LC7) (E216144)	0	800	124	124	87
Contingency Treatment System to Effluent to Line Creek (LC8) (E219411)	0	248	40	40	30
No Name Creek Pond Effluent to Line Creek (LC9) (E221268)	1	890	167	167	115
Dry Creek Sedimentation Ponds Effluent to Dry Creek (SPDC) (E295211)	0	252	52	52	36
Discharge from Horseshoe Pit (HSP) (E308146)	0	53	126[1]	40[2]	20[2]

1. Based on 2022 equation. However, the correlation is very week and therefore a lower reportable trigger has been referenced.
2. Based on the Horseshoe Pit Pumping Plan Trigger Action Response Plan

Summary

This TSS determination method will be utilized as a method for real time field analysis of TSS values for authorized discharge. In 2022, the only TSS/turbidity linear correlation that was developed using data for applicable Authorized Discharges and showed strong correlations ($R^2 \geq 0.7$) was the Dry Creek Sedimentation Pond discharge. As such, to ensure LCO uses the strongest correlations and the most protective reportable trigger value, LCO has decided to reference the 2016 TSS/Turbidity correlations for MSA North Ponds and No Name Creek Pond for 2022. For the Contingency Treatment System, the 2017 correlation that includes data from the 2017 spike test will be referenced. The correlations are summarized below in Table 7.

Table 7: TSS-Turbidity relationship for authorized discharges

Location	MOE EMS Number	Teck Station Code	Coefficient of Determination (R2)	Linear Function Equation
MSA North Ponds Effluent to Line Creek	E216144	LC7	0.9525	TSS-F = 0.3988*(Turb-F) + 1.0126
Contingency Treatment System to Effluence to Line Creek	E219411	LC8	0.8454	TSS-F = 1.5837*(Turb-F) – 8.4018
No Name Creek Pond Effluence to Line Creek	E221268	LC9	0.7296	TSS-F = 0.2936*(Turb-F) + 3.23
Dry Creek Sedimentation Ponds Effluent to Dry Creek	E295211	SPDC	0.7449	TSS-F = 0.2882*(Turb-F) + 1.4625
Discharge from Horseshoe Pit	E308146	LC_HSP	0.3743 (Very weak)	TSS-F = 0.4195*(Turb-F) + 0.1891 (Equation is not applicable)

Although there was no discharge from No Name Creek Pond in 2015, 2016, and 2019-2022, strong correlation exists likely due to the number of data points (N=72) over the period assessed (2012-2014). The correlation for Dry Creek Settling Ponds was updated based on maintenance of works from 2020 that altered the discharge location. The TSS/Turbidity dataset (N=180) over the two-year record (2020-2022) provided a correlation >70% that provided a more conservative estimation of compliance triggers and will therefore be used for 2023. The data from the spike test conducted in 2017 has improved the correlation for the Contingency Treatment System. A TSS/turbidity linear correlation for discharge from HSP dewatering was developed in 2020 and updated in 2022 using 2016 to 2022 data; however, the correlation remains very weak, and the equation was deemed not suitable for providing protective triggers for sampling and reporting. Instead, Table 8 references triggers from the Trigger Action Response Plan (TARP) provided in the 2022 Horseshoe Ridge Pit Dewatering Plan.

Line Creek will continue to perform field turbidity measurements and collect samples for laboratory analysis for TSS, when and where possible, to further refine the above correlations and to construct new correlations at additional appropriate monitoring locations. Triggers have been identified for ENV reporting purposes for potential non-compliances; actual non-compliance will be confirmed by lab analyses. Additionally, triggers for sample collection are also developed to assist in the continual improvement of each correlation.

Table 8: Turbidity trigger values for collecting TSS samples and reporting potential non-compliances.

Location	Turb-F at which TSS-F = 50 mg/L	Reportable trigger value (NTU)	Sample trigger value (NTU)
MSA North Ponds Effluent to Line Creek (LC7) (E216144)	124	124	87
Contingency Treatment System to Effluent to Line Creek (LC8) (E219411)	40	40	30
No Name Creek Pond Effluent to Line Creek (LC9) (E221268)	167	167	115
Dry Creek Sedimentation Ponds Effluent to Dry Creek (SPDC) (E295211)	52	52	36
Discharge from Horseshoe Pit (HSP) (E308146)	126[1]	40[2]	20[2]

1. Based on 2022 equation. However, the correlation is very week and therefore a lower reportable trigger has been referenced (from 2022 HSP Dewatering Plan).
2. Based on the Horseshoe Pit Pumping Plan Trigger Action Response Plan

Appendix A – 2022 Monitoring Data (TSS and Turbidity)

E216144 MSA North Ponds Effluent to Line Creek (LC_LC7)					
	Parameter	TOTAL SUSPENDED SOLIDS, LAB		TURBIDITY, FIELD	
	Fraction	N		N	
	Unit	mg/l		ntu	
Location	Date	Result Text	Result Value	Result Text	Result Value
LC_LC7	1/4/2022	< 1.0	1	0.46	0.46
LC_LC7	1/7/2022	< 1.0	1	-	-
LC_LC7	2/8/2022	< 1.0	1	0.36	0.36
LC_LC7	3/4/2022	< 1.0	1	0.62	0.62
LC_LC7	3/8/2022	< 1.0	1	0.36	0.36
LC_LC7	3/14/2022	-	-	2.6	2.6
LC_LC7	3/22/2022	-	-	0.01	0.01
LC_LC7	3/28/2022	-	-	0.9	0.9
LC_LC7	4/5/2022	< 1.0	1	0.05	0.05
LC_LC7	4/18/2022	-	-	0.01	0.01
LC_LC7	4/24/2022	-	-	0.14	0.14
LC_LC7	5/2/2022	< 1.0	1	0.19	0.19
LC_LC7	5/9/2022	-	-	0.01	0.01
LC_LC7	5/16/2022	-	-	0.07	0.07
LC_LC7	6/8/2022	< 1.0	1	0.01	0.01
LC_LC7	6/14/2022	-	-	0.01	0.01
LC_LC7	7/5/2022	< 1.0	1	0.11	0.11
LC_LC7	7/14/2022	< 1.0	1	0.65	0.65
LC_LC7	8/3/2022	< 1.0	1	1.63	1.63
LC_LC7	8/30/2022	1.2	1.2	0.91	0.91
LC_LC7	9/6/2022	< 1.0	1	0.8	-
LC_LC7	9/19/2022	< 1.0	1	0.1	0.1
LC_LC7	10/3/2022	< 1.0	1	0.07	0.07
LC_LC7	11/8/2022	< 1.0	1	0.01	0.01
LC_LC7	12/5/2022	< 1.0	1	0.1	0.1

Influent to E221268 Contingency Treatment System (LC_LC8IN or LC_LC3)					
	Parameter	TOTAL SUSPENDED SOLIDS, LAB		TURBIDITY, FIELD	
	Fraction	N		N	
	Unit	mg/l		ntu	
Location	Date	Result Text	Result Value	Result Text	Result Value
LC_LC3	1/4/2022	1.1	1.1	0	0
LC_LC3	1/7/2022	< 1.0	1	0.04	0.04
LC_LC3	1/10/2022	1.4	1.4	0.6	0.6
LC_LC3	1/25/2022	< 1.0	1	0.16	0.16
LC_LC3	2/1/2022	2.6	2.6	0.4	0.4
LC_LC3	2/8/2022	2.1	2.1	0.3	0.3
LC_LC3	2/8/2022	< 1.0	1	0.3	0.3
LC_LC3	2/15/2022	2.3	2.3	0.36	0.36
LC_LC3	2/22/2022	3.1	3.1	0.6	0.6
LC_LC3	3/1/2022	1.2	1.2	0.23	0.23
LC_LC3	3/8/2022	< 1.0	1	0.39	0.39
LC_LC3	3/8/2022	< 1.0	1	0.39	0.39
LC_LC3	3/15/2022	< 1.0	1	0.48	0.48
LC_LC3	3/22/2022	2	2	0.01	0.01
LC_LC3	3/28/2022	3.1	3.1	1.52	1.52
LC_LC3	3/28/2022	3.3	3.3	1.52	1.52
LC_LC3	4/7/2022	< 1.0	1	1.35	1.35
LC_LC3	4/11/2022	< 1.0	1	0.53	0.53
LC_LC3	4/11/2022	1.3	1.3	0.53	0.53
LC_LC3	4/19/2022	< 1.0	1	0.01	0.01
LC_LC3	4/25/2022	1	1	0	0
LC_LC3	5/5/2022	2.8	2.8	0.58	0.58
LC_LC3	5/9/2022	2.3	2.3	0.01	0.01
LC_LC3	5/17/2022	1.1	1.1	0.19	0.19
LC_LC3	5/24/2022	1.3	1.3	0.1	0.1
LC_LC3	5/31/2022	1.1	1.1	0.29	0.29
LC_LC3	6/6/2022	3.2	3.2	0.34	0.34
LC_LC3	6/6/2022	< 1.0	1	0.34	0.34
LC_LC3	6/14/2022	1.2	1.2	3.24	3.24
LC_LC3	6/22/2022	1.9	1.9	0.55	0.55
LC_LC3	6/27/2022	2.2	2.2	0.11	0.11
LC_LC3	7/5/2022	< 1.0	1	0.01	0.01
LC_LC3	7/11/2022	1.5	1.5	0.01	0.01
LC_LC3	7/19/2022	< 1.0	1	0.02	0.02
LC_LC3	7/26/2022	< 1.0	1	0.1	0.1
LC_LC3	8/3/2022	< 1.0	1	0.9	0.9
LC_LC3	8/8/2022	1.4	1.4	0.01	0.01
LC_LC3	8/8/2022	1.2	1.2	0.01	0.01
LC_LC3	8/16/2022	1.6	1.6	0.01	0.01
LC_LC3	8/17/2022	< 1.0	1	3.62	3.62
LC_LC3	8/23/2022	< 1.0	1	0.75	0.75
LC_LC3	8/30/2022	2	2	0.28	0.28
LC_LC3	8/30/2022	< 1.0	1	0.28	0.28
LC_LC3	9/6/2022	< 1.0	1	0.1	0.1
LC_LC3	9/13/2022	< 1.0	1	0.24	0.24
LC_LC3	9/19/2022	< 1.0	1	0.1	0.1
LC_LC3	9/29/2022	1.5	1.5	-	-
LC_LC3	10/3/2022	< 1.0	1	0.16	0.16
LC_LC3	10/11/2022	< 1.0	1	0.1	0.1
LC_LC3	10/18/2022	< 1.0	1	0.1	0.1
LC_LC3	10/18/2022	< 1.0	1	0.1	0.1
LC_LC3	10/25/2022	1.3	1.3	0.01	0.01
LC_LC3	11/1/2022	10.1	10.1	0.17	0.17
LC_LC3	11/8/2022	1.5	1.5	0.01	0.01
LC_LC3	11/14/2022	< 1.0	1	0.11	0.11
LC_LC3	11/21/2022	< 1.0	1	0.27	0.27
LC_LC3	11/28/2022	1.8	1.8	0.1	0.1
LC_LC3	12/5/2022	1.1	1.1	0.1	0.1
LC_LC3	12/5/2022	2.2	2.2	0.1	0.1
LC_LC3	12/12/2022	< 1.0	1	0.1	0.1
LC_LC3	12/12/2022	< 1.0	1	0.1	0.1
LC_LC3	12/19/2022	< 1.0	1	0.1	0.1
LC_LC3	12/28/2022	< 1.0	1	0.28	0.28

