



BC EAO EAC Application – Tenas Project

Section 13.0 Management Plans

Chapter 11 Minesite Water Management Plan

May 2022

VERSION 1.0

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Submitted by:	Telkwa Coal Limited Suite 1410 – 409 Granville Street Vancouver, BC V6C 1T2

Tenas Project

Section 13.0 Management Plans

Chapter 11 Minesite Water Management Plan

TABLE OF CONTENTS

Table of Contents	i
List of Figures	iii
List of Tables	iv
List of Appendices.....	vi
Abbreviations and Acronyms	vii
Units of Measure	ix
Executive Summary.....	xi
1. Introduction	1
2. Purpose and Objectives	1
3. Scope and Scale.....	2
4. Compliance Obligations	3
4.1 Regulatory Requirements	3
4.2 Standard Practices and Procedures (SPPs).....	5
5. Relationship to Other Management Plans.....	6
6. Details of the Minesite Water Management Plan (MWMP).....	7
6.1 Supporting Climate Analysis	7
6.1.1 Temperature	7
6.1.2 Precipitation	7
6.1.2.1 Annual Frequency Analyses	8
6.1.2.2 Depth Duration Frequency Curves.....	9
6.1.2.3 Extreme Precipitation	10
6.1.3 Snowmelt.....	11
6.1.4 Tenas Project Runoff	12
6.1.5 Evaporation.....	12
6.2 Surface Water Management Plan	13
6.2.1 Summary of Water Management Infrastructure	13
6.2.2 Surface Water Management Phases	14
6.3 Water Management Design	24
6.3.1 Design Peak Flow Estimates.....	24
6.3.2 Diversion and Collection Channels	26

6.3.2.1	Engineered Channels	26
6.3.2.2	Protection at Project Discharge Locations.....	31
6.3.3	Dam Classification and Design.....	35
6.3.3.1	Classification.....	35
6.3.3.2	Selection of Inflow Design Flood (IDF).....	41
6.3.3.3	Spillway Design.....	42
6.3.3.4	Freeboard Evaluation	42
6.3.3.5	Dam Slope Stability	43
6.3.4	Sedimentation Ponds	44
6.3.4.1	Sedimentation Pond Design Methodology	46
6.3.4.2	Sedimentation Pond Design Results.....	47
6.3.5	Tenas Control Pond	53
6.3.5.1	Conceptual Model and Design Criteria.....	53
6.3.5.2	Operational Water Demand	54
6.3.5.3	Minimum Process Water Storage Volume.....	55
6.3.5.4	Monthly Water Balance for Target Operating Level	55
6.3.5.5	Pumping Rate	58
6.3.5.6	Sedimentation Capacity.....	58
6.3.5.7	Contingency Storage and Pond Spillway Invert.....	58
6.3.5.8	Spillway Sizing and Freeboard	59
6.3.5.9	Summary of Tenas Control Pond Design	60
6.3.6	Management Ponds.....	61
6.3.6.1	Design and Objectives.....	61
6.3.6.2	Spillway Sizing and Freeboard	63
6.3.6.3	Management Pond Operations	69
6.3.7	Other Project Infrastructure	70
6.3.7.1	Potable Water Storage Pond	70
6.3.7.2	Wastewater Storage Pond.....	70
6.3.7.3	Soil Treatment Facility Pond.....	70
6.3.7.4	Quarry Development	71
6.3.8	Pumping Systems and Pipelines	71
6.3.8.1	Pump Design Details	71
6.3.9	Road Crossings Design.....	73
6.3.10	Care and Maintenance (C&M).....	77
6.3.11	Closure and Reclamation	77
7.	Monitoring.....	79
7.1	Monitoring Summaries.....	79
7.1.1	Flow Monitoring Results.....	79
7.1.2	Water Quality Monitoring Results	79
7.1.3	Data Interpretation	80
7.2	Performance Objectives	80

