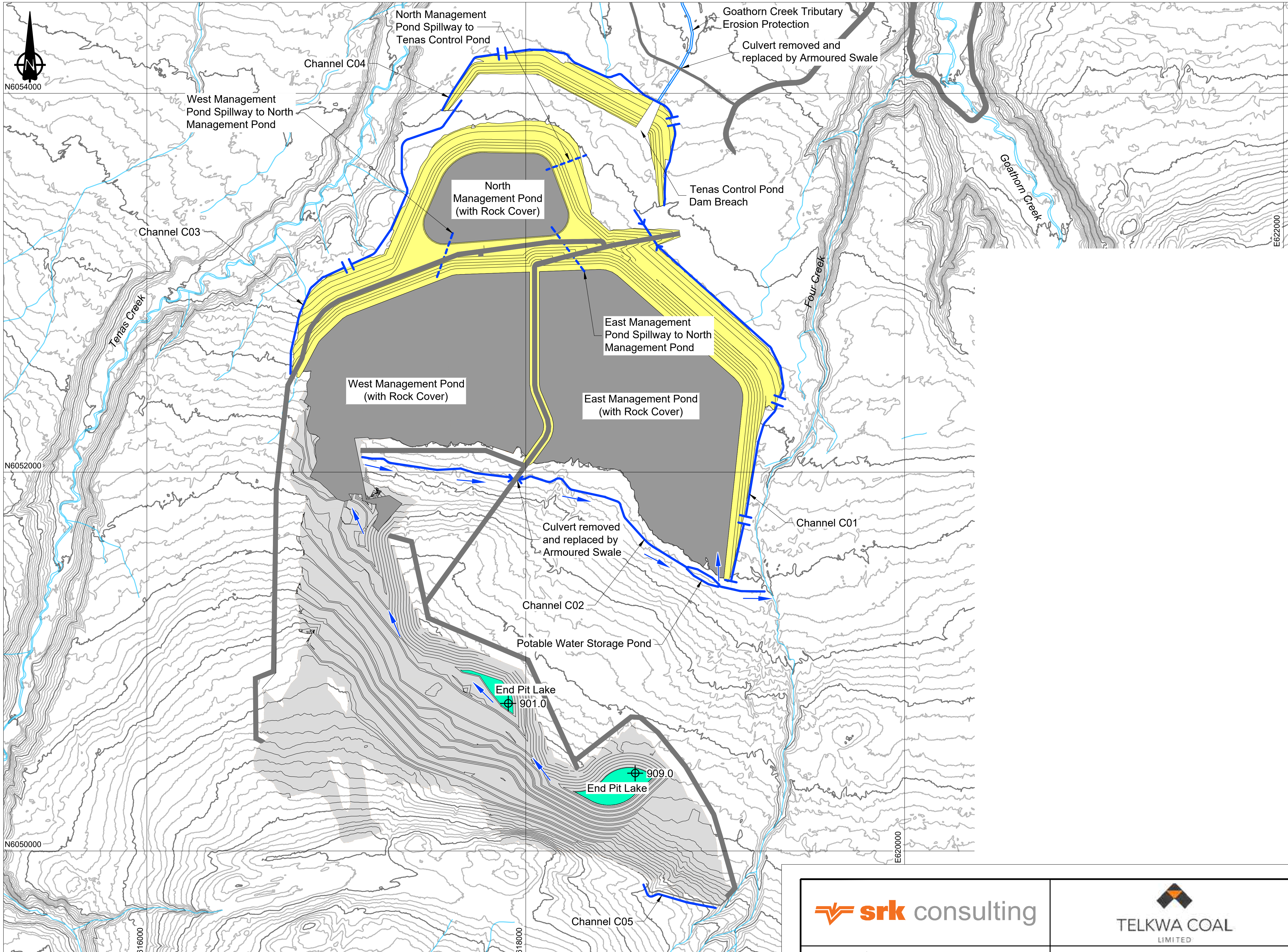
1.9.4.4 Post-closure Phase

In the Post-closure Phase, mainly monitoring and maintenance activities will be undertaken for the Project. Furthermore, all water bodies will fill up to post-closure level elevations and reach an equilibrium state at approximately the predicted elevations for the end pit lakes. TCL plans two (2) subphases of Active Post-closure and Passive Post-closure that correspond to the above activities.

Water management activities are presented in **Figure 1.9-73**. Further information is provided in the **RCP**.



LEGEND

- Water Management Feature
- Water Flow Direction
- Spillway
- Culvert
- Channel Breach
- Existing Watercourse
- Proposed Road
- Dam and Buttress
- End Pit Lake
- Backfill / NAG Pile
- Rock Cover

NOTES

1. Contours shown at 5.0m intervals.
2. All dimensions shown in meters unless otherwise stated.
3. Tenas Control Pond is breached and Goathorn Creek tributary erosion protection is extended to the outlet of the North Management Pond spillway.
4. Closure spillways route runoff from covered Management Ponds to Goathorn Creek tributary.
5. Channels C01, C03 and C04 are breached.
6. Channel C02 and C05 continue to divert water to Four Creek.
7. Pit lake forms in southern extents of open pit. Discharge flows through non-PAG rock backfill towards West Management Pond.
8. Coal Processing Plant (CPP), CPP sedimentation pond, Wastewater Storage Pond and Soil Treatment Facility are decommissioned.

REFERENCE

NAD83 UTM Zone 9.

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srk consulting

TELKWA COAL LIMITED

Environmental Assessment

Water management infrastructure after the Active portion of the Post-closure Phase

SRK JOB NO.: 1CT027.003	Telkwa Coal	DATE: 2021/10/01	APPROVED: SAB	FIGURE: 1.9-73
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1.10 Project Components Summary

This EAC Application is based on a feasibility level of engineering design. The components and activities described in this EAC Application do not comprise an initial stage or subcomponent of a larger project or planned later expansion but represent the entire Project envisioned.

The Project will include the following major components:

- open pit;
- CP;
- coal handling systems for ROM coal, processed rock, and processed coal (including CPP conveyors, storage bins, and stockpiles);
- administration, first aid, maintenance/warehouse, mine dry, laboratory, light vehicle, mine rescue, and warehouse buildings;
- Surface Water Management Infrastructure, including the Project sedimentation ponds, such as the Tenas Control Pond dam and associated spillway, the CPP Sedimentation Pond, Rail Infrastructure Sedimentation Pond, Explosive Magazine Sedimentation Pond and Explosive Facility Sedimentation Pond, as well as erosion protection along Goathorn Creek tributary;
- temporary diversion berms and channels to collect and divert runoff around working areas;
- Potable Water Storage Pond and associated collection channel and distribution network, as well as water supply wells;
- fuel and lubricant storage facilities and distribution network;
- Explosive Magazine, storage silos, and vehicle wash and maintenance facilities;
- propane storage facilities and distribution network (as required);
- solid waste management systems including landfill, recycling, and composting facilities;
- haul roads and access roads within the Minesite;
- TAC which encompasses an 11 km newly constructed Bypass Road and improvements to approximately 5.0 km of an existing FSR;
- a 3.5 km long 25 kV powerline and a 25 kV to 600 V substation adjacent to the CPP;
- Rail Infrastructure consisting of processed coal stockpiles, scales, dust control facilities and a 2.5 km Rail Loop connected to the CNR track and the Rail Infrastructure Sedimentation Pond; and
- a permanent bridge over Goathorn Creek.

Figures 1.10-1 shows the location of the Project components. The maximum estimated total area disturbed by the Project (i.e., the area of an outline containing all the Project components, buffers, and contingency areas) is approximately 1,853 ha while the estimated Project footprint (where actual Project Components are on the landscape) is 830.1 ha. **Table 1.10-1** summarizes the areas of individual Project components.

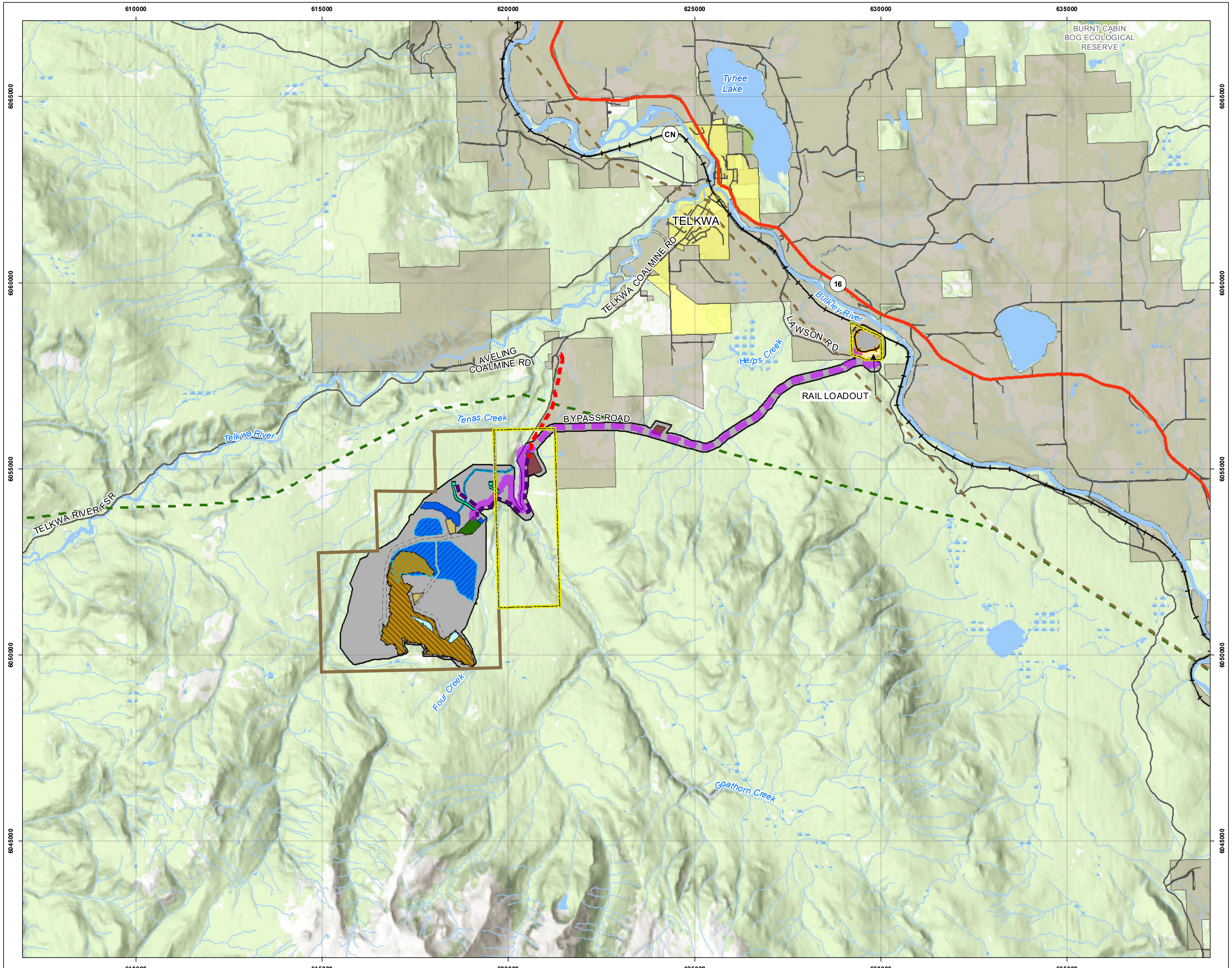
A site plan focused on mine related infrastructure was developed for the Project and **Figure 1.10-2** shows a high-level view of the infrastructure related to the open pit and management ponds. **Figure 1.10-3** shows a zoomed in view of the MIC.

The site plan has been designed to reduce the interaction of light and heavy mine vehicles as a significant number of past incidents at active mines involved these vehicles. **Figure 1.10-4** illustrates the dedicated areas for light vehicles (LV) and heavy mine vehicles (HV).