E295211 Dry Creek Sedimentation Pond Effluent to Dry Creek (LC_SPDC)					
	Parameter	TOTAL SUSPENDED SOLIDS, LAB		TURBIDITY, FIELD	
	Fraction	N		N	
	Unit	mg/l		ntu	
Location	Date	Result Text	Result Value	Result Text	Result Value
LC_SPDC	1/5/2022	< 1.0	1	0.59	0.59
LC_SPDC	1/12/2022	< 1.0	1	1.06	1.06
LC_SPDC	1/19/2022	2.1	2.1	0.01	0.01
LC_SPDC	1/26/2022	< 1.0	1	0.29	0.29
LC_SPDC	2/2/2022	< 1.0	1	0.64	0.64
LC_SPDC	2/9/2022	< 1.0	1	0.44	0.44
LC_SPDC	2/15/2022	< 1.0	1	0.58	0.58
LC_SPDC	2/22/2022	1.1	1.1	0.95	0.95
LC_SPDC	3/2/2022	< 1.0	1	0.48	0.48
LC_SPDC	3/7/2022	< 1.0	1	0.51	0.51
LC_SPDC	3/15/2022	2.6	2.6	0	-0.04
LC_SPDC	3/23/2022	< 1.0	1	0.01	0.01
LC_SPDC	3/30/2022	2.1	2.1	1.85	1.85
LC_SPDC	4/6/2022	1.2	1.2	15.25	15.25
LC_SPDC	4/12/2022	1.1	1.1	0.78	0.78
LC_SPDC	4/17/2022	< 1.0	1	0.5	0.5
LC_SPDC	4/24/2022	1.2	1.2	0.92	0.92
LC_SPDC	5/3/2022	5.7	5.7	2.06	2.06
LC_SPDC	5/5/2022	3.4	3.4	1.36	1.36
LC_SPDC	5/11/2022	< 1.0	1	1.89	1.89
LC_SPDC	5/13/2022	6.9	6.9	3.18	3.18
LC_SPDC	5/17/2022	< 1.0	1	0.93	0.93
LC_SPDC	5/19/2022	1.1	1.1	-	-
LC_SPDC	5/24/2022	1.4	1.4	0.54	0.54
LC_SPDC	5/25/2022	3	3	4.97	4.97
LC_SPDC	5/26/2022	1.4	1.4	-	-
LC_SPDC	5/31/2022	1.4	1.4	13.72	13.72
LC_SPDC	6/7/2022	1.4	1.4	2.21	2.21
LC_SPDC	6/10/2022	< 1.0	1	-	-
LC_SPDC	6/14/2022	< 1.0	1	0.01	0.01
LC_SPDC	6/17/2022	18.6	18.6	17.23	17.23
LC_SPDC	6/19/2022	14.9	14.9	18.46	18.46
LC_SPDC	6/21/2022	9.5	9.5	16.17	16.17
LC_SPDC	6/28/2022	2.9	2.9	2.54	2.54
LC_SPDC	7/7/2022	1.1	1.1	0.41	0.41
LC_SPDC	7/12/2022	< 1.0	1	2.14	2.14
LC_SPDC	7/18/2022	< 1.0	1	8.15	8.15
LC_SPDC	7/25/2022	1.3	1.3	7.85	7.85
LC_SPDC	8/2/2022	< 1.0	1	0.86	0.86
LC_SPDC	8/9/2022	< 1.0	1	0.24	0.24
LC_SPDC	8/16/2022	< 1.0	1	0.74	0.74
LC_SPDC	8/23/2022	2.2	2.2	2.42	2.42
LC_SPDC	8/30/2022	5.4	5.4	1.37	1.37
LC_SPDC	9/6/2022	2.3	2.3	0.56	0.56
LC_SPDC	9/13/2022	1	1	0.1	0.1
LC_SPDC	9/20/2022	< 1.0	1	0.29	0.29
LC_SPDC	9/27/2022	1.5	1.5	0.34	0.34
LC_SPDC	10/3/2022	3.3	3.3	1.41	1.41
LC_SPDC	10/12/2022	1.6	1.6	0.35	0.35
LC_SPDC	10/18/2022	2.5	2.5	0.01	0.01
LC_SPDC	10/25/2022	2.6	2.6	0.1	0.1
LC_SPDC	11/1/2022	1.3	1.3	5.25	5.25
LC_SPDC	11/8/2022	< 1.0	1	0.25	0.25
LC_SPDC	11/15/2022	1.5	1.5	6.35	6.35
LC_SPDC	11/22/2022	< 1.0	1	5.75	5.75
LC_SPDC	11/29/2022	1.1	1.1	0.01	0.01
LC_SPDC	12/7/2022	1	1	0.12	0.12
LC_SPDC	12/13/2022	< 1.0	1	0.04	0.04
LC_SPDC	12/20/2022	-	-	0.07	0.07
LC_SPDC	12/22/2022	1.9	1.9	0.12	0.12
LC_SPDC	12/29/2022	1.4	1.4	0	0

E308146 Discharge from Horseshoe Pit (LC_HSP)					
	Parameter	TOTAL SUSPENDED SOLIDS, LAB		TURBIDITY, FIELD	
	Fraction	N		N	
	Unit	mg/l		ntu	
Location	Date	Result Text	Result Value	Result Text	Result Value
LC_HSP	6/20/2022	13.3	13.3	14.5	14.5
LC_HSP	6/27/2022	4.5	4.5	12.36	12.36
LC_HSP	7/5/2022	5.4	5.4	3.82	3.82
LC_HSP	7/11/2022	8.9	8.9	16.53	16.53
LC_HSP	7/26/2022	1	1	0.1	0.1
LC_HSP	7/29/2022	6.24	6.24	-	-
LC_HSP	7/31/2022	0.1	0.1	-	-
LC_HSP	8/3/2022	1.9	1.9	3.08	3.08
LC_HSP	8/8/2022	2.1	2.1	1.77	1.77
LC_HSP	8/15/2022	1.3	1.3	0.72	0.72
LC_HSP	8/25/2022	2.2	2.2	9.66	9.66
LC_HSP	10/3/2022	1.8	1.8	0.76	0.76
LC_HSP	10/12/2022	1.8	1.8	5.16	5.16
LC_HSP	10/17/2022	3.5	3.5	5.37	5.37
LC_HSP	10/26/2022	2	2	1.17	1.17
LC_HSP	11/2/2022	1	1	0.95	0.95
LC_HSP	11/14/2022	1	1	4.56	4.56
LC_HSP	11/21/2022	1.8	1.8	1.5	1.5
LC_HSP	11/28/2022	1.1	1.1	1.72	1.72
LC_HSP	12/6/2022	1	1	2.68	2.68
LC_HSP	12/12/2022	1.1	1.1	0.95	0.95
LC_HSP	12/19/2022	1.7	1.7	3.43	3.43
LC_HSP	12/28/2022	1.6	1.6	2.38	2.38

9.13 Appendix M – 2022 HSP and MSX Dewatering Tool Evaluations

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Memo

To	Francisco Beltran, Chris Blurton, Ben Gesner	**Client**	Teck Coal Ltd.
From	Noah Levin, Christina James	**Project**	CAPR002402
Cc	Terri Laliberte (SRK)	**Date**	March 23, 2023
Subject	Horseshoe Ridge Pit and MSX Pit Dewatering Tool Assessment – *FINAL*		

File name: LineCreek_DewateringToolEvaluation_Memo_CAPR002402_20230323_FNL.docx

1 Introduction

SRK Consulting (Canada) Inc. has developed a deterministic Excel™ based mass balance tool for the Horseshoe Ridge Pit (HSP) and MSX Pit at the Line Creek Operations (LCO) to calculate dewatering rates that ensure downstream water quality does not exceed relevant permit limits or benchmarks (SRK 2022a and SRK 2022b). As per Section 4.3 (vii) of the Environmental Management Act Permit PE 5353, water quality predictions from the tool were compared to actual monitoring results at downstream locations to identify potential areas for improvement in water quality predictions for pit pumping in the upcoming year.