8.	Reporting.....	82
8.1	General Reporting.....	82
8.2	Compliance Reporting	82
8.3	Internal Reporting.....	82
8.4	Annual Reporting Requirements.....	82
9.	Roles and Responsibilities.....	84
9.1	Mine Manager	84
9.2	Mine Superintendent.....	84
9.3	Environmental Coordinator	84
9.4	Environmental Technician.....	84
9.5	Quality Assurance/Quality Control (QA/QC) Technician	85
9.6	Employees and Contractors.....	85
10.	Communication	86
10.1	Training and Awareness	86
10.2	Employee Training	86
10.3	Contractor and Visitor Training	86
11.	Evaluation and Adaptive Management	87
11.1	Evaluation	87
11.2	Adaptive Management	87
11.3	Continual Improvement.....	87
12.	Change Management.....	88
13.	Conclusion	88
14.	References.....	89

LIST OF FIGURES

Figure 1-1:	Water Management Overview	1
Figure 1-2:	Water Management Rail Infrastructure Area	2
Figure 6.1-1:	Monthly precipitation as snow and rain.....	8
Figure 6.2-1:	Water Management Construction Phase Year -0.5.....	18
Figure 6.2-2:	Water Management End of Year 1	19
Figure 6.2-3:	Water Management End of Year 5	20
Figure 6.2-4:	Water Management End of Year 10	21
Figure 6.2-5:	Water Management Decommissioning and Reclamation Phase	22
Figure 6.2-6:	Water Management Post-closure Phase	23

Figure 6.3-1:	Calibrated curve number (CN) values and CN values after adjustments for AMC III saturated conditions for return periods.....	25
Figure 6.3-2:	Typical sediment control pond geometry	47
Figure 6.3-3:	Sedimentation pond catchment area map for (a) Tenas Control Pond, (b) Coal Processing Plant (CPP) and Explosive Infrastructure area sedimentation ponds and (c) Rail Infrastructure Sedimentation Pond	52
Figure 6.3-4:	Tenas Control Pond conceptual design schematic	53
Figure 6.3-5:	Tenas Control Pond catchment area, Year 5, during critical potentially acid generating (PAG) placement period.....	57
Figure 6.3-6:	Routing of the inflow design flood (IDF) through the Tenas Control Pond spillway	59
Figure 6.3-7:	Management pond spillway catchment map	66
Figure 6.3-8:	North Management Pond inflow design flood (IDF) hydrographs. (a) Operation Phase conditions hydrographs (b) Post-closure Phase conditions hydrographs.....	68
Figure 6.3-9:	East Management Pond inflow design flood (IDF) hydrographs. (a) Operation Phase conditions hydrographs (b) Post-closure Phase conditions hydrographs.....	68
Figure 6.3-10:	West Management Pond inflow design flood (IDF) hydrographs. (a) Operation Phase conditions hydrographs (b) Post-closure Phase conditions hydrographs.....	69

LIST OF TABLES

Table 4.1-1:	Legislation and Guidelines Relevant to the Minesite Water Management Plan (MWMP)	3
Table 5-1:	Management Plans with a Relationship to the Minesite Water Management Plan (MWMP)	6
Table 6.1-1:	Project Temperature Summary (degrees Celsius [oC])	7
Table 6.1-2:	Project Precipitation Summary (millimetres [mm])	8
Table 6.1-3:	Annual Precipitation Frequency Analysis	9
Table 6.1-4:	Project Depth-Duration-Frequency (DDF) Data with Climate Change, Year 2100 (Precipitation Depth – millimetres [mm])	10
Table 6.1-5:	Tenas Project Probable Maximum Precipitation (PMP)	10
Table 6.1-6:	Tenas Baseline Project Probable Maximum Precipitation (PMP) Inflow Design Flood (IDF) Curve.....	11
Table 6.1-7:	Project Daily Snowmelt Depth Frequency Analysis	11
Table 6.1-8:	Tenas Project Monthly Runoff Distribution (percent [%])	12
Table 6.1-9:	Annual Runoff Frequency Analysis	12
Table 6.1-10:	Tenas Project Monthly Evaporation Rates (millimetres [mm])	12