Table 1.10-1: Summary of Tenas Project Component Footprints

Major Component	Subcomponent	Major Component Area (ha)	Subcomponent Area (ha)
Open pit related		293.3	
	Open pit including backfill areas	207.5	207.5
	Haul roads and service roads	31.0	31.0
	Cleared areas for access	54.7	54.7
Coal Processing Plant and ancillary buildings including processed coal, rock and run-of -mine coal stockpiles		15.2	
Material storage facilities		139.1	
	Rock and overburden (dams and buttresses)	106.2	106.2
	Reclamation material (surface soil) stockpiles	32.9	32.9
Site water management infrastructure and discharges		300.4	
	Collection, diversion, and discharge channels	38.7	38.7
	Management, Sedimentation, and Control ponds	261.7	261.7
Explosive infrastructure	Includes access roads and sedimentation ponds	3.1	
Tenas Access Corridor including gravel quarries		60.3	
Power supply	Under all new powerlines excluding overlap	5.0	
Rail Infrastructure	Centre of Rail Loop excluded	13.8	
Project Footprint		830.1	
Buffers and Contingency areas		1,025.0	
Project Area		**1,855.1**	

Note: *ha=hectare*



Tenas Project

Site Plan showing Project Components

Legend

- Rail Line
- Highway
- Road
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- Municipal Area
- General Private Property
- 138 kV Transmission Line
- 500 kV Transmission Line

Project Features

- Existing 25 kV Power Line
- 25 kV Power Line
- Haul Road
- Rail Loop
- Discharge Path
- Tenas Access Corridor
- Backfill Area
- Control and Plant Sedimentation Pond
- Explosive Infrastructure
- Management Pond
- Mine Infrastructure Complex (Coal Processing Plant, Mine Administration and Dry Building, Maintenance Facility, Run-of-Mine and Processed Coal Stockpiles)
- Open Pit
- Pit Lake
- Quarry
- Rail Infrastructure
- Topsoil Stockpile
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.
3. Project line features are for display only.

Sources

- Project Features: Allegiance Coal, April 21, 2021.
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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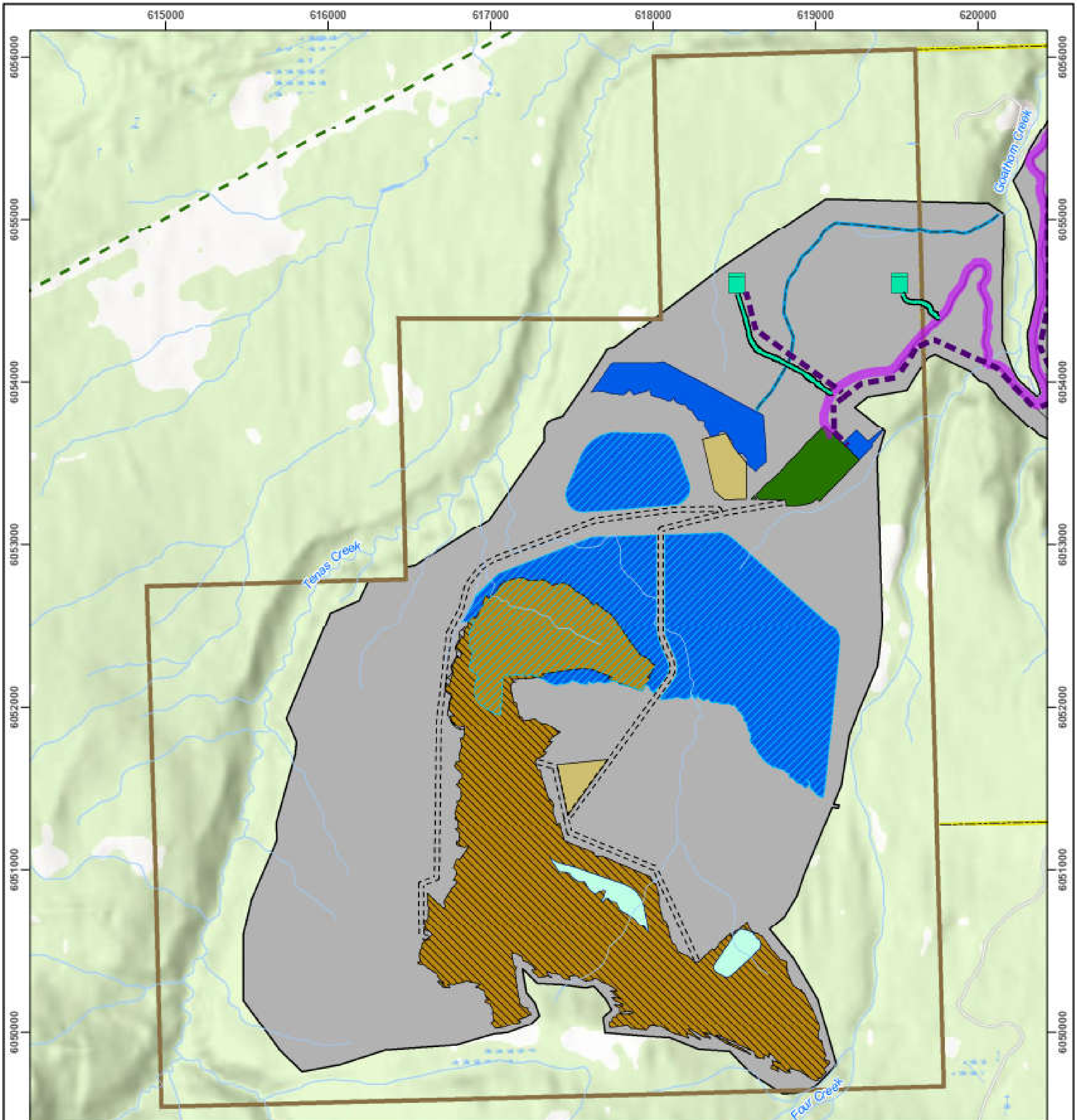
Project No.	Production Date: Apr 26, 2021	Figure 1.10-1

TELKWA COAL LIMITED



Legend

- 500 kV Transmission Line

Project Features

- 25 kV Power Line
- Haul Road
- Discharge Path
- Tenas Access Corridor
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area
- Backfill Area
- Control and Plant Sedimentation Pond
- Explosive Infrastructure
- Management Pond
- Mine Infrastructure Complex
- Open Pit
- Pit Lake
- Topsoil Stockpile

Tenas Project
Project Components

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Notes

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3. Project line features are for display only.

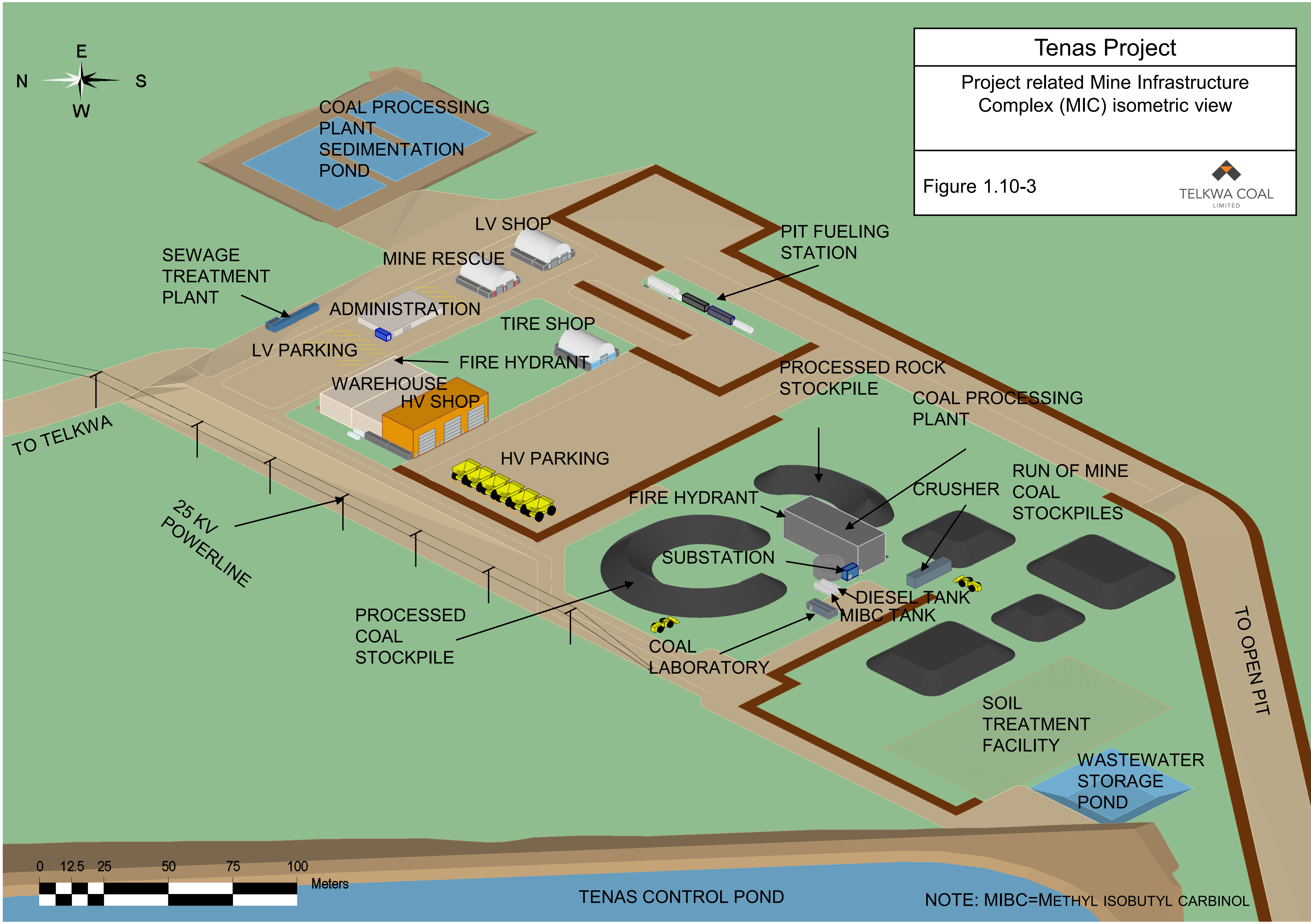
Sources

- Project Features: Allegiance Coal, April 21, 2021.
- Basedata: Government of British Columbia
- Basemap: World Topo Base

Figure 1.10-2

Production Date: Oct 29, 2021

TELKWA COAL LIMITED


Tenas Project
Project related Mine Infrastructure Complex (MIC) isometric view
Figure 1.10-3
TELKWA COAL
LIMITED
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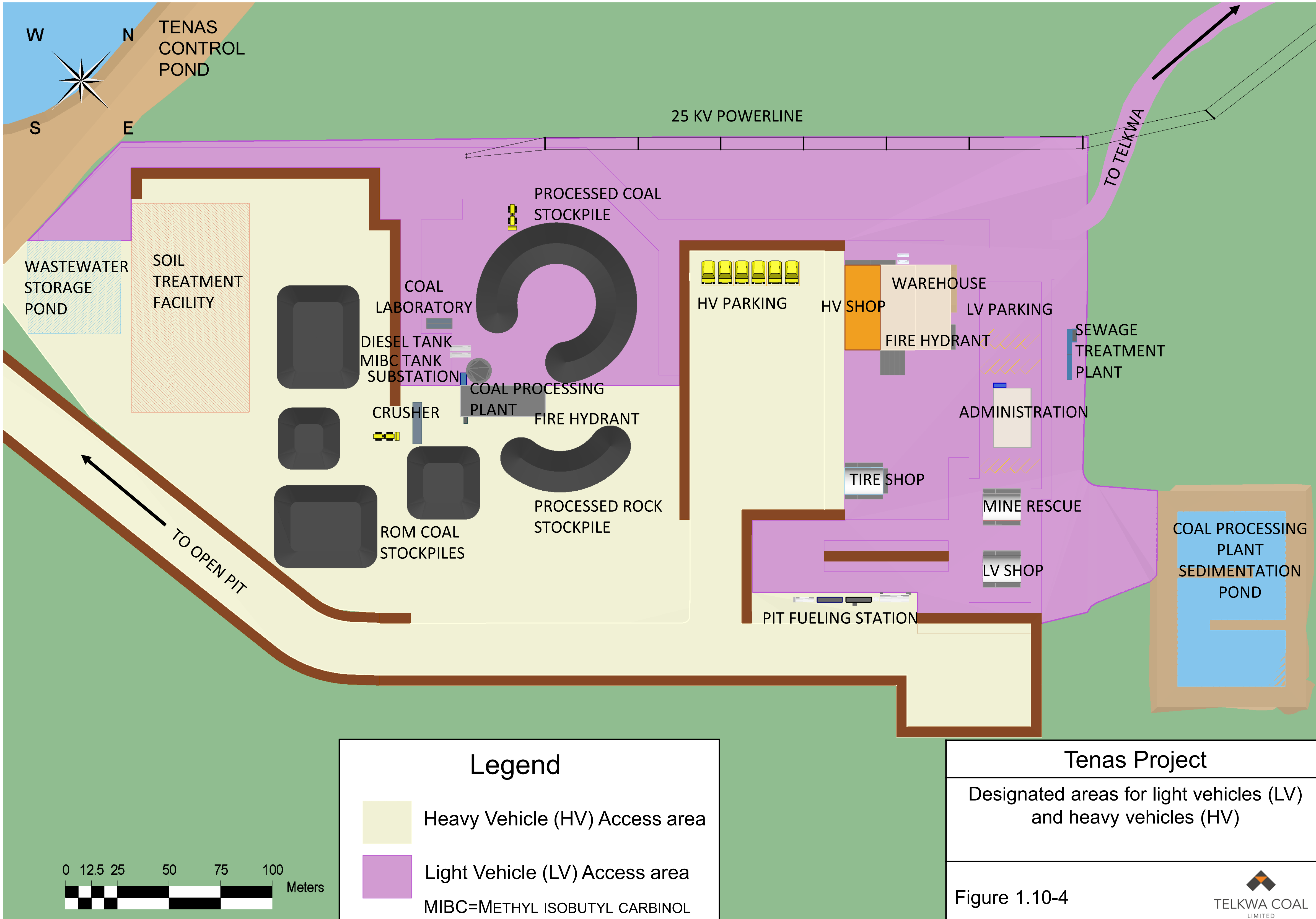
W
COAL PROCESSING PLANT SEDIMENTATION POND
LV SHOP
PIT FUELING STATION
SEWAGE TREATMENT PLANT
MINE RESCUE
ADMINISTRATION
TIRE SHOP
LV PARKING
FIRE HYDRANT
WAREHOUSE
HV SHOP
PROCESSED ROCK STOCKPILE
COAL PROCESSING PLANT
TO TELKWA
HV PARKING
RUN OF MINE COAL STOCKPILES
CRUSHER
FIRE HYDRANT
25 KV POWERLINE
SUBSTATION
DIESEL TANK
MIBC TANK
PROCESSED COAL STOCKPILE
COAL LABORATORY
TO OPEN PIT
SOIL TREATMENT FACILITY
WASTEWATER STORAGE POND
0 12.5 25 50 75 100
Meters
TENAS CONTROL POND
NOTE: MIBC=METHYL ISOBUTYL CARBINOL