The recommended pump rates were calculated using conservatively high water quality inputs for the pits and conservatively low flow conditions for Line Creek. Assuming these criteria are met, water quality in Line Creek is expected to remain below water quality thresholds with the recommended pump rate provided by SRK (2022a and 2022b).

This memo provides a summary of HSP and MSX water quality conditions, pit dewatering rates applied in 2022, Line Creek flow conditions, as well as a comparison of water quality from the tool to actual monitoring results. Water quality data for Line Creek is from LC_LCDSSLCC (Line Creek Compliance Point) and LC_LCUSWLC.

1.1 Evaluation Criteria

The assumptions in the dewatering tools are true when the following conditions are met:

1. Water quality in HSP or MSX is equal or lower than the input values used in the tool.
2. Flow conditions in Line Creek are equal or higher than the values used in the tool.

Observed 2022 monitoring data are compared to calculation inputs to determine if these two criteria were met. However, both the MSX and HSP dewatering tools are editable and allow for use of recent monitoring data to modify pump rates if the conditions are not met or recommended pit dewatering rates were insufficient to address pumping requirements.

The evaluation of the tool includes evaluation of monitoring data compared to each criteria, comparison of applied dewatering rates compared to recommended dewatering rates and comparison of resulting Line Creek water quality compared to water quality thresholds.

2 2022 Flow Analysis

Available monitoring data for 2022 are presented in Table 2-1.

Table 2-1: Flow Data Availability

Name	Station ID	Duration of 2022 Time Series	Total Samples from 2022
MSX Pit	LC_MSX	January 4, October 2 – December 31	92
Horseshoe Ridge Pit	LC_HSP	June 19 – December 31	196
Line Creek – Compliance Point	LC_LCDSSLCC	January 4 – November 21	49

2.1 MSX Pit Dewatering Rate Comparison

Dewatering rates for MSX Pit are provided for January 4, and October 2 – December 31 (Figure 2-1). Teck personnel have commented that on days where no data were reported, no dewatering from MSX Pit occurred. The design of MSX Pit utilized passive drainage via ditching for most of the year. This allowed for in-pit water to be directed towards a sump, which passively drained into MSAW at a sufficient rate that pumping was not necessary. However, in October 2022, a buttress was installed in the pit to mitigate geotechnical risk. As a result of this change, water was no longer able to exit the pit passively, and pumping was required on an intermittent basis to manage the water levels in the pit from that point forward. Active dewatering from MSX Pit occurred on 12 days.

In 2022, some COPC (Contaminants of Potential Concern) concentrations in MSX Pit were observed to be higher than what was previously input into the dewatering tool. As a result, the tool inputs were updated as per the Pit Pumping Plan procedure, and maximum allowed pumping rates were decreased, and these reduced rates were communicated to operations. Therefore pumped rates from MSX are consistently below the modelled flows used for the pit pumping plan and tool.

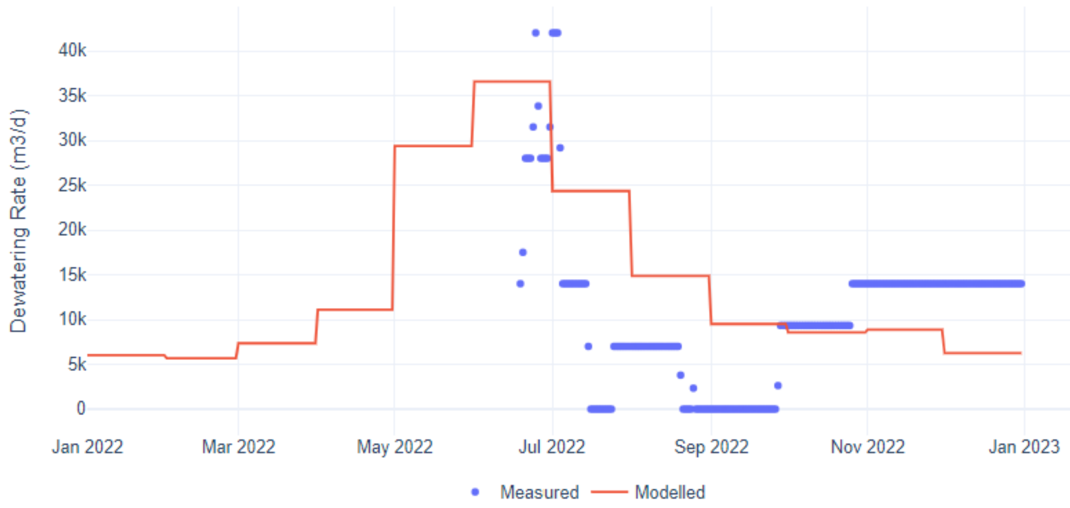
Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

Figure 2-1: Modelled vs. Measured Dewatering Rates at MSX

2.2 HSP Pit Dewatering Rate Comparison

Dewatering rates for HSP are provided from June 19 to December 31, 2022 (Figure 2-2). The HSP pump rate adhered to the established guidelines for HSP pump rate in 2022, with some exceptions. On June 25 and July 1-3, 2022, the applied dewatering rate exceeded the recommended dewatering rate. However, the exceedances were isolated, and were necessary to manage excessively high flood waters which threatened critical infrastructure (i.e. infiltration gallery) for the Mine Service Building at LCO.

The dewatering rates applied from October 1 to December 31, 2022, were consistently higher than the recommended dewatering rates. The increased dewatering rate was necessary to accommodate a strong freshet and delays in pumping operations. The HSP dewatering tool was edited to recalculate the pit dewatering rate based on recent monitoring data. LCO updated the tool with real time Line Creek flows and data from the most recent water quality sampled from HSP to calculate the optimal pump rate for October through December, which at times led to higher (or lower) pump rates than originally recommended by SRK.

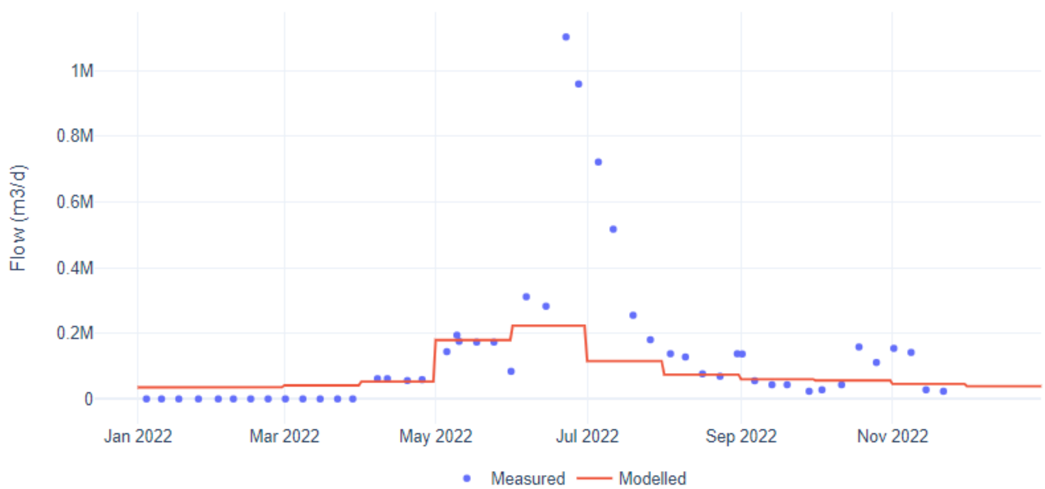


Source: https://srk.sharepoint.com/sites/NACAPR002402/Internal/!020_Project_Data/010_SRK/MSX_HSP_Tool_Assessment_r0_NL.py

Figure 2-2: Modelled vs. Measured Dewatering Rates at HSP

2.3 Line Creek Flow Comparison

Weekly flowrates for Line Creek from January 4 to March 28, 2022, were reported as “no flow” due to staff gauges being completely frozen over, and therefore unreadable (Figure 2-3). The measured flow at Line Creek is lower than the 1 in 10 dry-year on May 5, May 10 – May 31, August 23, September 6 to October 11, and November 14 to November 21, 2022. On these days, assumption 2 (Section 1.1) for the tool was not met.



Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

Figure 2-3: Measured vs. Modelled Flow Rates at Line Creek (LC_LCDSSLCC)

3 2022 Water Quality Analysis

Available water quality monitoring data for 2022 are presented in Table 3-1, and include a full suite of parameters as analyzed by ALS labs.

Table 3-1: Water Quality Data Availability

Name	Station ID	Duration of 2022 Time Series	Total Samples from 2022	Total Samples used in Tool
MSX Pit	LC_MSX	January 2, 2022 to December 14, 2022	62	13
Horseshoe Ridge Pit	LC_HSP	June 1, 2022 to December 19, 2022	36	85
Line Creek – Compliance Point	LC_LCDSSLCC	January 4, 2022 to December 19, 2022	57	362

Source: Compiled in text.

3.1 MSX Water Quality

COPCs were identified by SRK in the initial development of each pit dewatering tool. No new COPCs were identified in the 2022 water quality dataset. Table 3-2 shows the 95th percentile concentration of the COPCs observed in MSX Pit in 2022, and the concentrations of the COPCs used to represent MSX water quality in the dewatering tool. The 'Exceedance' column reports if the measured concentration in 2022 exceeds the concentration used in the tool.