Table 6.2-1:	Water Management Infrastructure.....	13
Table 6.2-2:	Surface Water Management Activities by Project Phase.....	15
Table 6.3-1:	Goathorn Creek near Telkwa (WSC 08EE008) Curve Number (CN) Calibration Results.....	24
Table 6.3-2:	Design Criteria for Engineered Channels.....	27
Table 6.3-3:	Summary of Tenas Project Collection and Diversion Channels	28
Table 6.3-4:	Engineered Channel Peak Flow Results.....	29
Table 6.3-5:	Engineered Channel Design Results	30
Table 6.3-6:	Four Creek Erosion Protection Design Criteria	32
Table 6.3-7:	C-02 Channel Discharge to Four Creek Design Flow Results.....	32
Table 6.3-8:	C-02 Control Structure and Overflow Weir Design Results	33
Table 6.3-9:	Summary of Erosion Protection Design at Goathorn Creek Discharge Location	34
Table 6.3-10:	Canadian Dam Association (CDA) (2013) Dam Classifications.....	35
Table 6.3-11:	Consequence Classification for Excavated Water Storage Ponds	37
Table 6.3-12:	Consequence Classification for Management Ponds and Tenas Control Pond	39
Table 6.3-13:	Inflow Design Flood (IDF) based on Consequence Classification	41
Table 6.3-14:	Tenas Project Dam's Freeboard Summary	43
Table 6.3-15:	Sediment Control Pond Objective and Discharge Summary	44
Table 6.3-16:	Design Criteria for Sediment Control Ponds	45
Table 6.3-17:	Sedimentation Pond Hydrologic Analysis Summary	48
Table 6.3-18:	Sediment Control Pond Geometry and Design Summary.....	49
Table 6.3-19:	Sediment Control Pond Sedimentation Calculation Summary.....	50
Table 6.3-20:	Tenas Control Pond Design Criteria.....	54
Table 6.3-21:	Tenas Control Pond Monthly Water Balance for one (1) in 10-year Dry Condition in Mine Year Five (5), during Critical Potentially Acid Generating (PAG) Placement Period	56
Table 6.3-22:	Tenas Control Pond Spillway and Freeboard Results	60
Table 6.3-23:	Summary Tenas Control Pond Design.....	60
Table 6.3-24:	Management Pond Deposition Schedule	62
Table 6.3-25:	Management Pond Design Volumes and Elevations.....	62
Table 6.3-26:	Design Criteria for Management Pond Spillways.....	64
Table 6.3-27:	Management Pond Operational Spillway and Freeboard Results	67

Table 6.2-1:	Water Management Infrastructure.....	13
Table 6.2-2:	Surface Water Management Activities by Project Phase.....	15
Table 6.3-1:	Goathorn Creek near Telkwa (WSC 08EE008) Curve Number (CN) Calibration Results.....	24
Table 6.3-2:	Design Criteria for Engineered Channels.....	27
Table 6.3-3:	Summary of Tenas Project Collection and Diversion Channels	28
Table 6.3-4:	Engineered Channel Peak Flow Results.....	29
Table 6.3-5:	Engineered Channel Design Results	30
Table 6.3-6:	Four Creek Erosion Protection Design Criteria	32
Table 6.3-7:	C-02 Channel Discharge to Four Creek Design Flow Results.....	32
Table 6.3-8:	C-02 Control Structure and Overflow Weir Design Results	33
Table 6.3-9:	Summary of Erosion Protection Design at Goathorn Creek Discharge Location	34
Table 6.3-10:	Canadian Dam Association (CDA) (2013) Dam Classifications.....	35
Table 6.3-11:	Consequence Classification for Excavated Water Storage Ponds	37
Table 6.3-12:	Consequence Classification for Management Ponds and Tenas Control Pond	39
Table 6.3-13:	Inflow Design Flood (IDF) based on Consequence Classification	41
Table 6.3-14:	Tenas Project Dam's Freeboard Summary	43
Table 6.3-15:	Sediment Control Pond Objective and Discharge Summary	44
Table 6.3-16:	Design Criteria for Sediment Control Ponds	45
Table 6.3-17:	Sedimentation Pond Hydrologic Analysis Summary	48
Table 6.3-18:	Sediment Control Pond Geometry and Design Summary.....	49
Table 6.3-19:	Sediment Control Pond Sedimentation Calculation Summary.....	50
Table 6.3-20:	Tenas Control Pond Design Criteria.....	54
Table 6.3-21:	Tenas Control Pond Monthly Water Balance for one (1) in 10-year Dry Condition in Mine Year Five (5), during Critical Potentially Acid Generating (PAG) Placement Period	56
Table 6.3-22:	Tenas Control Pond Spillway and Freeboard Results	60
Table 6.3-23:	Summary Tenas Control Pond Design.....	60
Table 6.3-24:	Management Pond Deposition Schedule	62
Table 6.3-25:	Management Pond Design Volumes and Elevations.....	62
Table 6.3-26:	Design Criteria for Management Pond Spillways.....	64
Table 6.3-27:	Management Pond Operational Spillway and Freeboard Results	67