Tenas Project

Designated areas for light vehicles (LV) and heavy vehicles (HV)

Figure 1.10-4

1.11 Open Pit

1.11.1 Open Pit Optimization

A process of open pit optimization guided the detailed open pit design for the Project. A series of nested open pit shells were developed representing increasing COSR so that the ultimate open pit shell can be selected based on both the incremental and overall strip ratios of each shell.

1.11.1.1 Methodology

A block model is generated specifically for the COSR analysis that combines all coal seams into a single coal percentage for each block. The open pit optimization parameters are set to count all tonnes of coal equally, resulting in open pits being based on the strip ratio alone.

1.11.1.2 Optimization Input Parameters

The open pit optimization parameters employed for this COSR analysis are uniquely set up such that each nested open pit shell represents an increase in incremental strip ratio, as opposed to conventional open pit optimization which accounts for variable ore values throughout the deposit. The mining cost and coal price are given realistic values although it is only the ratio between them and the revenue factor which is of concern for generating optimized open pit shells of a certain incremental strip ratio. The coal washing cost is set to CDN$5.25 per ROM tonne because all the coal included in the model is considered part of the coal resource (after applying minimum seam widths and ash cut-off values). **Table 1.11-1** provides the parameters used for the open pit optimization runs conducted for the Project.

Table 1.11-1: Open Pit Optimization Parameters

Parameter	Units	Value
Open pit slopes	Overall degrees	50.0
Mining cost	$/BCM	4.75
Dilution/coal loss	centimetre	Included in block model
Processing cost	$/tonne ROM	5.25
Coal price	$/tonne processed coal	132.34

***Notes**: $=Canadian dollar; BCM=bank cubic metre; ROM=run-of-mine*

1.11.1.2.1 Open Pit Optimization Results

Using revenue factors ranging from 0.30 to 1.20, optimized open pit shells were generated representing incremental strip ratio open pits from a low of 1.5 BCM/tonne up to a high of 10 BCM/tonne. The tonnes of insitu coal, volume of non-coal material (rock, overburden, and reclamation material (surface soil)), cumulative strip ratio, and incremental strip ratio of the nested open pit shells are graphed in **Figure 1.11-1.**

Figure 1.11-1 illustrates the selected open pit that was determined by the open pit optimization process.

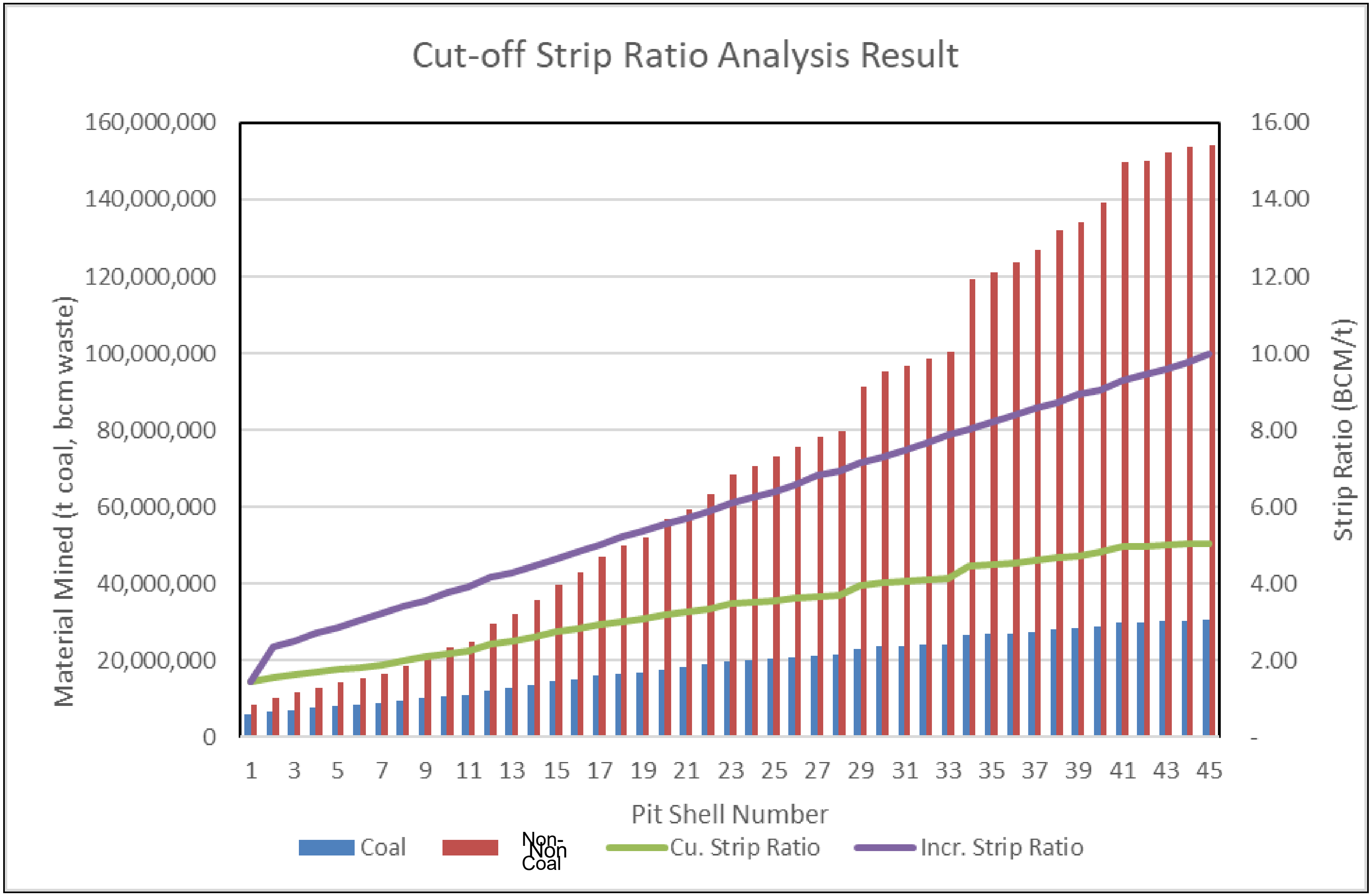
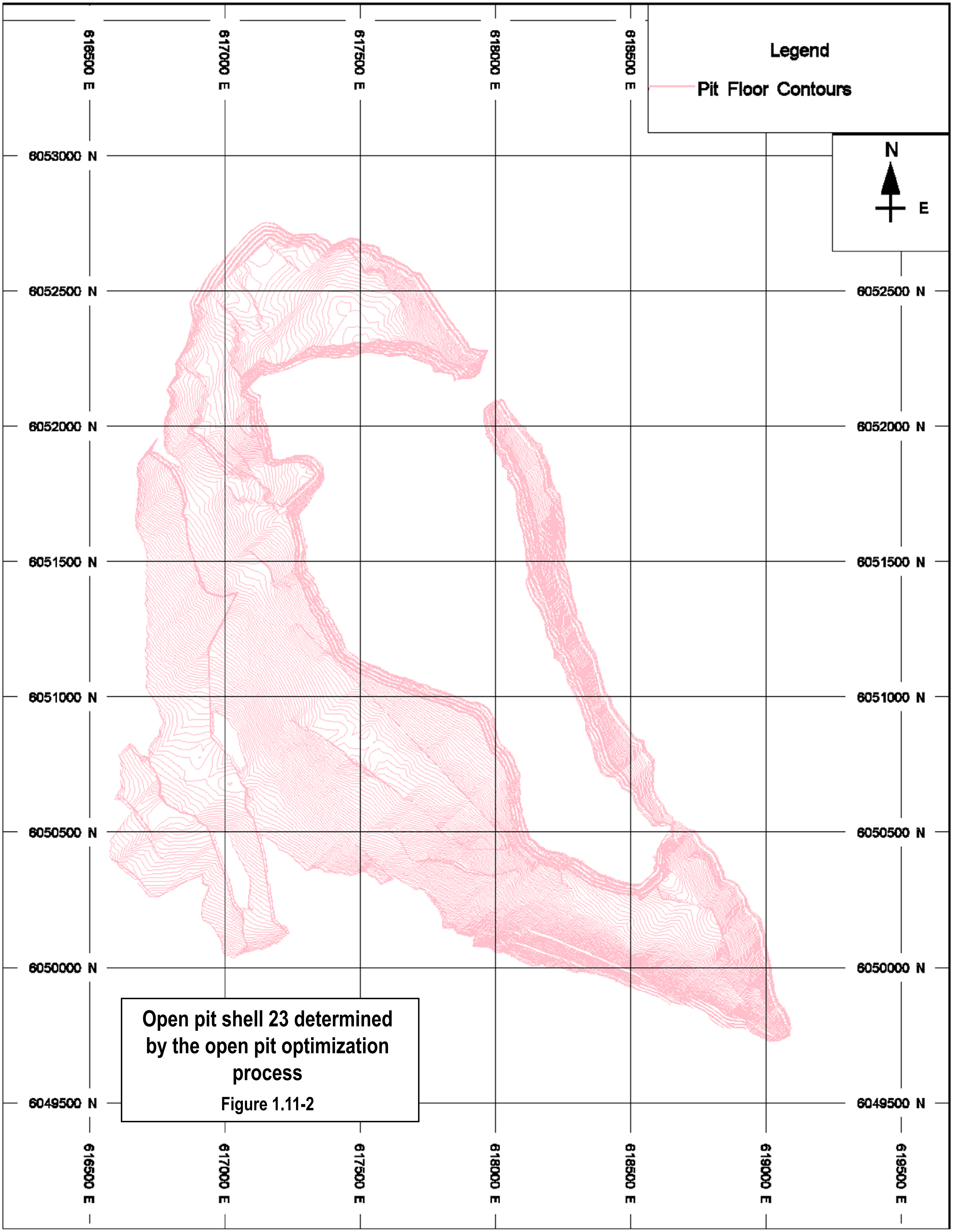


Figure 1.11-1: Cut-off strip ratio analysis results



Open pit shell 23 determined by the open pit optimization process

Figure 1.11-2

1.11.2 Open Pit Geotechnical Considerations

The proposed open pit configuration is designed to respect the Tenas syncline fold which contains the coal-bearing sedimentary sequences. The design incorporates the identified fault structures and an excavation strategy required to economically mine the Tenas Deposit. The rock mass is of moderate quality and the performance of the bench slopes will be related to the blasting and excavation practices to avoid excessive unplanned undercutting of the pervasive bedding structures.