Table 3-3 and Table 3-4 shows the maximum, and 95th percentile of the COPCs observed in MSX Pit during, and outside of active pumping from MSX Pit. As per SRK's dewatering tool methodology, the highest concentration is utilized for water quality datasets with less than ten samples, while the 95th percentile concentration is used for datasets with more than ten samples.

Table 3-2: Modelled and Measured Water Quality at MSX Pit (n = 62)

Parameter	Dewatering Tool Input Concentration	95th Percentile Measured Concentration (2022)	Exceedance
Dissolved Aluminum (mg/L)	0.029	0.008	False
Dissolved Antimony (mg/L)	0.016	0.006	False
Dissolved Arsenic (mg/L)	0.0025	0.0014	False
Dissolved Barium (mg/L)	2.86	3.54	True
Dissolved Beryllium (mg/L)	0.025	0.040	True
Dissolved Chromium (mg/L)	0.0004	0.0002	False
Dissolved Cobalt (mg/L)	0.01998	0.01148	False

Parameter	Dewatering Tool Input Concentration	95th Percentile Measured Concentration (2022)	Exceedance
Dissolved Iron (mg/L)	0.21	0.05	False
Dissolved Nickel (mg/L)	0.085	0.062	False
Nitrate (mg N/L)	15.97	13.20	False
Nitrite (mg N/L)	0.61	1.05	True
Ammonia (mg N/L)	7.0	6.2	False
Phosphorus (mg/L)	0.096	0.067	False
Total Selenium (mg/L)	68.0	5.05	False
Dissolved Sulphate (mg/L)	304.2	193.8	False
Total Dissolved Solids (mg/L)	1009.0	1197.5	True
Dissolved Uranium (mg/L)	0.034	0.003	False
Total Organoselenium (µg/L)	0.052	0.031	False

Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

Note: If there are ten or less samples in the water quality dataset, the maximum concentration is used. Otherwise, the 95th percentile of data is used.

Table 3-3: Modelled and Measured Water Quality at MSX Pit During Pumping (n = 9)

Parameter	Dewatering Tool Input Concentration	Maximum Measured Concentration (2022)	Exceedance
Dissolved Aluminum (mg/L)	0.029	0.006	False
Dissolved Antimony (mg/L)	0.016	0.010	False
Dissolved Arsenic (mg/L)	0.0025	0.0012	False
Dissolved Barium (mg/L)	2.86	2.58	False
Dissolved Beryllium (mg/L)	0.025	0.04	True
Dissolved Chromium (mg/L)	0.0004	0.0002	False
Dissolved Cobalt (mg/L)	0.01998	0.00999	False
Dissolved Iron (mg/L)	0.21	0.02	False
Dissolved Nickel (mg/L)	0.085	0.034	False
Nitrate (mg N/L)	15.97	14.40	False
Nitrite (mg N/L)	0.61	1.34	True
Ammonia (mg N/L)	7.0	6.3	False
Phosphorus (mg/L)	0.096	0.093	False
Total Selenium (mg/L)	68.0	5.01	False
Dissolved Sulphate (mg/L)	304.2	138.0	False
Total Dissolved Solids (mg/L)	1009.0	1220.0	True
Dissolved Uranium (mg/L)	0.034	0.0032	False

Parameter	Dewatering Tool Input Concentration	Maximum Measured Concentration (2022)	Exceedance
Total Organoselenium (µg/l)	0.052	0.020	False

Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

Table 3-4: Modelled and Measured Water Quality at MSX Pit Outside of Pumping (n = 53)

Parameter	Dewatering Tool Input Concentration	95th Percentile Measured Concentration (2022)	Exceedance
Dissolved Aluminum (mg/L)	0.029	0.009	False
Dissolved Antimony (mg/L)	0.016	0.0049	False
Dissolved Arsenic (mg/L)	0.0025	0.0018	False
Dissolved Barium (mg/L)	2.86	3.55	True
Dissolved Beryllium (mg/L)	0.025	0.040	True
Dissolved Chromium (mg/L)	0.0004	0.0002	False
Dissolved Cobalt (mg/L)	0.01998	0.01204	False
Dissolved Iron (mg/L)	0.21	0.05	False
Dissolved Nickel (mg/L)	0.085	0.063	False
Nitrate (mg N/L)	15.97	7.452	False
Nitrite (mg N/L)	0.61	0.70	True
Ammonia (mg N/L)	7.0	6.2	False
Phosphorus (mg/L)	0.096	0.049	False
Total Selenium (mg/L)	68.0	4.93	False
Dissolved Sulphate (mg/L)	304.2	201.4	False
Total Dissolved Solids (mg/L)	1009.0	1116	True
Dissolved Uranium (mg/L)	0.034	0.0034	False
Total Organoselenium (µg/l)	0.052	0.031	False

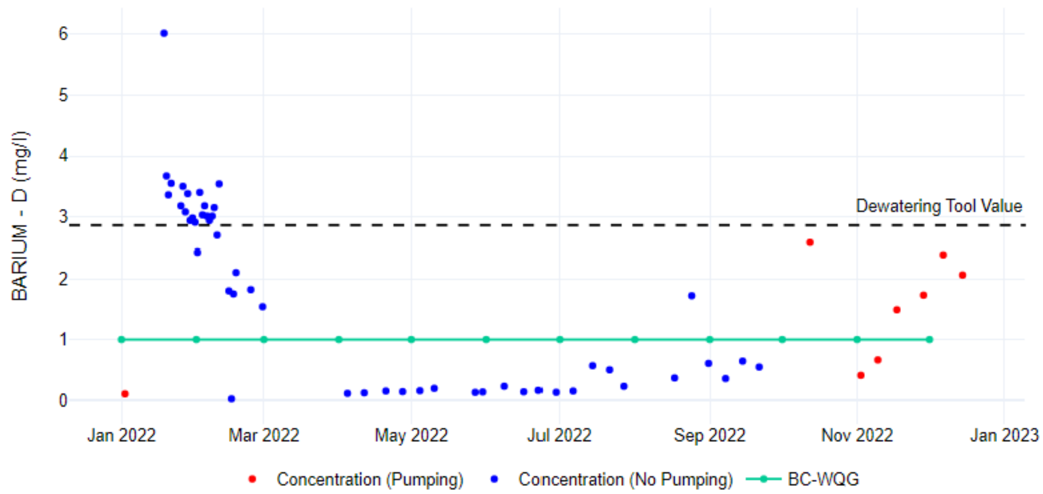
Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

In 2022, MSX pit concentrations of dissolved barium, dissolved beryllium, nitrite, and total dissolved solids, exceed the modelled concentration used in the dewatering tool. During periods when MSX Pit is actively dewatered, dissolved beryllium, nitrite, and total dissolved solids exceed the modelled concentration used in the dewatering tool. Therefore, assumption 1 (Section 1.1) was not met for these constituents.

The elevated concentrations observed in 2022 may be due to the increased sample size in 2022 (n=62 in 2022 compared to the data incorporated in the dewatering tool, n=13). As the sample size increases, there is an increased probability of capturing natural variability in parameter concentrations including higher than average concentrations.

3.1.1 Dissolved Barium

Dissolved barium consistently exceeds the modelled concentration of 2.86 mg/L between January 18, 2022, and February 8, 2022. No exceedances of the modelled concentration occurred during pumping. The concentration used in the model is likely low as no measured barium data for January was previously available, and barium concentration exhibits seasonality with higher concentrations observed during winter months (Figure 3-1).

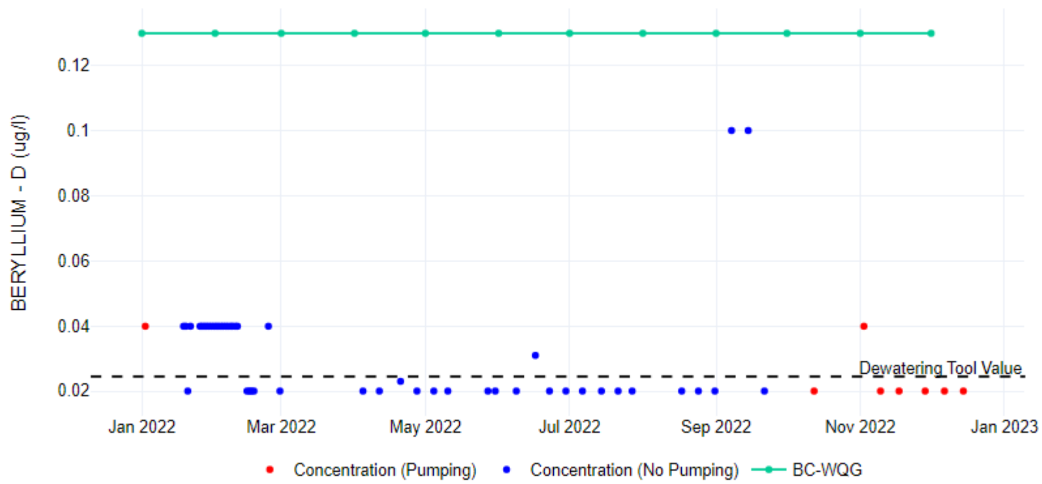


Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

Figure 3-1: Barium Concentration in MSX Pit

3.1.2 Dissolved Beryllium

Dissolved beryllium exceeds the modelled concentration of 0.024 ug/L from January 2 to February 23, June 16, September 7, September 14, and November 2 (Figure 3-2). Two exceedances (January 4 and November 2) occurred during pumping. The elevated concentrations of beryllium are the same as the detection limits for each sample. It is also worth noting that although beryllium had been previously identified as a COPC, no samples in 2022 were above the BC-WQG, and would therefore not be considered a COPC.