Table 6.3-28:	Management Pond Post-Closure Spillway and Freeboard Results.....	67
Table 6.3-29:	Tenas Project Pumping System Description.....	71
Table 6.3-30:	Pump Design Summary	73
Table 6.3-31:	Design Criteria for Road Crossings	75
Table 6.3-32:	Road Crossings Culvert Details.....	76
Table 7.2-1:	Performance Objectives.....	80

LIST OF APPENDICES

Appendix 13.11-A	Engineering Drawings
Appendix 13.11-B	Dam Breach Assessment
Appendix 13.11-C	Stage-Storage Relationships
Appendix 13.11-D	Soil Cover Memo
Appendix 13.11-E	Minesite Water Monitoring Program

ABBREVIATIONS AND ACRONYMS

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
AIR	Application Information Requirements
ARD	acid rock drainage
AMC	antecedent moisture conditions
BC	British Columbia
BC MECCS	British Columbia Ministry of Environment and Climate Change Strategy
BC MEM	British Columbia Ministry of Energy and Mines
BC MEMLI	British Columbia Ministry of Energy, Mines and Low Carbon Innovation
BC MEMPR	British Columbia Ministry of Energy, Mines and Petroleum Resources
BC MFLNRO	British Columbia Ministry of Forests, Lands, and Natural Resource Operations
BC MAL	British Columbia Ministry of Agriculture and Lands
BC MOE	British Columbia Ministry of Environment
BC MOF	British Columbia Ministry of Forests
BMPs	best management practices
C	Chapter
C&M	Care and Maintenance
CCME	Canadian Council of Ministers of the Environment
CDA	Canadian Dam Association
CEMP	Construction Environmental Management Plan (S13.0-C4)
CMIP5	Coupled Model Intercomparison Project
CN	curve number
Code	Health, Safety and Reclamation Code in British Columbia (British Columbia Ministry of Energy, Mines and Low Carbon Innovation [BC MEMLI] 2021))
CPP	Coal Processing Plant
CRWE	Complimentary Relationship Wet Environment Model
CSP	corrugated steel pipes
DDF	depth-duration-frequency
DMP	Discharge Management Plan (S13.0-C5)
EA	environmental assessment
EAC	Environmental Assessment Certificate
EMS	Environmental Management System (S13.0-C1)
EMP	Explosives Management Plan (S13.0-C6)
EOM	End of Mining
E0Y	End of Year
GCMS	Global Circulation Models