The open pit footwalls will be excavated along shallow to moderate dipping bedding structures as shown in **Figure 1.11-3**. With consideration to the proposed open pit, bedding can be divided into the following:

- West Footwalls (Mining Phase 1, 2 and 4 Pits): Shallow west-dipping sedimentary sequences along the west limb of the deposit. Bedding dip angles ranged from 0 degrees to 12 degrees with normal and thrust faulting locally offsetting the continuous bedding structures. The coal geology model indicates bedding can be vertically displaced to approximately 15 m within the proposed open pit excavation. An opposing west facing East Highwall is to be excavated to about 60 m height; and
- Southern Footwalls (Mining Phase 3 Pits): Shallow to moderate northeast and southwest dipping sedimentary sequences within the tighter synclinal fold. Bedding dips range from 20 degrees to 45 degrees along the west limb of the fold and from 15 degrees to 40 degrees within the east limb of the fold which becoming tighter in the southern-most open pit area.

Please see attached **Appendix 1.0-G SRK, Tenas Project Open Pit Stability and Slope Design Reports** which contains the two (2) geotechnical stability reports completed by SRK in relation to both the EA open pit design and the DFS open pit design. Please note both reports are referenced as the EA open pit geotechnical stability report builds on the DEF open pit geotechnical stability report.

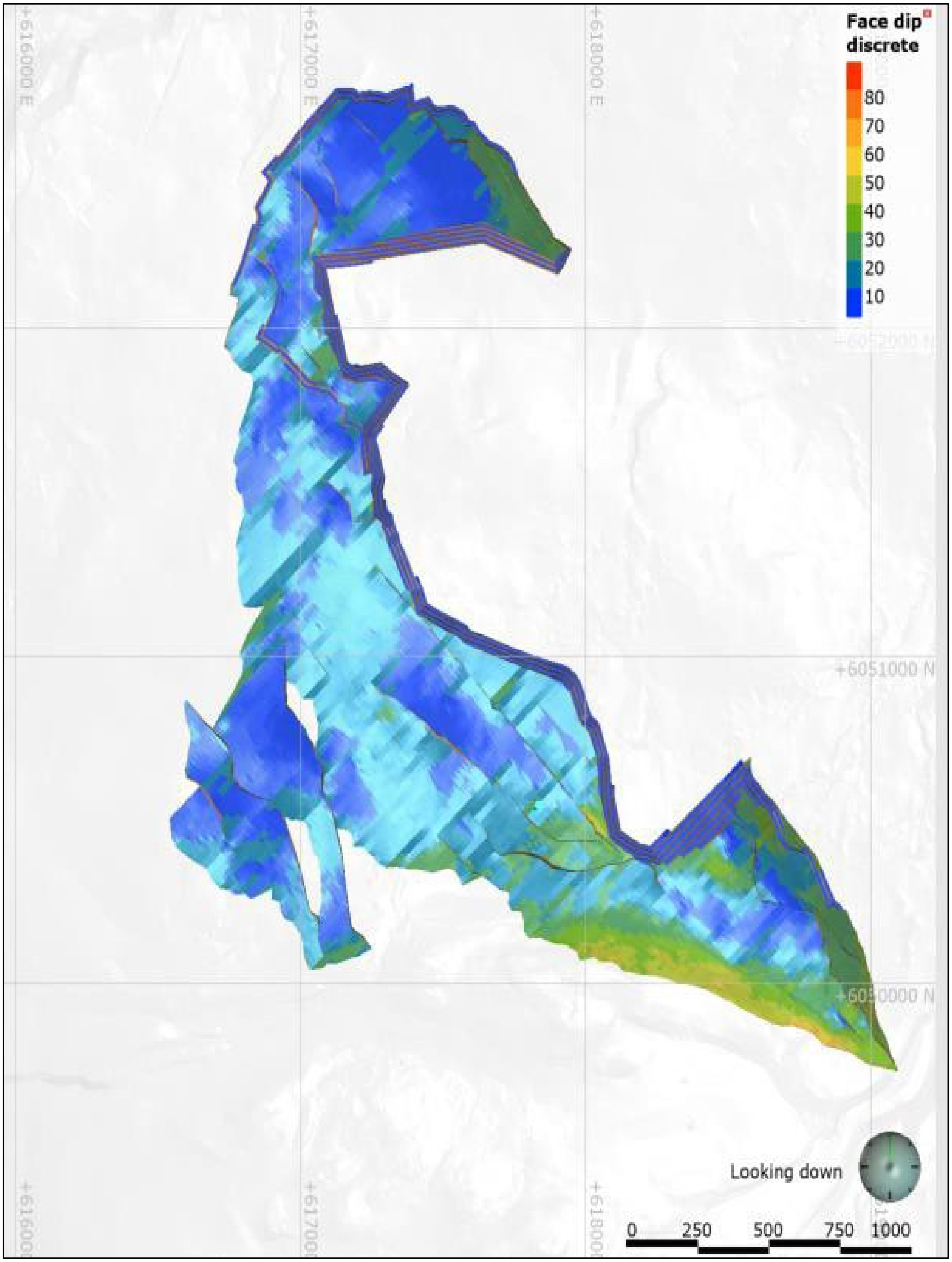


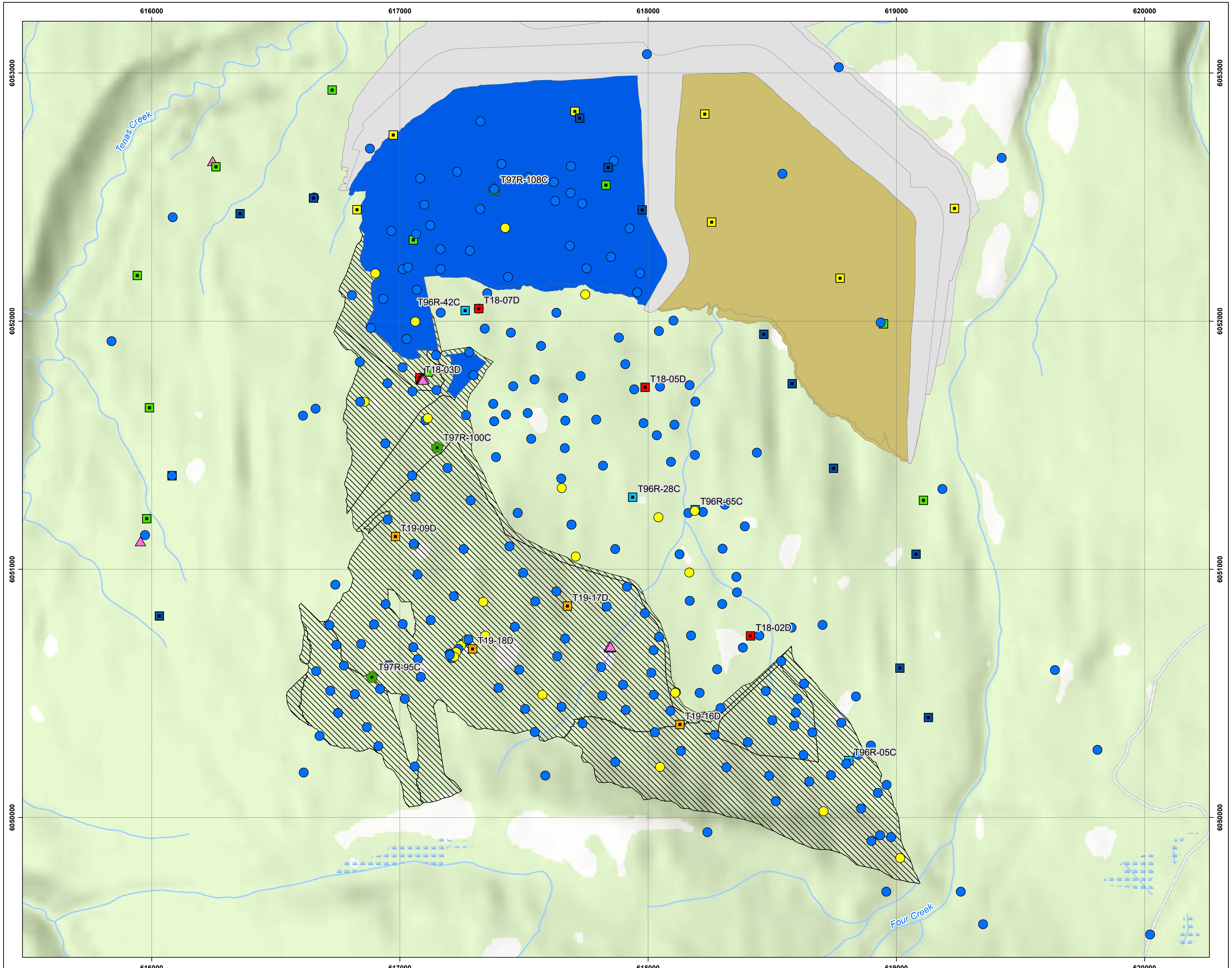
Figure 1.11-3: Final pit floor dips within the environmental assessment (EA) open pit

1.11.2.1.1 Open Pit Site Investigations and Geotechnical Strength Parameters

SRK conducted open pit slope geotechnical investigations in 2018 and 2019 comprising eight (8) diamond drillholes specific to the Open Pit. Details on the various field investigations completed on the property by SRK and Piteau Associates are included in **Appendix 1.0-H SRK, Field Reports for 2018, 2019, and 2021 and Piteau Engineering Geology and Geotechnical Assessment, Tenas Pit and Waste Dumps** attached. The inclined drillholes were positioned to investigate the rock mass that is to be mined and the ultimate footwall rocks. The locations of the drillholes are presented by **Figure 1.11-4.** It should be noted that some drillholes are now located outside of the open pit design due to the reduction in the excavation footprint, however, provide representative data for the rock mass character across the flatter and folded sequences within the EA open pit. These drillholes did target the DFS open pit footprint.

The drillholes were geotechnically logged, sampled, field tested and supported with laboratory testing. The results of the pit slope field investigations are summarized in two (2) separate data reports (SRK 2018 and SRK 2019a). In addition, the geotechnical logging and core photo review of diamond drillholes conducted by Piteau Associates in 1997.

Geotechnical and exploration drillholes were used to support the formation of the three-dimensional (3D) geological and structural model that is relied on for the stability analyses presented in this report. Reviews of geological logging, Manalta basic geotechnical logging, diamond core photographs and downhole geophysical data were evaluated to provide confidence in the geological and structural geology models.



Tenas Project

Plan location showing drillholes used for geotechnical data collection for the Tenas Project

Legend

- Historical Exploration Diamond Core
- Historical Exploration Diamond Drilling
- Manalta Geotechnical Program
- Piteau 1997 Geotechnical Diamond Drilling Program
- Piteau 1997 Sonic Program
- SRK 2018 Sonic Program
- SRK 2018 Geotechnical Diamond Drilling Program
- SRK 2019 Geotechnical Diamond Drilling Program
- SRK 2019 Sonic Program
- Telkwa 2018 Exploration Diamond Drilling
- Telkwa 2019 Exploration Diamond Drilling
- Watercourse
- Wetland
- EA Open Pit
- Core Footprint
- Pond
- Rock Cover

Notes

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Sources

- Project Features: Allegiance Coal, 2020
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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srk consulting

ALLEGIANCE COAL LIMITED

Geotechnical strength parameters were selected to represent rock masses forming the open pit walls and backfill rock materials. The material parameters used in the stability analyses were based on the field investigation results, laboratory testing, published information and experience with materials demonstrating similar characteristics (SRK 2018, SRK 2019a and SRK 2019b).

To evaluate the stability sensitivity along the Skeena Group and Hazelton Volcanics contact, a weak surface representing a lower-bound strength of the direct shear testing on bedding was adopted (SRK 2019b). Review of published literature indicates that this lithological contact is unconformable in characteristics, and that coarser conglomerates and sandstones form the initial sedimentary units directly overlying the older Hazelton Volcanics units in the Telkwa area (Gagnon et al. 2012).