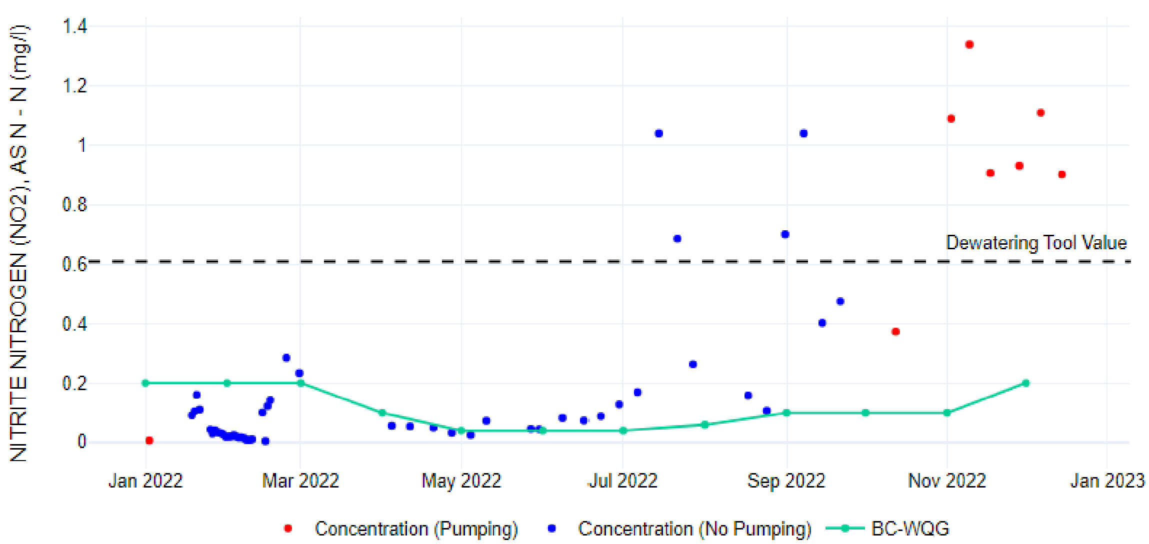


Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

Figure 3-2: Beryllium Concentration in MSX Pit

3.1.3 Nitrite

Nitrite occasionally exceeds the modelled concentration of 0.61 mg/L from July 14 to October 12, and always exceeds 0.61 mg/L after November 2 (Figure 3-3). Six exceedances (November 2 to December 14) occurred during pumping.

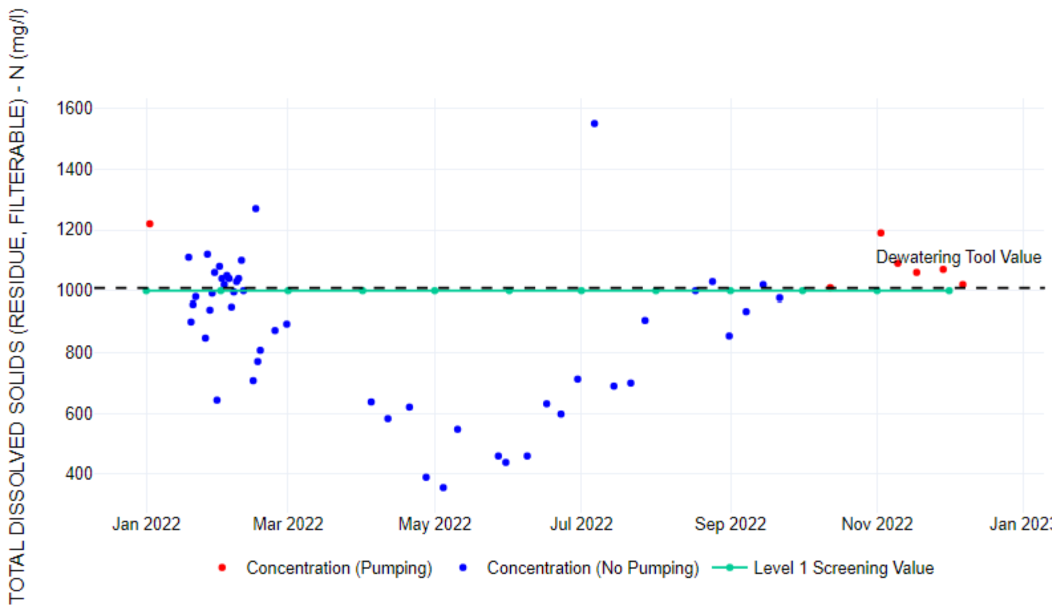


Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

Figure 3-3: Nitrite Concentration in MSX Pit

3.1.4 Total Dissolved Solids

Total dissolved solids (TDS) exceeded the modelled concentration of 1,009 mg/L consistently from January 2 to February 15, and from November 2 to December 6 (Figure 3-4). Six exceedances (January 2, and November 2 to December 6) occurred during pumping. Like barium, the concentration used in the dewatering tool is likely underestimated as the model did not incorporate January data. TDS also exhibits seasonality, with higher concentrations observed during winter months.



Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

Figure 3-4: Total Dissolved Solids in MSX Pit

3.2 HSP Water Quality

COPCs were identified by SRK in the initial development of the HSP dewatering tool. No new COPCs were identified in the 2022 water quality dataset.

Table 3-4 shows the 95th percentile concentration of the COPCs observed in 2022, and the concentrations of the COPCs used in the tool at HSP. The ‘Exceedance’ column reports if the measured concentration in 2022 exceeds the concentration used in the tool.

Table 3-5: Modelled and Measured Water Quality at HSP Pit

Parameter	Dewatering Tool Input Concentration	95th Percentile Measured Concentration (2022)	Exceedance
Ammonia (mg N/L)	0.8	0.03	False
Total Cobalt (mg/L)	0.008	0.0005	False
Dissolved Copper (mg/L)	0.001	0.0005	False
Dissolved Oxygen (mg/L)	3.1	11.0	False*
Total Nickel (mg/L)	0.031	0.009	False
Nitrite (mg N/L)	0.165	0.009	False
Phosphorus (mg/L)	0.04	0.02	False
Total Selenium (µg/L)	18.6	14.2	False
Dissolved Sulphate (mg/L)	283.0	122.6	False
Nitrate (mg N/L)	2.32	1.53	False
Dissolved Cadmium (µg/L)	0.17	0.10	False
Dimethylseleneoxide (µg/L)	0.032	0.016	False
Methylseleninic acid (µg/L)	0.044	0.016	False

Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

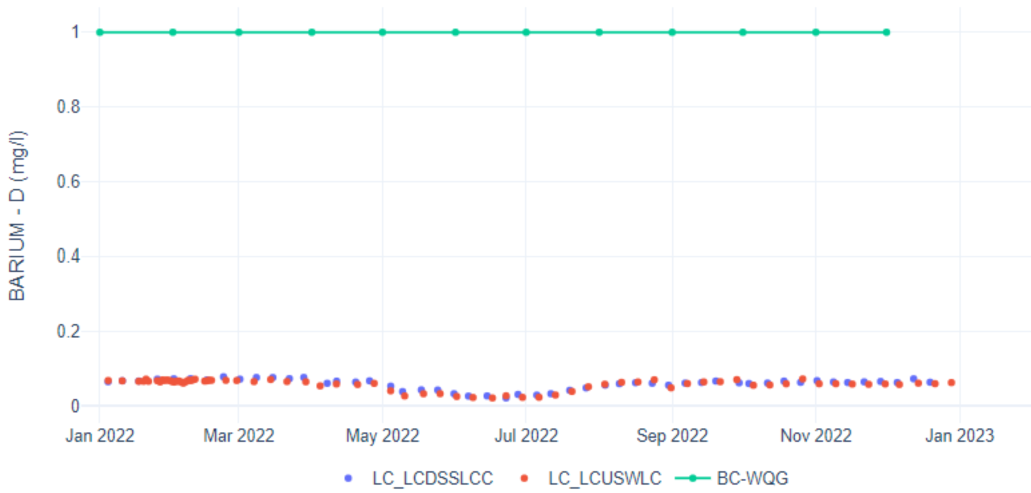
The 95th percentile concentration of samples measured in 2022 for all constituents did not exceed the concentration used in the tool. HSP water quality in 2022 had higher dissolved oxygen concentration than the minimum threshold, indicating it is not a concern for discharge. The concentration of dissolved oxygen must be maintained higher than the minimum threshold of 3.1 mg/l.

3.3 Line Creek Water Quality

The water quality at the compliance point in Line Creek (LC_LCDSSLCC) and at LC_LCUSWLC were compared against the thresholds used in the tool. At MSX Pit, while several constituents were found to have a measured concentration that exceeded the concentration used by the tool to represent pit water quality, the concentration of those same constituents in Line Creek are below the relevant water quality threshold.