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
GISTM	Global Industry Standards on Tailings Management
GovCan	Government of Canada
Gov BC	Government of British Columbia
HDPE	high-density polyethylene
HEC-HMS	hydrologic modelling system designed to simulate the precipitation-runoff processes of dendritic drainage basins
H:V	slope ratio horizontal to vertical
HW/D	headwater depth to culvert diameter ratio
ICLR	Institute for Catastrophic Loss Reduction
ICMM	International Council on Mining & Metals
IDF	inflow design flood
JAIR	Joint Application Information Requirements for <i>Mines Act</i> and <i>Environmental Management Act</i> Permits (British Columbia Ministry of Energy, Mines and Petroleum Resources [BC MEMPR] and British Columbia Ministry of Environment and Climate Change Strategy [BC MECCS] 2019).
LIDAR	Light Detection and Ranging
LOM	life-of-mine
LWBMV	Land and Water Boards of the Mackenzie Valley
MA/EMA	<i>Mines Act</i> , RSBC 1996, c 293, and <i>Environmental Management Act</i> , SBC 2003, c 53
MAR	mean annual runoff depth
MERP	Mine Emergency Response Plan (S13.0-C9)
MIC	Mine Infrastructure Complex
ML	metal leaching
MWMP	Minesite Water Management Plan (S13.0-C11)
ML/ARDMP	Metal Leaching/Acid Rock Drainage Management Plan (S13.0-C12)
non-PAG	non-potentially acid generating
NRC	National Research Council Canada
OHSP	Occupational Health and Safety Program (S13.0-C13)
OMS	Operation, Maintenance and Surveillance
PAG	potentially acid generating
PCIC	Pacific Climate Impacts Consortium
PMP	probable maximum precipitation
PMF	Probable Maximum Flood
Project	Tenas Project
POC/COC	Parameters of Concern/Contaminants of Concern
POPC/COPC	Parameters of Potential Concern/Contaminants of Potential Concern
QA/QC	Quality Assurance/Quality Control

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
ROM	run-of-mine
S	Section
SCS	Soil Conservation Service
SEMP	Socio-Economic Management Plan (S13.0-C16)
SRK	SRK Consulting (Canada) Inc.
CSP	corrugated steel pipes
SOPs	Standard Operating Procedures
SPPs	Standard Practices and Procedures
TAC	Tenas Access Corridor
TARP	Trigger Action Response Plan
Tc	time of concentration
TCL	Telkwa Coal Limited
TRM	turf reinforcement mat
TSS	Total Suspended Solids
MOC	Management of Change
MWMP	Vegetation Management Plan (S13.0-C18)
USACE	U.S. Army Corps of Engineers
USDA	United States Department of Agriculture
WMO	World Meteorological Organization

UNITS OF MEASURE

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
°C	degrees Celsius
%	percent
1 in	one in (i.e., 1 in 100-year flood)
D ₅₀	mean rock size for which 50% of rocks are smaller
HP	horsepower
km ²	square kilometres
L/s/km ²	litres per metre per square kilometre (unit peak flow)
m	metre
m ²	square metre
m ³ /s	cubic metres per second
m/s	metres per second
mm	millimetre

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
masl	metres above sea level
Mm ³	million cubic metres
SWE	snow-water equivalent
V _{min}	Minimum Storage Volume
V _{Target}	Maximum Target Operating Volume Post-Freshet
V _{Contingency}	Contingency Storage

EXECUTIVE SUMMARY

Water management designs for the Tenas Project (Project) have been developed in support of Telkwa Coal Limited (TCL)'s Environmental Assessment Certificate (EAC) Application. The water management system was prepared for the proposed life-of-mine (LOM), including the Construction, Operation (with progressive reclamation), Decommissioning and Reclamation, and Post-closure phases. Design criteria have been selected based on applicable regulations and associated guidance documents, including the Health, Safety and Reclamation Code for Mines in British Columbia (British Columbia Ministry of Energy, Mines and Low Carbon Innovation [BC MEMLI] 2021) (Code), and with consideration for Project-specific risks.

The objectives of the water management system include minimizing the potential effects on the downstream environment by managing water within the Project Footprint such that water quality and water quantity objectives and/or regulated discharge parameter limits and rates, are achieved. Potentially-acid generating (PAG) materials are separated and stored in a series of management ponds which are designed with a permanent water cover to effectively prevent metal leaching (ML) and acid rock drainage (ARD). A minimum of 1 metre (m) of water cover will be maintained on top of all PAG material throughout the LOM, using runoff collected from within the Project footprint. All water storage facilities, including management ponds, are equipped with emergency spillways, designed in accordance with Canadian Dam Association (CDA) guidelines based on dam failure consequence classifications. These consequence classifications are supported by dam breach and inundation modelling.