1.11.2.1.2 Major Structures within Open Pit

The 3D coal geology model and deposit structural geology has been defined by TCL using the geotechnical drilling and available exploration drillhole data. The TCL 2019 geological model was also used by the DFS completed in 2019. The major structures at the Project are characterised by continuous north-south striking thrust and normal faults. The sense of movement has been interpreted by TCL, largely based on the offsets between each coal seam. A total of 18 faults have been interpreted for the Project and were incorporated into the stability analysis carried out by SRK.

A summary of the fault interaction with the EA Open Pit Design is shown in **Figure 1.11-5**. In general, the faults are interpreted to be steep, and no bedding parallel structures have been defined. The faults strike the endwalls at perpendicular orientations, and highwalls are generally designed behind the north-south trending faults to reduce stability risks associate with the planar sliding or structures acting as tension cracks, in addition, to potentially disturbed rock mass a review of the drill core recovered for the Project indicates that faults are discrete structures within limited rock mass disturbance adjacent to the fault core.

The faults along the East Footwall within the Mining Phase 3 Pit are potentially adverse and normal-faulting offsets have been interpreted. The interaction of these faults has been evaluated as part of the 3D stability analyses work, and de-risked through the staged excavation and backfilling strategy.

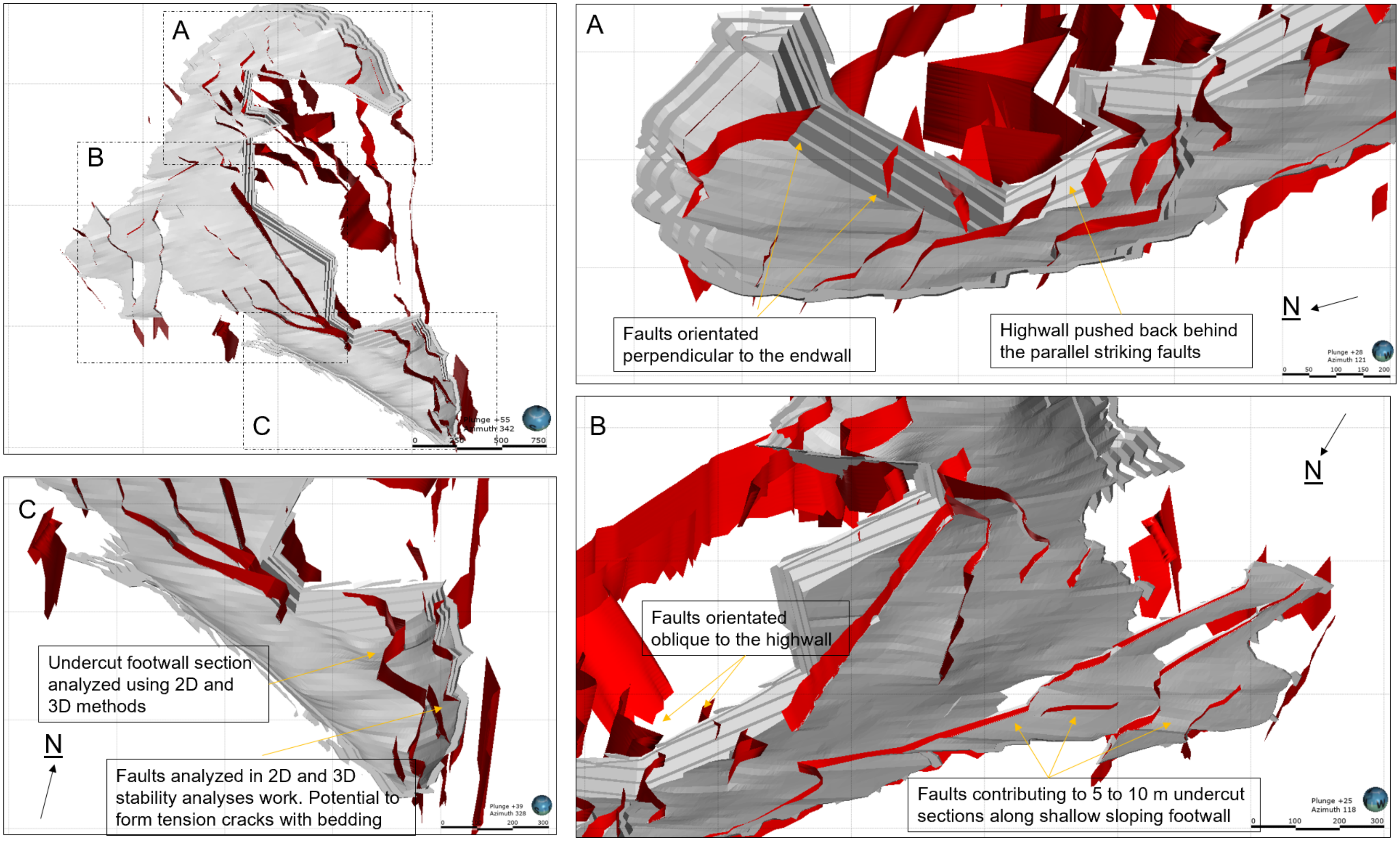


Figure 1.11-5: Major fault interactions(red) within the environmental assessment (EA) open pit design (grey)

1.11.2.1.3 Stability Assessment for Open Pit Slopes

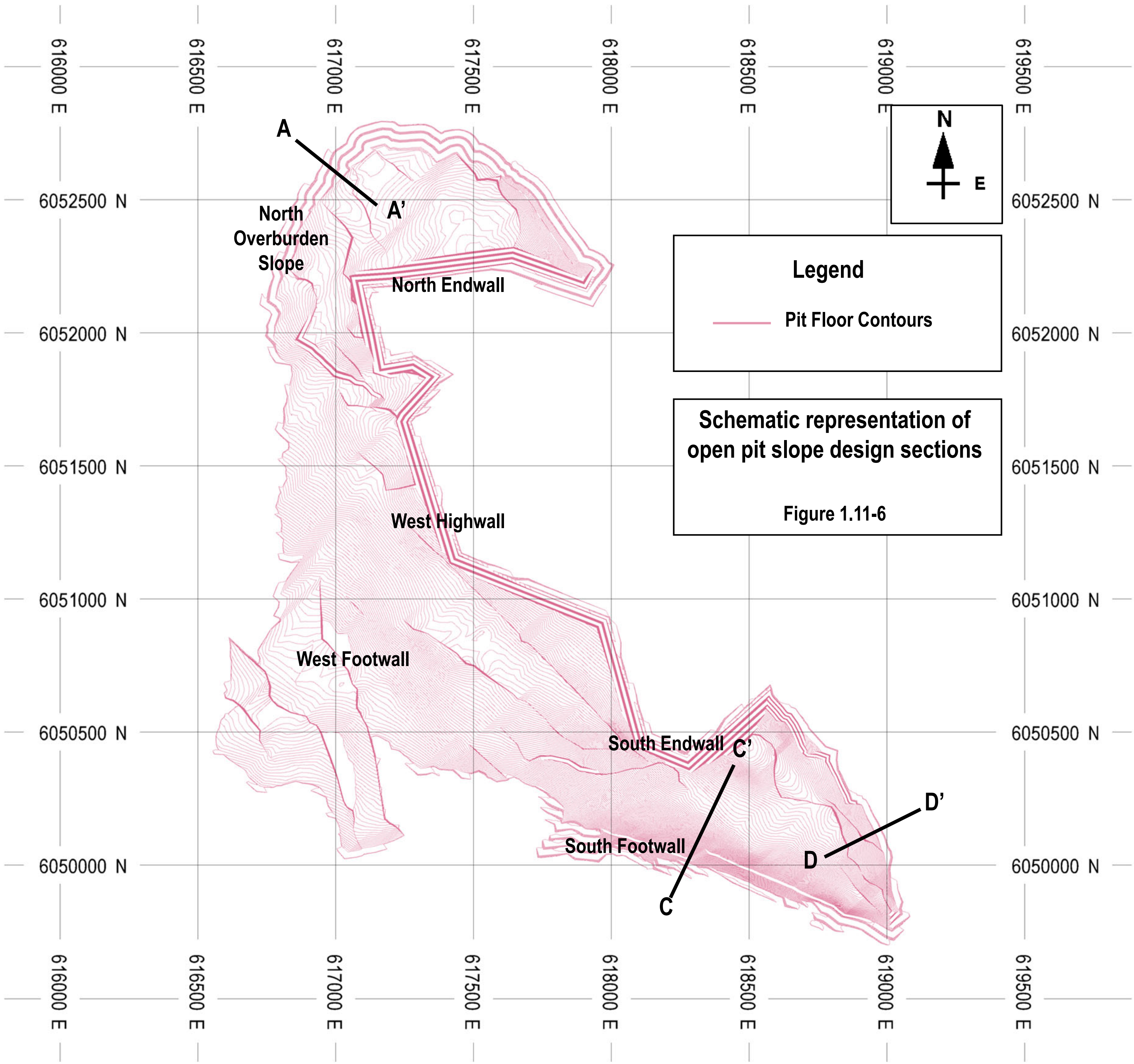
Bench to inter-ramp scale kinematic analyses were carried out for each domain and all applicable slope face directions. The analyses were carried out to identify the kinematic failure modes that could limit the design stability. The kinematic stability was based on the orientation of bedding and joints, and the presence of major continuous faults that could potentially under-cut the pervasive bedding structures.

Two-dimensional (2D) and 3D deterministic and probabilistic slope stability analyses were carried out using Rocscience™ limit-equilibrium (LE) programs Slide2 and Slide3. The LE analyses are considered an appropriate method for the evaluation of the design open pit wall configurations due to the representation of a non-circular failure through the anisotropic rock mass, including planar sliding mechanisms along the pervasive bedding structures. Failure along bedding is considered the most significant risk to the open pit wall stability for the Project. Within the Slide 2 and Slide 3 models, bedding structures are defined by as ubiquitous material with an orientation consistent to the TCL geological model interpretation.

The predictive groundwater modelling work carried out by SRK was incorporated into the slope stability analyses, including pore pressure heads exported from an open pit-scale transient FEFLOW 3D hydrogeological model and phreatic surfaces approaches. These groundwater cases are to be used as targets for the slope depressurisation monitoring during excavation.

The 2D and 3D stability analyses carried out for the DFS, and EA open pit designs include:

- stability sections completed for the DFS open pit design are presented by **Figure 1.11-6**. The 2D LE results for the DFS open pit design are summarized by **Table 1.11-2**. The results indicate that all the sections achieve the design acceptance criteria except for the undercut Section D-D'. This section indicated that an excavation and backfilling strategy was needed to be developed as part of the EA mine plan;
- 2D stability sections completed for the EA open pit were selected to represent the steepest and highest portions of the EA Phase 3 open pit which was determined to require a staged excavation strategy due to local undercutting of the bedding sequences shown by **Figure 1.11-7.** The location of the stability sections is presented in **Figure 1.11-7**. The 2D LE results for the EA open pit design are summarized by **Table 1.11-3**;
- support the staged EA excavation and backfilling strategy for the Phase 3 Pit. The results of the 3D stability analyses are presented in **Table 1.11-4** and like the 2D analyses, the results of the 3D LE stability analysis indicated that the Phase 3 Pit East Footwall is potentially unstable without an appropriate excavation and backfill strategy. **Figure 1.11-8** shows the theoretical East Footwall analyses and indicates a Factor of Safety (FOS) of 0.8 associated with basal sliding along bedding and displacement along faults. The results of the two (2) 3D stability models indicate the East Footwall is expected to achieve the minimum design FOS of 1.3 where the staged excavation sequence is implemented (**Figure 1.11-9**). These models indicate that the critical slip surface, while still mostly sliding along bedding, has been reduced in extent due to confinement provided by the interim endwall and the backfill buttressing; and
- consideration to the backfilled reclamation configuration strategy across most of the open pit walls, the long-term slope stability conditions which are significantly higher than those analyzed as part of the Operation Phase. This is demonstrated with the analyses resulted summarized in **Table 1.11-4**.