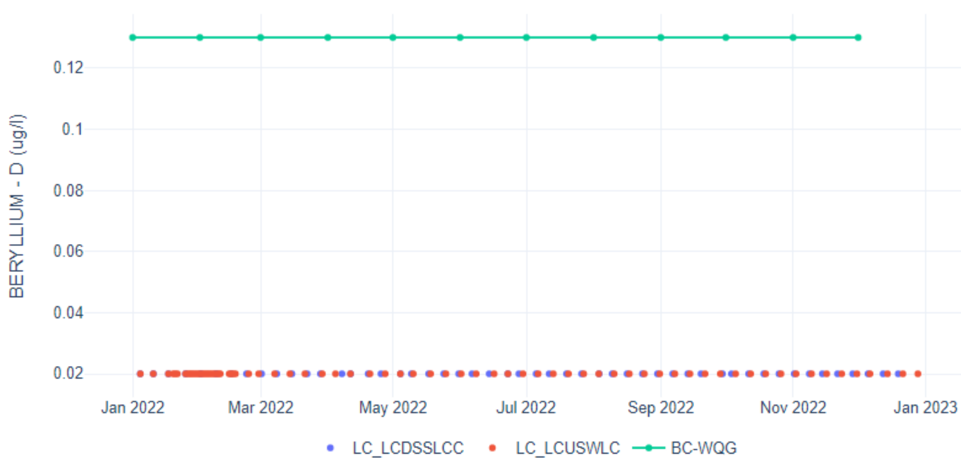
Dewatering from MSX Pit and HSP was conducted in 2022 during the periods of October to December and June to December, respectively. As a result, the water quality in Line Creek during dates outside of these dewatering periods is not influenced by MSX or HSP dewatering. However, Line Creek monitoring data for the entire year for each COPC has been provided.

Charts presenting the water quality data for all COPCs at LC_LCDSSLCC and LC_LCUSWLC can be found in Appendix A. Trends for COPCs that exceeded the modelled concentration at MSX Pit are provided in Figure 3-7 to Figure 3-11.



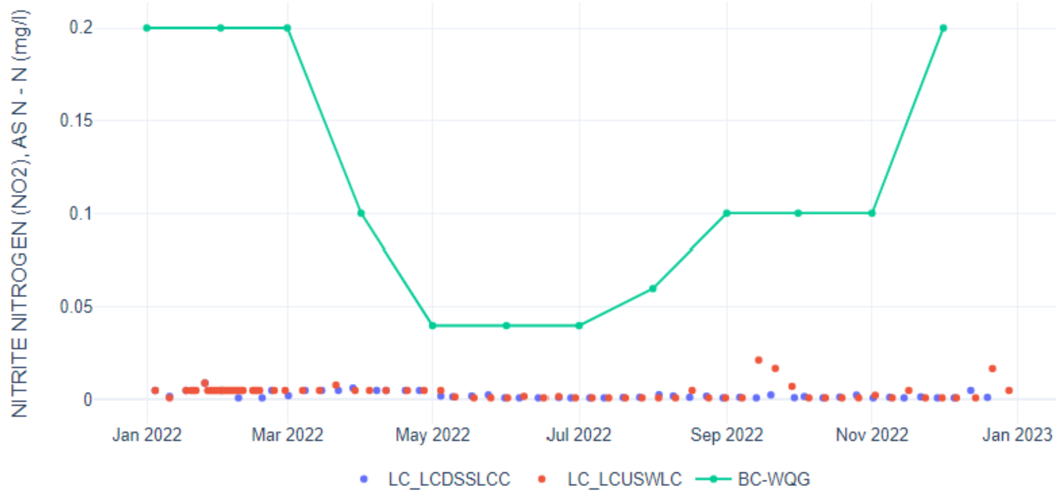
Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

Figure 3-5: Concentration of Dissolved Barium in Line Creek



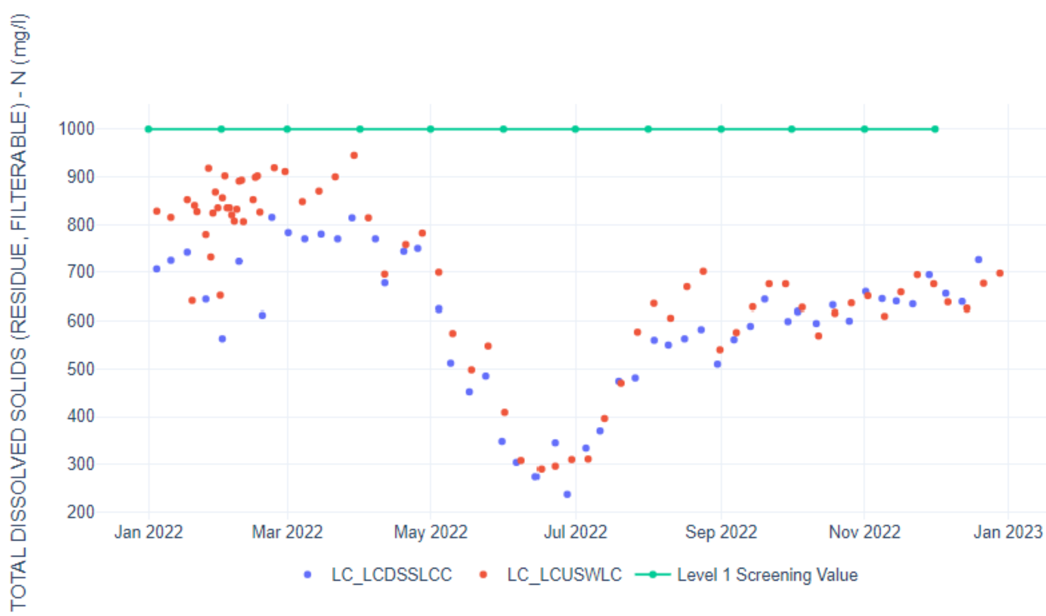
Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

Figure 3-6: Concentration of Dissolved Beryllium in Line Creek



Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

Figure 3-7: Concentration of Nitrite in Line Creek



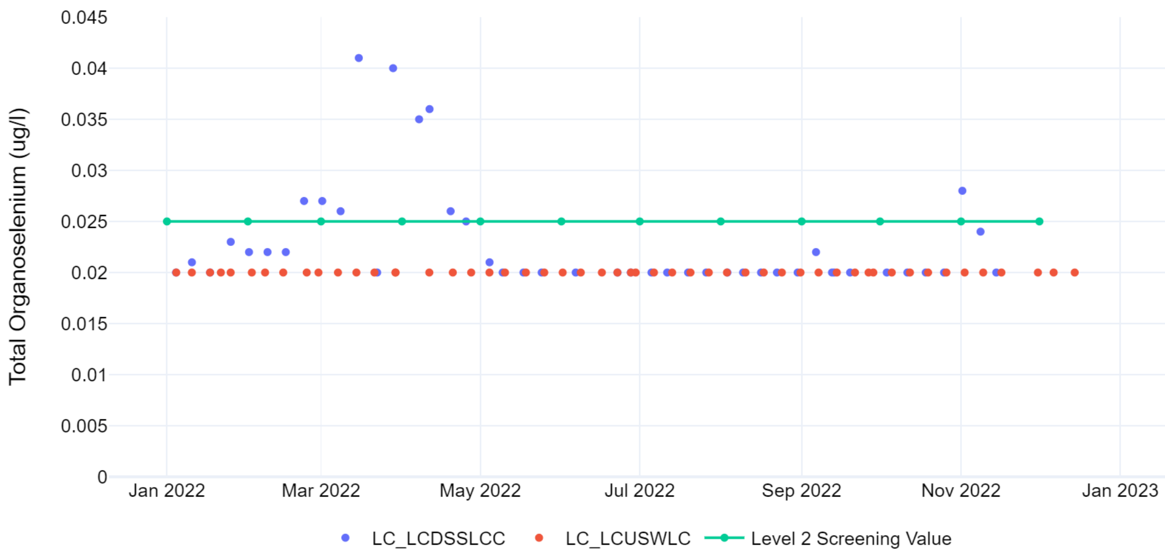
Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

Figure 3-8: Concentration of Total Dissolved Solids in Line Creek

The tool methodology can be considered sufficiently conservative as the parameters whose concentrations exceeded the tool input concentrations did not exceed the established water quality thresholds at LC_LCDSSLCC or LC_LCUSWLC.

3.3.1 Organoselenium at LC_LCDSSLCC and LC_LCUSWLC

Organoselenium exceeded the level 1 screening value on nine occasions at LC_LCDSSLCC in 2022. All occurrences except one occur during freshet. Since the concentrations of organoselenium at MSX Pit and Horseshoe Ridge Pit do not exceed the level 1 screening value, it is unlikely that they are the source of the organoselenium found in LC_LCDSSLCC. At LC_LCUSWLC, organoselenium concentrations were at or below the detection limits for all samples.



Source: MSX_HSP_Tool_Assessment_r1_NL.ipynb

Figure 3-9: Concentration of Total Organoselenium in Line Creek

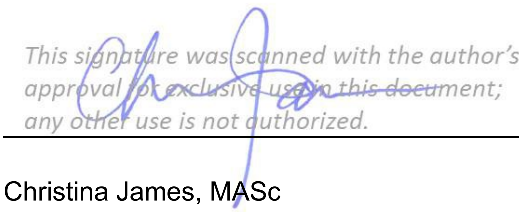
4 Conclusions and Recommendations

Although the concentration of some constituents exceeded the dewatering tool input concentrations in the MSX dewatering tool, and the flow at Line Creek was at times lower than the low flow assumption in both tools during the year, the tools were both successful in recommending dewatering rates that ensured the concentration of COPCs at LC_LCDSSLCC and LC_LCUSWLC did not exceed the water quality thresholds.