Diversion channels are designed to route runoff from undisturbed areas around Project infrastructure into adjacent creeks and rivers, maintaining pre-existing watershed drainage conditions wherever feasible. Collection channels are designed to collect runoff from disturbed areas for suspended solids treatment prior to discharge to the environment. Erosion protection for all channels was selected based on the design life of each structure and the expected velocities during design flood events. Many of the channels are lined with turf reinforcement mats for erosion protection to promote vegetation growth, while higher risk structures (i.e., steeper channel segments, channels with design lives extending into post-closure, and spillway channels) are lined with riprap.

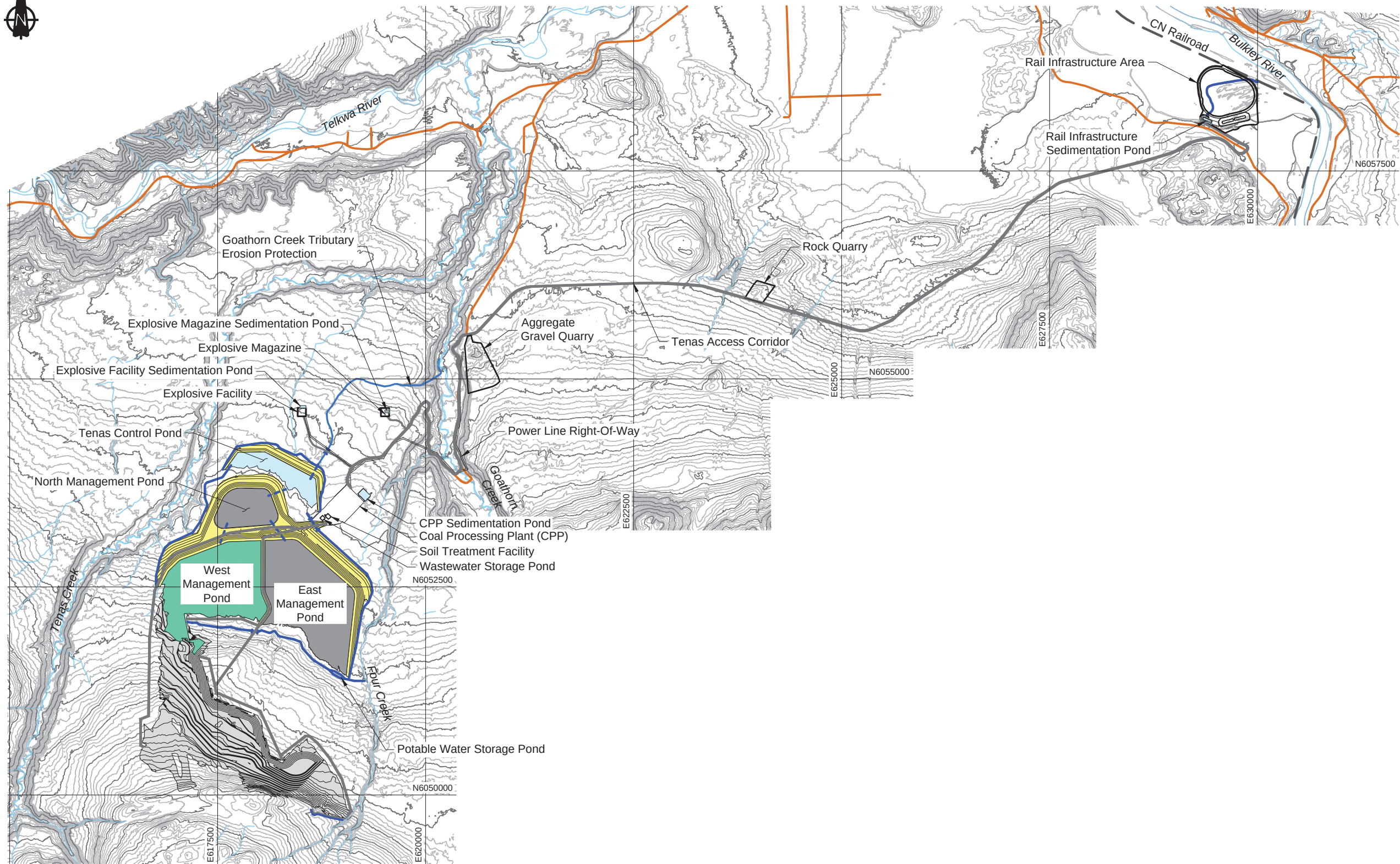
The Tenas Control Pond has been designed to provide sediment control for the open pits, water management ponds and rock storage areas, as well as provide water supply to the Coal Processing Plant (CPP) and the management pond water covers. Target operating levels were established for the Tenas Control Pond to meet water demand year-round and in upset conditions (i.e., droughts). Excess water is discharged via a pumping system over the dam to a tributary of Goathorn Creek. The pond includes an emergency spillway and an additional surge capacity equal to the 1 in 10-year inflow volume to provide operational flexibility with respect to discharge rates into Goathorn Creek.