Schematic representation of open pit slope design sections

Figure 1.11-6

Table 1.11-2: Summary of Two-dimensional (2D) Limit-equilibrium Results for Definitive Feasibility Study (DFS) Design Open Pit that are Applicable to the Environmental Assessment (EA) Open Pit

Stability Section	Open Pit Wall	Modelled Wall Height (m)	Groundwater Conditions	Minimum Acceptable FOS	Critical Calculated FOS	Maximum Acceptable POF (%)	Critical Calculated POF (%)
Section A-A’	North overburden slope	35	Partially saturated	1.3	1.6	5-10	<1
Section C-C’	South highwall	65	Partially saturated	1.3	1.7	5-10	<1
	South footwall	170	Partially saturated	1.3	2.1	5-10	<1
Section D-D’	East footwall (undercut)	70	Partially saturated	1.3	1.0	5-10	7
	East footwall (buttressed rock fill)	70	Partially saturated	1.3	1.7	5-10	<1

***Notes:** <=less than; %=percent, FOS=Factor of Safety; m=metre; POF=Probability of Failure*

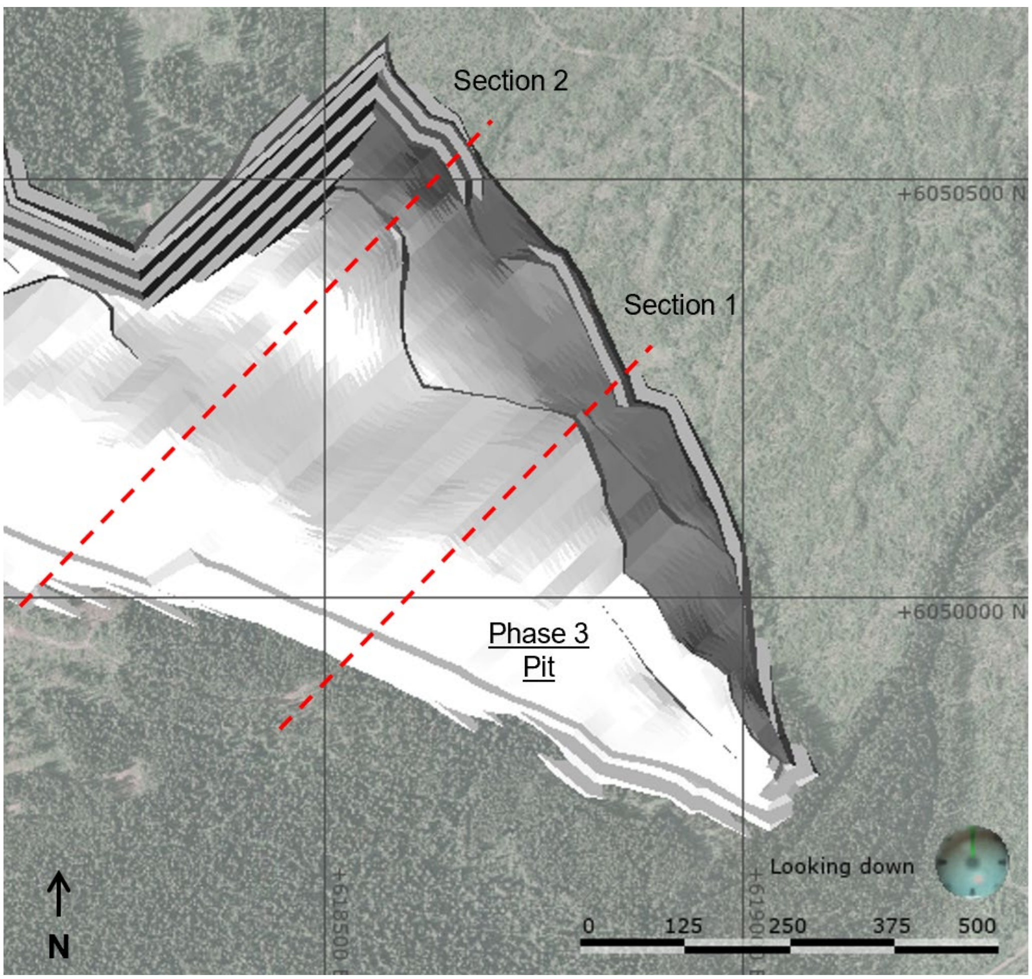


Figure 1.11-7: Schematic representing the open pit wall geotechnical design sections for the environmental assessment (EA) open pit

Table 1.11-3: 2D Limit Equilibrium (LE) Stability Analyses for the Environmental Assessment (EA) Open Pit Design

Open Pit Mining Phase	Stability Section	Open Pit Wall	Modelled Wall Height (m)	Overall Wall Angle (°)	Excavation Stage	Groundwater	Static Conditions				Pseudo-static Conditions	
							Minimum Design FOS	Minimum Modelled FOS	Maximum Design POF	Maximum Modelled POF	Minimum Design FOS	Minimum Modelled FOS
Phase 3	1	West Footwall	155	24	Final Open Pit	Phreatic Surface	1.3	1.5	5%	<1%	1.1	1.5
						Pore Pressure	1.3	1.7	5%	<1%	1.1	1.7
					Mine Closure Backfilled	Phreatic Surface (end pit lake)	1.3	> 4.0	5%	<1%	1.1	> 3.6
						Pore Pressure (end pit lake)	1.3	> 4.0	5%	<1%	1.1	> 3.6
		East Footwall	40	24	Interim Excavation 1	Phreatic Surface	1.3	1.4	5%	1%	n/a	-
			55	23	Interim Excavation 2	Phreatic Surface	1.3	1.3	5%	4%	n/a	-
			75	31	Final Open Pit Sensitivity(1)	Phreatic Surface	1.3	0.9	5%	51%	n/a	-
						Pore Pressure	1.3	0.8	5%	66%	n/a	-
					Mine Closure Backfilled	Phreatic Surface (end pit lake)	Entire slope height is backfilled					
						Pore Pressure (end pit lake)	Entire slope height is backfilled					
	2	West Footwall	225	20	Final Open Pit	Phreatic Surface	1.3	1.4	5%	<1%	1.1	1.3
						Pore Pressure	1.3	2.1	5%	<1%	1.1	2.0
					Mine Closure Backfilled	Phreatic Surface (end pit lake)	1.3	> 3.2	5%	<1%	1.1	2.9
						Pore Pressure (end pit lake)	1.3	> 3.6	5%	<1%	1.1	> 3.2
		East Footwall	55	33	Interim Excavation 1	Phreatic Surface	1.3	1.8	5%	<1%	n/a	-
			80	30	Interim Excavation 2	Phreatic Surface	1.3	1.5	5%	<1%	n/a	-
			105	24	Final Open Pit Sensitivity(1)	Phreatic Surface	1.3	0.8	5%	100%	n/a	-
						Pore Pressure	1.3	0.7	5%	100%	n/a	-
					Mine Closure Backfilled	Phreatic Surface (end pit lake)	Entire slope height is backfilled					

Open Pit Mining Phase	Stability Section	Open Pit Wall	Modelled Wall Height (m)	Overall Wall Angle (°)	Excavation Stage	Groundwater	Static Conditions				Pseudo-static Conditions	
							Minimum Design FOS	Minimum Modelled FOS	Maximum Design POF	Maximum Modelled POF	Minimum Design FOS	Minimum Modelled FOS
						Pore Pressure (end pit lake)	Entire slope height is backfilled					

Notes: *°=degree; >=greater than; <=less than; %=percent; FOS=Factor of Safety; m=metre; n/a=not applicable; POF=Probability of Failure*
(1)Sensitivity cases are not part of the proposed TCL mine plan or open pit design.

Table 1.11-4: Summary of Three-dimensional (3D) Stability Analyses for the Environmental Assessment (EA) Open Pit, East Footwall

Open Pit Mining Phase	Interim Excavation Stage	Slope Height (m)	Excavation Stage	Modelled Groundwater Conditions	Static Conditions				Pseudo-static Conditions	
					Minimum Design FOS	Critical Modelled FOS	Minimum Design POF	Critical Modelled POF	Minimum Design FOS	Critical Modelled FOS
Phase 3	n/a	105	Sensitivity1 Scenario	Footwall elevation	1.3	0.8	5%	n/a1	1.1	n/a1
	5	105	During Excavation	Footwall elevation	1.3	2.0	5%	<1%	1.1	1.4
	6	105	During Excavation	Footwall elevation	1.3	1.9	5%	<1%	1.1	1.4

Notes: *FOS=Factor of Safety; POF=Probability of Failure*
[1]: Scenario not tested because static deterministic scenario did not meet acceptance criteria

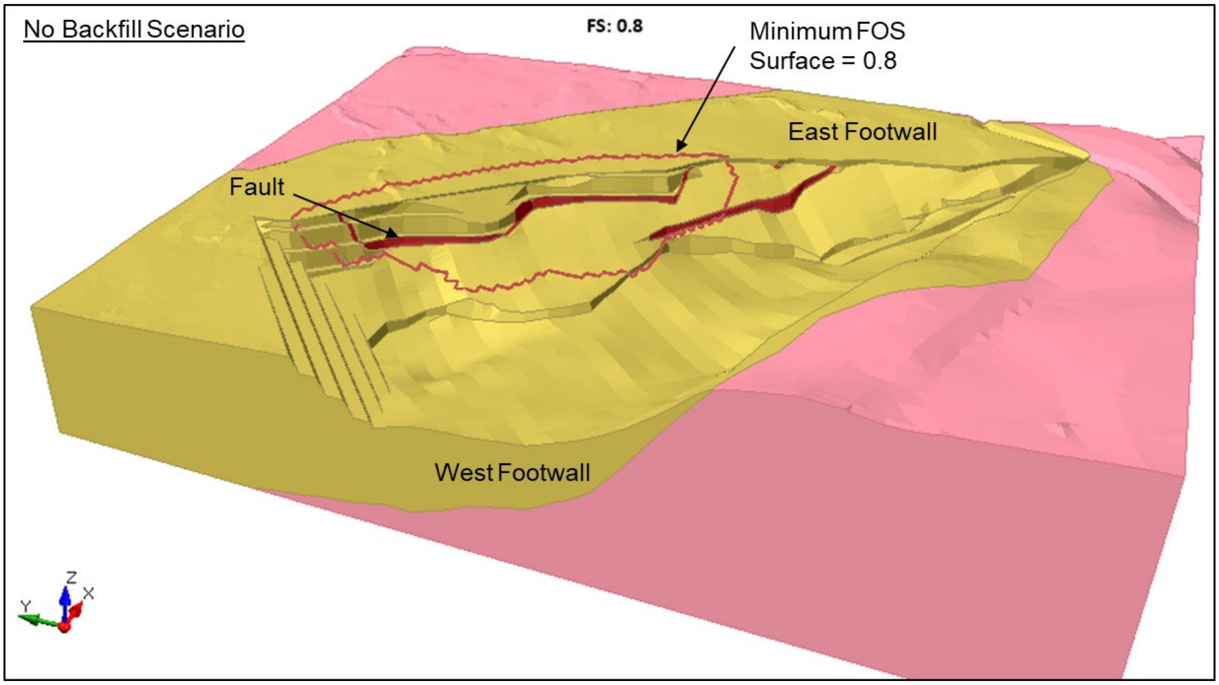


Figure 1.11-8: Three-dimensional (3D) analyses results for sensitivity scenario where undercut bedding slope is not supported with an excavation strategy for the environmental assessment (EA) open pit

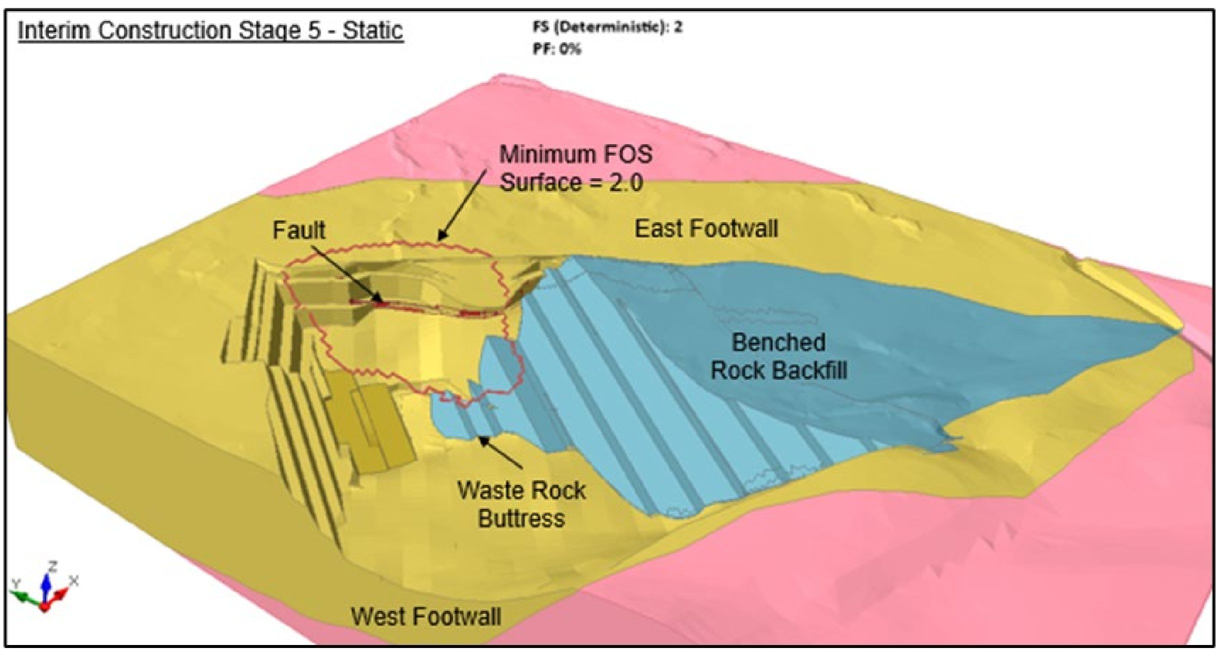


Figure 1.11-9: Three-dimensional (3D analyses results for sensitivity scenario where undercut bedding slope is not supported with an excavation strategy for the environmental assessment (EA) open pit

1.11.3 Open Pit Slope Design Criteria

Design criteria presented in Guidelines to Open Pit Slope Design (Read and Stacey 2009) have been utilized to design the open pit. The recommended criteria is based on levels of confidence in the understanding of site conditions and material parameters and the consequences of instability. A minimum design static FOS of 1.30 and a maximum Probability of Failure (POF) of 5% have been adopted due to the medium consequence of failure mainly related to smaller production working space adjacent to the final open pit walls at the Project, and the resulting probability that a failure could impact nearby workers and equipment.