With respect to potential improvements to the dewatering tool, the following opportunities for improvement were identified:

- The dewatering methodology applied to MSX and HSP dewatering calculations do not account for inputs from other sources. If dewatering of multiple pits simultaneously into a shared receiving environment is required in the future, one tool should be developed to account for the cumulative contributions from all sources to ensure that the assimilative capacity of the receiving environment is not exceeded. However, since MSX Pit will cease mining operations in midway through Q1 2023, further updates to the MSX Pit dewatering tool are unnecessary.
- Annual review of water quality data should include updating the conservative assumptions on which the recommended pit dewatering rates are made. In 2022, MSX pit water quality exceeded the tool input concentrations for several parameters. However, as noted above, mining in MSX pit will cease in Q1 2023, and updating the dewatering tool is unnecessary. For HSP, the representative water quality used in the dewatering tool was deemed sufficiently conservative (higher than observed data in 2022). Therefore, no updates to the HSP dewatering tool inputs are necessary.

Regards,
SRK Consulting (Canada) Inc.



Noah Levin, P. Eng
Consultant

Christina James, MASc
Practice Lead

Attachments:

Appendix A Line Creek Water Quality Data

References

SRK Consulting (Canada) Inc., 2022a. Horseshoe Ridge Pit Dewatering Plan Water Quality Evaluation – 2021 Water Quality Update. Project Number 1CT017.299. September 2022.

SRK Consulting (Canada) Inc., 2022b. MSX Pit Dewatering Plan Water Quality Evaluation – 2021 Water Quality Update. Project Number 1CT017.299. May 2022.

Appendix A Line Creek Water Quality Data

ALUMINUM - D (mg/l)
0.1
0.08
0.06
0.04
0.02
0
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
BC-WQG

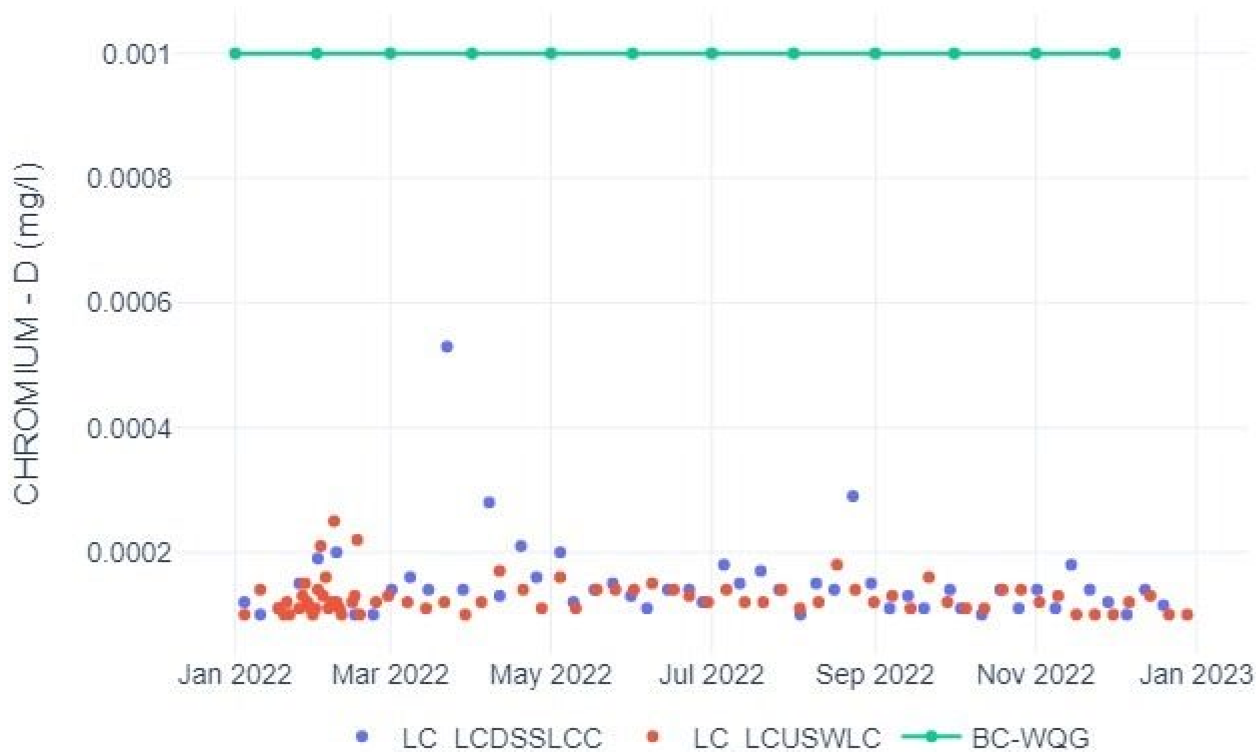
0.008
0.006
0.004
0.002
0
ANTIMONY - D (mg/l)
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
BC-WQG

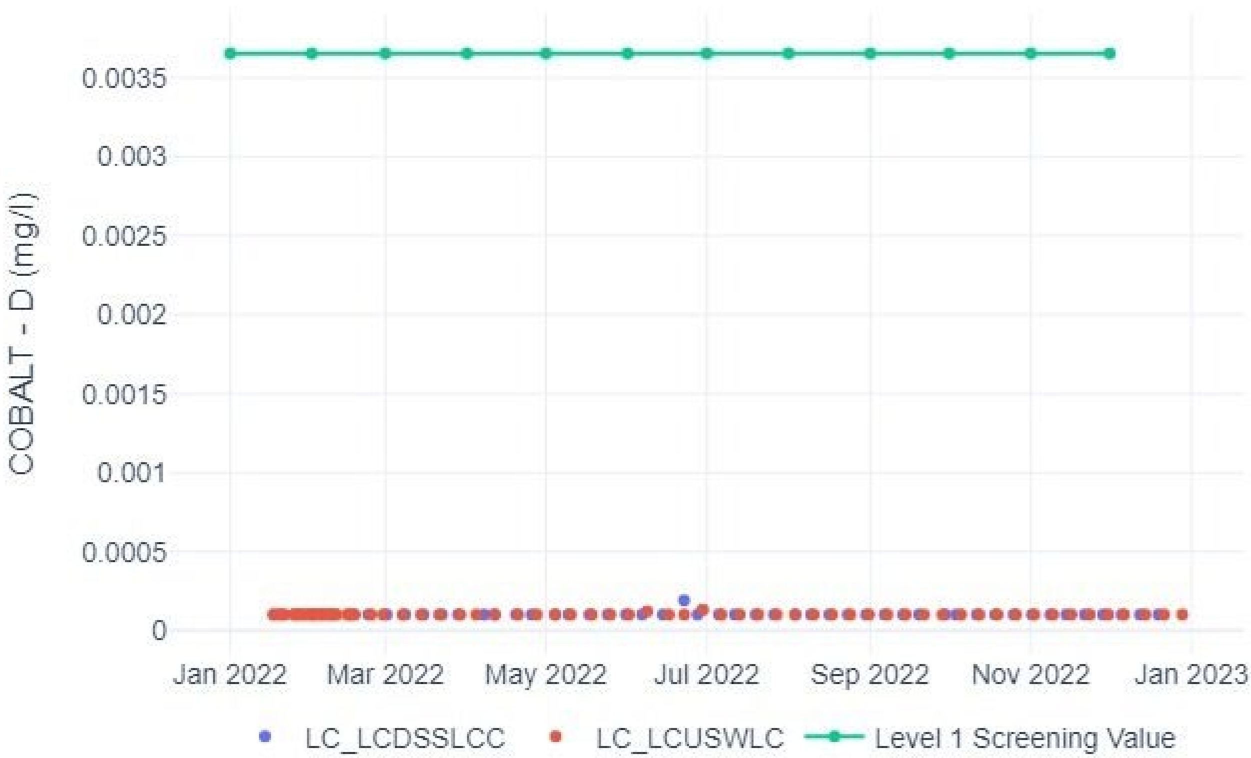
0.005
0.004
0.003
0.002
0.001
0
ARSENIC - D (mg/l)
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
BC-WQG

BARIUM - D (mg/l)
1
0.8
0.6
0.4
0.2
0
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
BC-WQG

BERYLLIUM - D (ug/l)
0.12
0.1
0.08
0.06
0.04
0.02
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
BC-WQG