In addition, sedimentation ponds will be situated downstream of all pads and working areas, including Explosives Magazine and Explosives Facility pads, the Rail Infrastructure area, and the Coal Processing Plant (CPP). Sedimentation ponds are designed in accordance with the British Columbia Ministry of Environment (BC MOE) Technical Guidance 7 in Environmental Management: Assessing the Design, Size, and Operation of Sediment Ponds Used in Mining (BC MOE 2015) to control sediment release from the Project to the environment. Sedimentation pond discharge is directed into the nearest watercourse, maintaining pre-mining drainage paths where feasible. Other ponds to be constructed are the Wastewater (sewage) Storage Pond, Potable Water Storage Pond and Soil Treatment Facility Pond.

1. INTRODUCTION

Telkwa Coal Limited (TCL) is proposing to develop the Tenas Project (Project) in northwest British Columbia (BC). The Project will consist of an open pit, a Coal Processing Plant (CPP) and Rail Loadout area, external non-potentially acid generating (non-PAG) rock and coal stockpiles, water management and control ponds, (**Figure 1-1** and **Figure 1-2**). Processed and unprocessed potentially acid generating (PAG) mine rock will be backfilled into the open pits (when available) and in the three (3) water management ponds, where the mine rock will be stored sub-aqueously. The mine life of the Project is estimated at 26.5 years which includes the Construction, Operation, and Decommissioning and Reclamation phases. This is followed by the Post-closure Phase, which will last 25 years.

The Minesite Water Management Plan (MWMP) describes the surface water management strategies and procedures at the Project. This MWMP will remain in place during all phases of the Project and will be subject to ongoing management review and revisions as required. The MWMP will mitigate potential environmental and safety issues related to surface water movement and storage onsite.



- Water Management Feature
- Spillway
- Existing Watercourse
- Existing Road
- Proposed Road
- Dam and Buttress
- Sedimentation and Control Pond
- Active Management Pond
- Backfill / NAG Pile
- Covered Inactive Management Pond

1. Contours shown at 5.0m intervals.
2. All dimensions shown in meters unless otherwise stated.
3. Mine Infrastructure designs by Telkwa Coal Limited (TCL).

NAD83 UTM Zone 9.