For the Project, the open pit and management pond wall design within the open pit criteria provided in **Tables 1.11-5** to **1.11-7** were adopted. The open pit wall design sections are illustrated by **Figures 1.11-10** below. The wall design criteria are contingent on geotechnical and geological mapping and wall monitoring during the Operation Phase of the Project to inform future designs as mining progresses deeper and identify any wall hazards to personnel and equipment in the open pit.

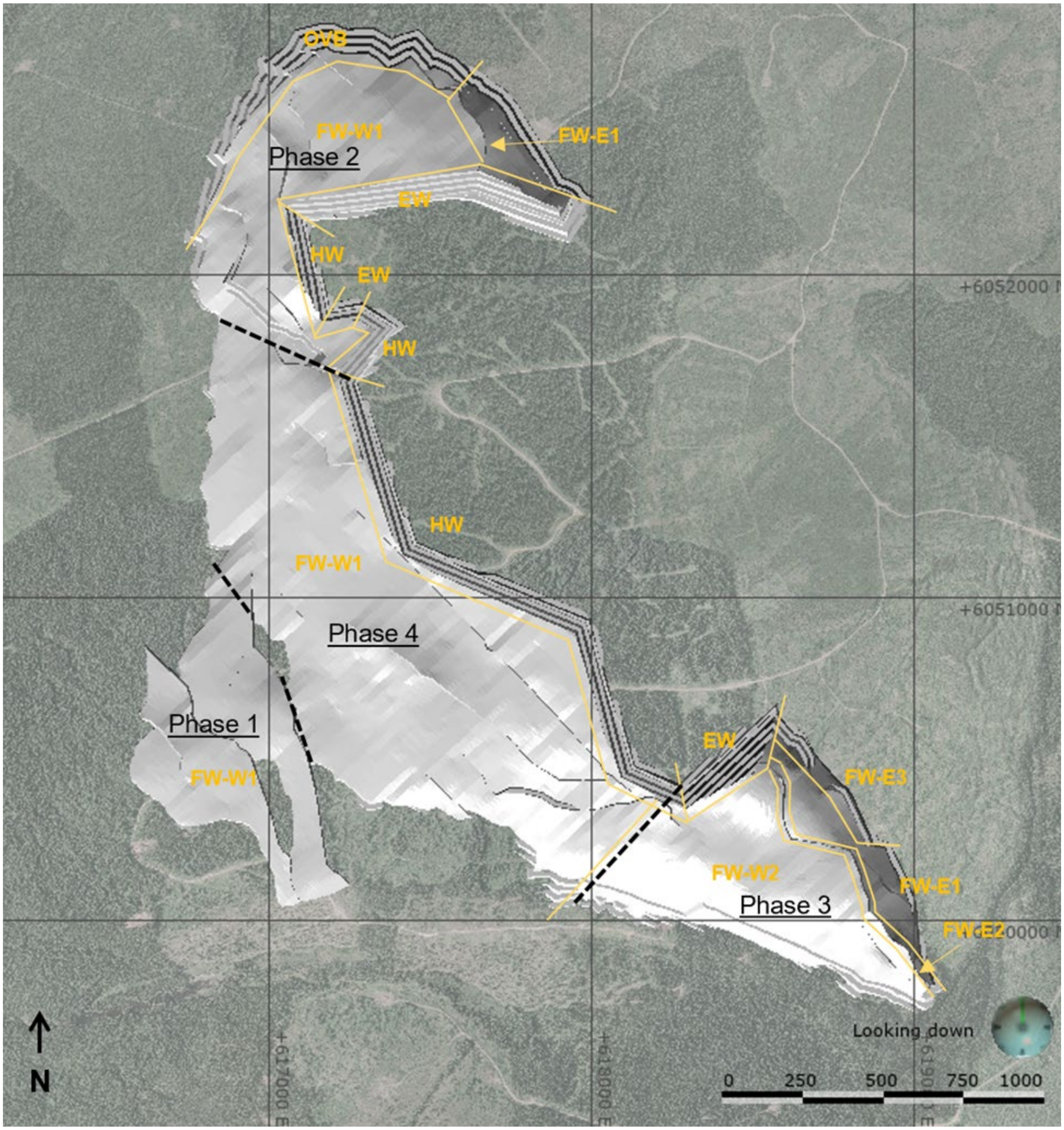


Figure 1.11-10: Schematic representation of open pit geotechnical slope design sectors and phases for the environmental assessment (EA) open pit prior to backfilling

Table 1.11-5: Open Pit Wall Slope Design Criteria by Open Pit Wall Type and Location

Open Pit Mining Phase	Open Pit Wall	Design Sector	Bedding Dip (°)	Maximum Bench Height (m)	Bench Face Angle (°)	Berm Width Above Max Bench (m)	Inter-ramp Angle (°)	Bench and Overall Stability Comments
1, 2 and 4	West Footwall Undercut	FW-W1	0 - 15	12	70	n/a	n/a	Undercutting of the west footwall is not expected to be greater than 12 m
3	East Footwall	FW-E1	0 - 35	Un-benched slope designed to follow bedding				Benching not required as footwall slope to follow bedding
			35 - 60	48	Parallel to bedding dip	9	Dependent on dip of bedding	Benched footwall may be adopted providing no adverse fault structures.
	East Footwall - Undercut	FW-E2	0 - 25	24	70	10	40	Interim design configuration for the undercut sections at the base of the East Footwall prior to backfilling of the exposed rock. To be implemented with strategic excavation sequence.
	East Footwall- Upper Benches	FW-E3	All	12	70	9	41.9	Rock fall related considered for upper rock slopes along the West Footwall.
	West Footwall	FW-W2	0 - 35	Un-benched slope designed to follow bedding				Benching not required as footwall slope to follow bedding
			30 - 60	48	Parallel to bedding dip	9	Dependent on dip of bedding	Benched footwall may be adopted providing that bedding is not undercut.
All	Weathered Rock	WR	All	12	70	10	40	Rock fall related to highly fractured rock. Rock fall-controlled stability considerations
All	Highwall	HW	All	24	70	11.5	50	Rock fall associated with the cross-joints is expected to be limited by the 70° inclined bench face. Highwalls are not significantly high and positioned behind major fault structures.
All	Endwalls	EW	All	24	70	11.5	50	Rock fall associated with the cross-joints is expected to be limited by the 70° inclined bench face. Endwalls are not significantly high and are orientated perpendicular to major fault structures.
All	Hazelton Volcanics	HV	All	24	65	46	50	Bench stability related to intersecting joints. Volcanics limited in exposed to several benches along the upper Phase 3 Pit.

Notes: *°=degree; %=percent; m=metre*

[1] Prior to excavation, geotechnical assessment is required to evaluate the East footwall performance, mine strategy and operational/monitoring procedures.

Table 1.11-6: Recommended Overburden Slope Design Criteria (Outside of Management Ponds)

Overburden/ Till Slope Design	No. Benches	Maximum Bench Height (m)	Bench Face Angle (°)	Berm Width (m)	Inter-ramp Angle (°)	Rock-Overburden/Till Contact Berm Width (m)	Comments
< 12	1	12	24	0	24	0	Single slope
12 - 24	2	12	50	17	24	17	Split benched slope
> 24	3+	12	50	17	24	17	Benched slope with likely groundwater influences

Notes: *°=degree; m=metre; No.=number*

Table 1.11-7: Recommended Overburden Slope Design Criteria (Inside of Management Ponds)

Overburden/ Till Slope Design	No. Benches	Maximum Bench Height (m)	Bench Face Angle (°)	Berm Width (m)	Inter-ramp Angle (°)	Rock-Overburden/Till Contact Berm Width (m)	Comments
< 12	1	12	24	0	21.8	0	Single slope
12 - 24	2	12	50	17	21.8	20	Split benched slope
> 24	3+	12	50	17	21.8	20	Benched slope with likely groundwater influences

Notes: *°=degree; m=metre; No.=number*

1.11.3.1.1.1 Backfilling and Open Pit Excavation Strategy

The entirety of the open pit is to be backfilled as excavation progresses. The backfilling will support the overall scale stability in the long-term, including entire buttressing in most cases (**Figure 1.11-11**). The staged backfilling is significantly important to achieving safe working conditions during excavation of the lower portions of the Phase 3 East Footwall (**Figure 1.11-12**).

The staged excavation and backfilling sequence through the Phase 3 Pit is required to achieve acceptable design stability. The excavation is to occur from south to north, with an excavation of interim northern endwalls followed by development benched backfill platforms to the south (**Figure 1.9-13**). The backfill is to buttress the localized and previously undercut bedding structures which can be exposed in benched between 10 m and 25 m overall height. The width of the localized undercut should not exceed 60 m (measured from interim endwall to toe of initial backfill platform). This strategy is to be repeated until the final North Endwall is established.