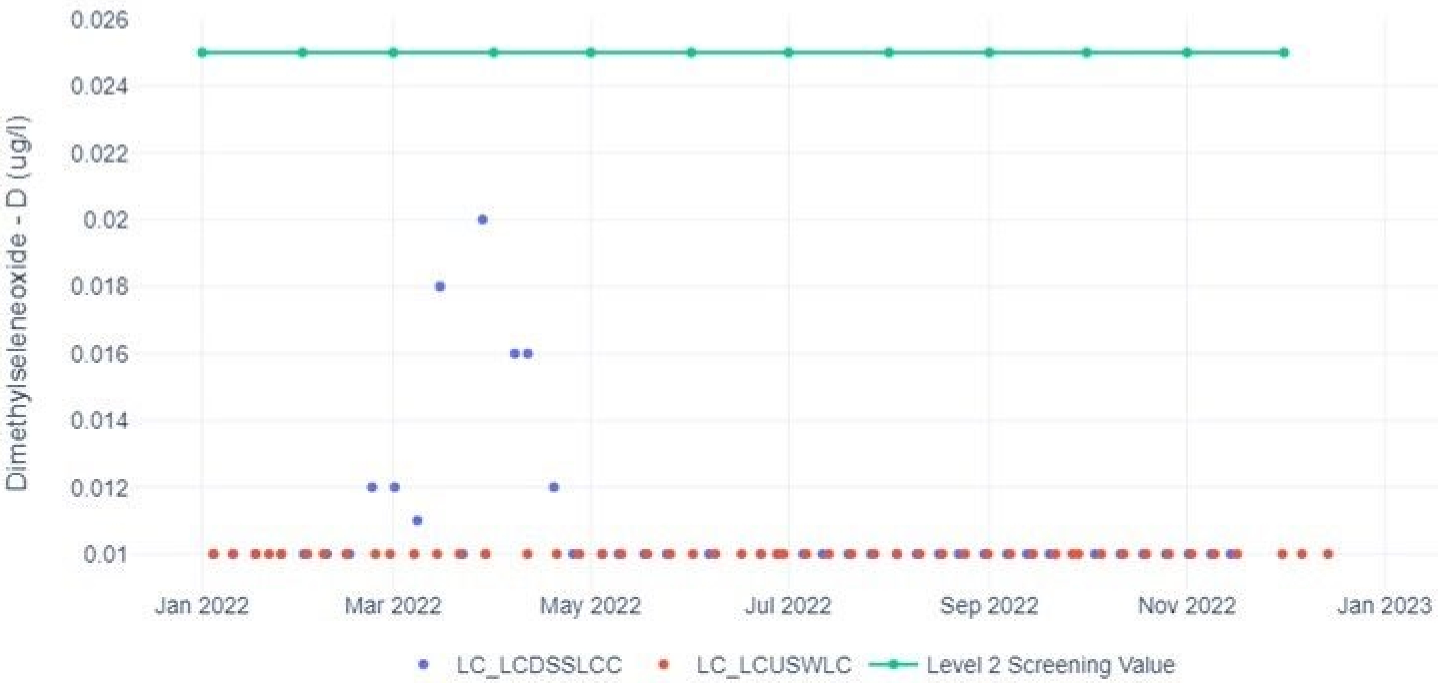
CADMIUM - D (ug/l)
0.5
0.4
0.3
0.2
0.1
0
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
Site Performance Objective


0.001
0.0008
0.0006
0.0004
0.0002
CHROMIUM - D (mg/l)
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
BC-WQG

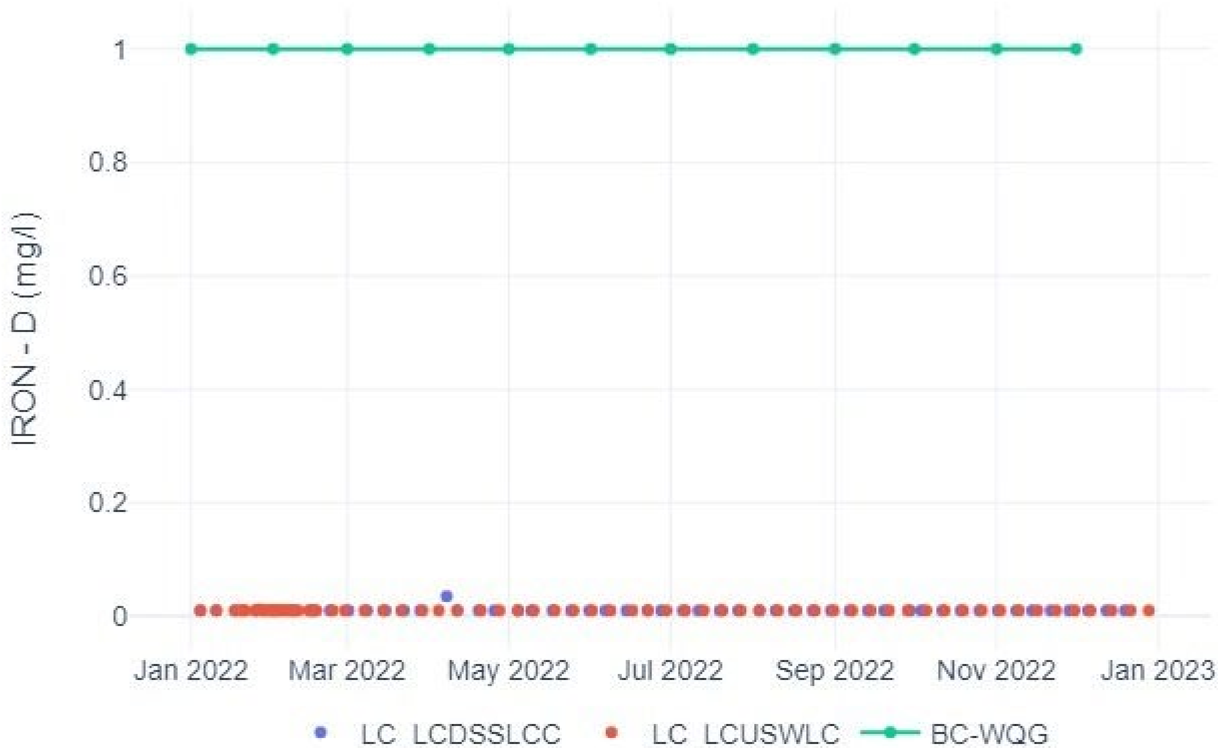


COBALT - D (mg/l)
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
Level 1 Screening Value

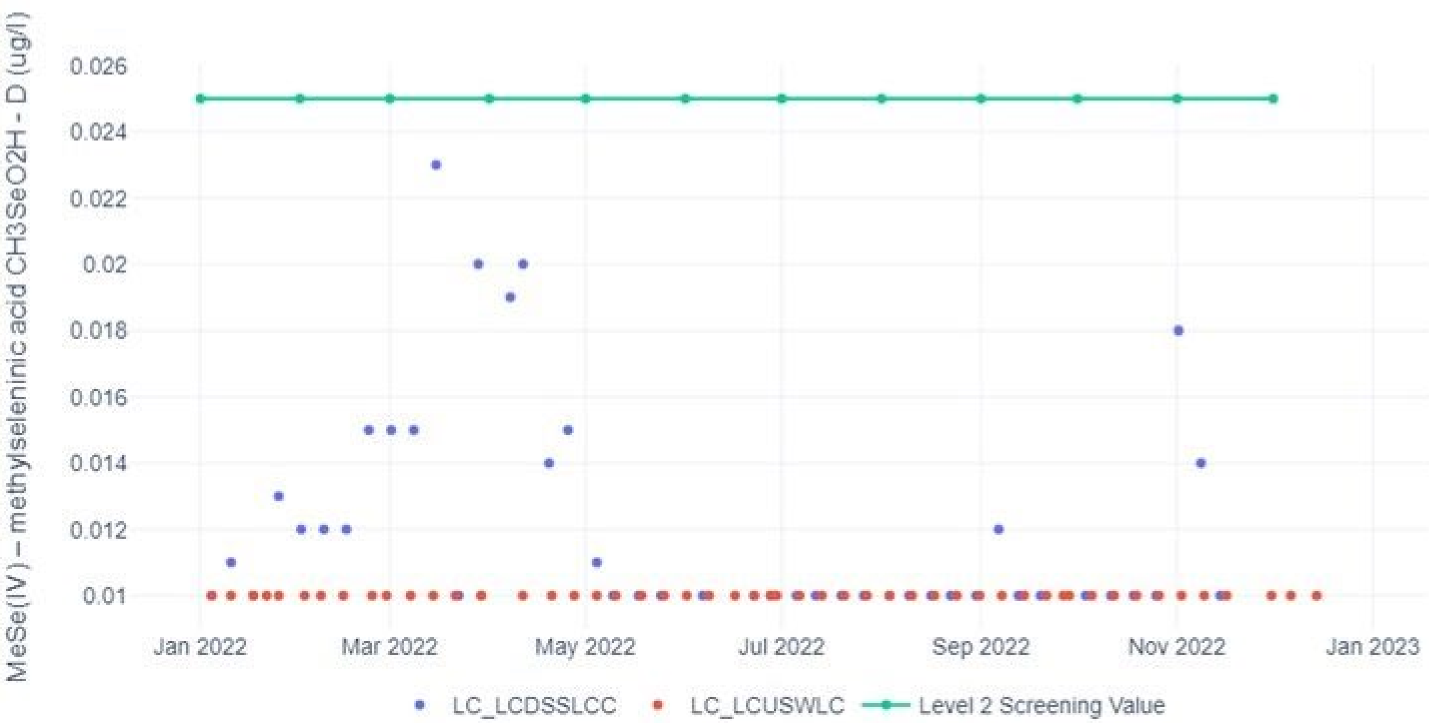
COPPER - D (mg/l)
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
BC-WQG BLM



Dimethylseleneoxide - D (ug/l)
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
Level 2 Screening Value



IRON - D (mg/l)
1
0.8
0.6
0.4
0.2
0
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
BC-WQG



MeSe(IV) – methylseleninic acid CH3SeO2H - D (ug/l)
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
Level 2 Screening Value


NICKEL - D (mg/l)
0.014
0.012
0.01
0.008
0.006
0.004
0.002
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
Level 2 Screening Value

NITRATE NITROGEN (NO3), AS N - N (mg/l)
25
20
15
10
5
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
Site Performance Objective

NITRITE NITROGEN (NO2), AS N - N (mg/l)
0.2
0.15
0.1
0.05
0
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
BC-WQG

NITROGEN, AMMONIA (AS N) - T (mg/l)
1.5
1
0.5
0
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
BC-WQG

0.02
0.015
0.01
0.005
PHOSPHORUS - T (mg/l)
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
Site Performance Objective

SELENIUM - T (ug/l)
80
60
40
20
0
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
Site Performance Objective


450
400
350
300
250
200
150
100
Sulphate (as SO4) - D (mg/l)
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
Site Performance Objective

0.1
0.08
0.06
0.04
0.02
0
URANIUM - D (mg/l)
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
LC_LCDSSLCC
LC_LCUSWLC
Level 2 Screening Value