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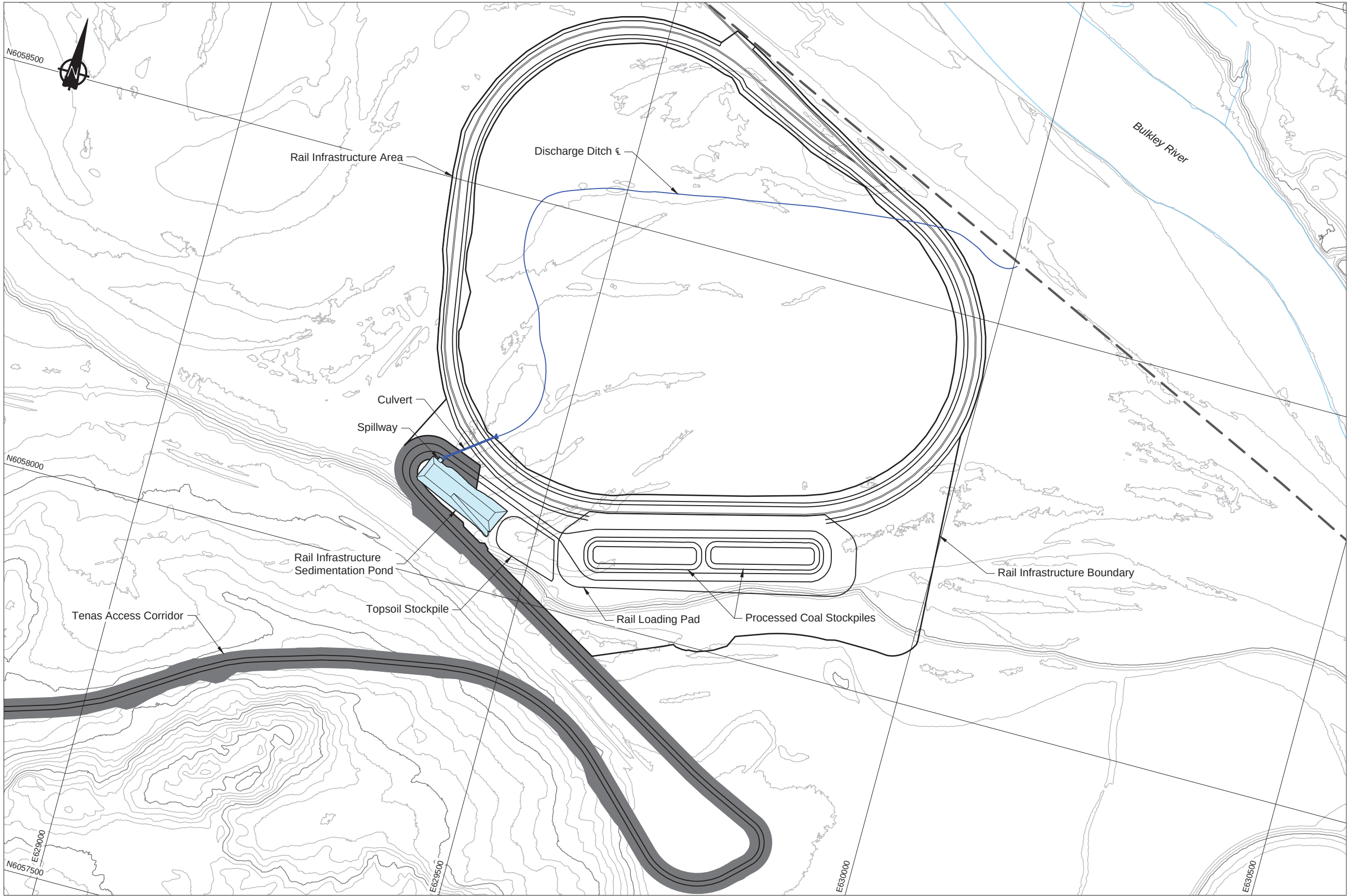
Telkwa Coal

Environmental Assessment

Water Management Overview

DATE: 2021/07/16	APPROVED: SAB	FIGURE: 1-1
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LEGEND

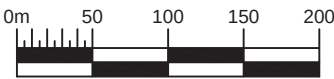
- Water Management Feature
- Spillway
- Culvert
- Existing Watercourse
- Proposed Road
- CN Railroad
- Sedimentation Pond

NOTES

- Contours shown at 2.0m intervals.
- All dimensions shown in meters unless otherwise stated.
- Pile designs by SRK Consulting Ltd.

REFERENCE

NAD83 UTM Zone 9.



SRK JOB NO.: 1CT027.003
FILE NAME: 1CT027.003 Pond Rail Infrastructure.dwg



Telkwa Coal

Environmental Assessment

Water Management Rail
Infrastructure Area

DATE:
2021/07/16

APPROVED:
SAB

FIGURE:
1-2