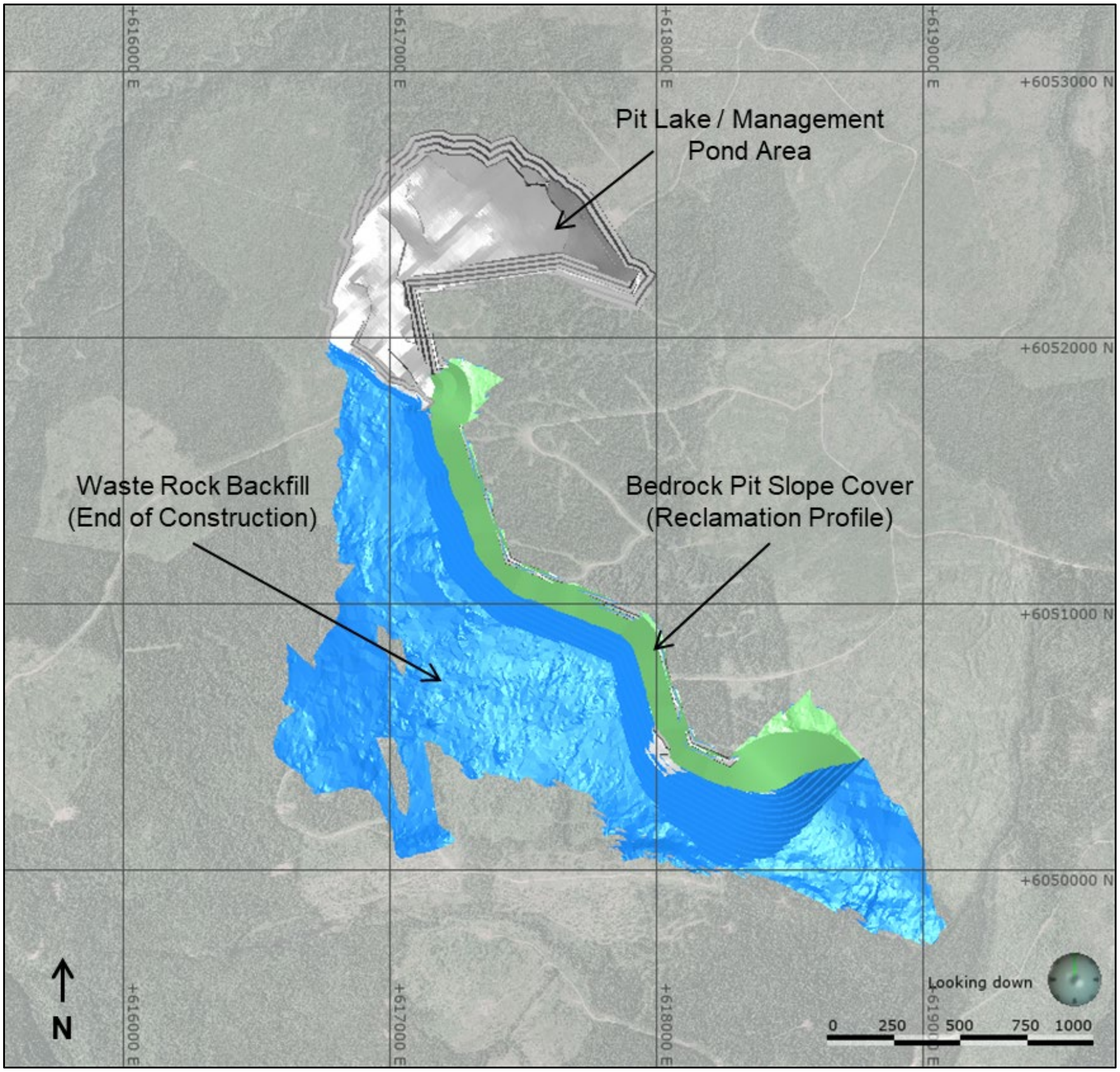


Figure 1.11-11: Location of placed backfill and overburden cover at end of the Decommissioning and Reclamation phase of the environmental assessment (EA) open pit

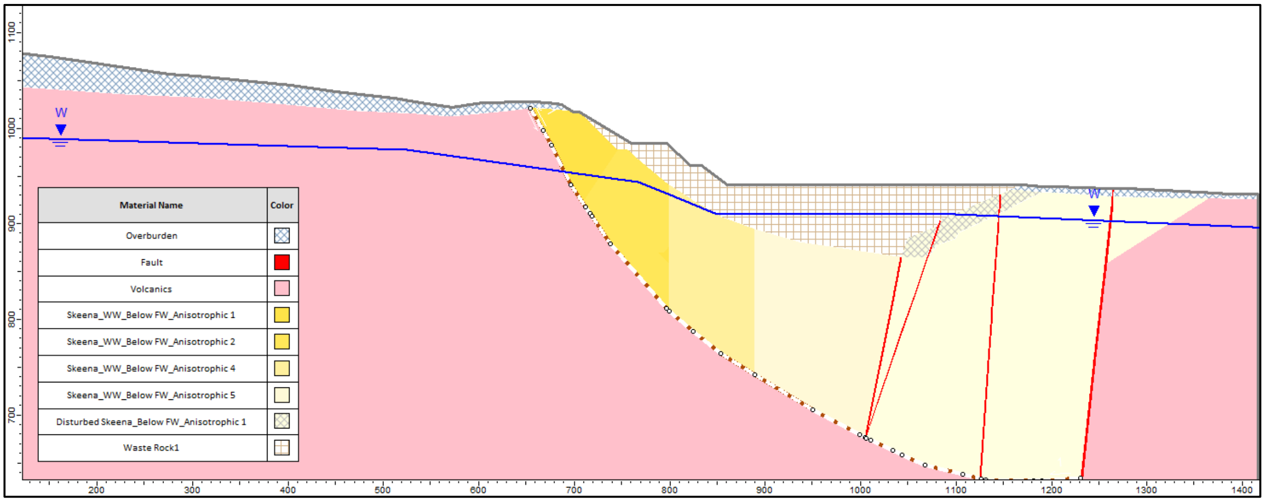


Figure 1.11-12: Geotechnical Design Section 1 of the environmental assessment (EA) Phase 3 open pit with backfilling completed (post Decommissioning and Reclamation Phase configuration)

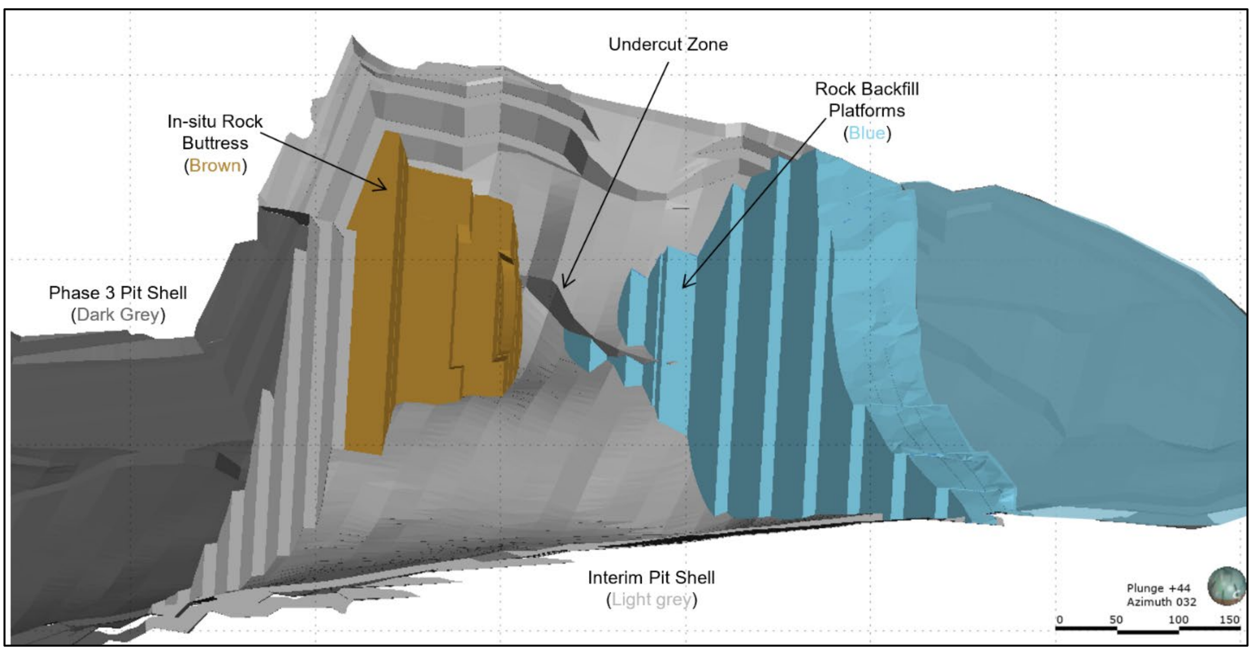


Figure 1.11-13: Schematic figure showing interim endwall and backfilling within the environmental assessment (EA) Phase 3 Open Pit

The stability, implementation and monitoring of the backfilling operations is detailed in a separate report on backfill stability authored by SRK and provided in **Appendix 1.0-Ia SRK, Tenas Project, Pit Backfill stability Assessment Report**. The backfill platforms have been designed to be 20 m high with at least

10 m width catch benches to an overall 2.5:1 (H:V) slope profile during Operation Phase. Where bottom-up construction methods are adopted, the catch benches will also include a 2 m berm near the platform crest to mitigate any rock roll out from future upslope backfill construction.

The use of the shallower overall slope profile and benched configuration is to improve the stability conditions and provide containment for any rock roll out. The mine plan is designed to limit the height of the platforms and position ramps away from the active backfilling to reduce the potential for slope hazards, including run-out. The staged construction is intended to achieve the following geotechnical objectives:

- Limit the height of dump and access lifts to mitigate against instability or run-out;
- Control ramp access to prevent exposure to boulder roll-out hazards;
- Manage dump advance direction so that active faces are directed away from mine operations; and
- Sequence backfill configuration to maintain offsets (both vertical and horizontal) and/or barriers between the mining benches and dumping areas.

1.11.3.2 Open Pit Wall Depressurization

The predictive open pit-scale 3D hydrogeological model (SRK 2020b) indicates that groundwater will be sufficiently drawn down naturally to achieve acceptable design stability conditions. In summary, the design stability conditions are reliant on the predicted natural depressurization conditions, and the validation of these conditions requires a tactical piezometer monitoring network.

However, there will remain risks associated with localized groundwater conditions, including potential upward gradients along the longer, shallow dipping footwall sections (**Figure 1.11-14**). This process can be observed in the Mining of the Phase 3 Pit (Stability Section 2) where elevation pore pressures can be observed locally toward the lower potions of the slope. Although these pressures are not shown to contribute to unacceptable design stability, it is acknowledged that passive depressurization measures could be required locally to enhance depressurisation. The stability risks associated with high pore pressures is significantly reduced with the shallow bedding orientation, staged excavation, and backfilling.

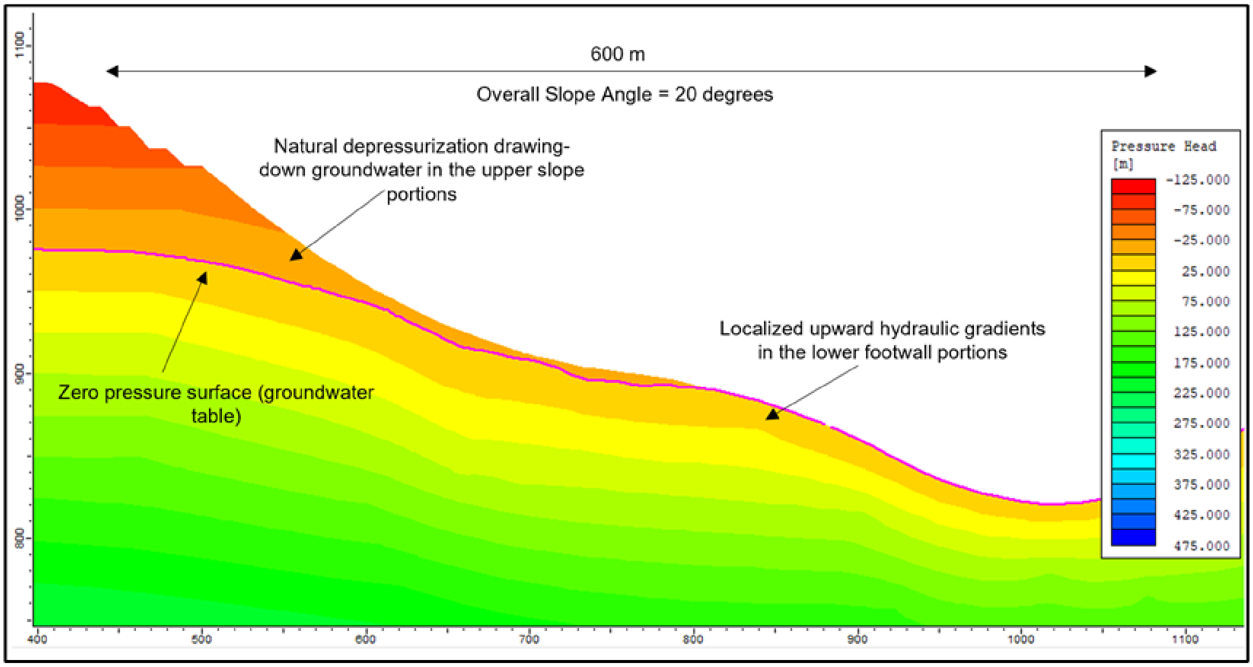


Figure 1.11-14: Schematic figure showing localized groundwater conditions with the environmental assessment (EA) open pit

1.11.3.2.1.1 <u>Open Pit Wall Monitoring Requirements</u>

The anticipated monitoring for the open pit will involve traditional prism installation and monitoring on a periodic basis with increasing frequency in relation to the previous results obtained and any visual observations and geologic mapping results. To support this visual inspection of the open pit walls is to be completed daily and more frequently if areas of instability are observed. Also, the current site groundwater monitoring network will need to be augmented to allow for adequate monitoring of groundwater levels in response to open pit development. If the situation warrants additional monitoring, 3D-radar equipment can be brought in to provide real time analysis of wall movements.

1.11.4 Open Pit Design Other Design Factors

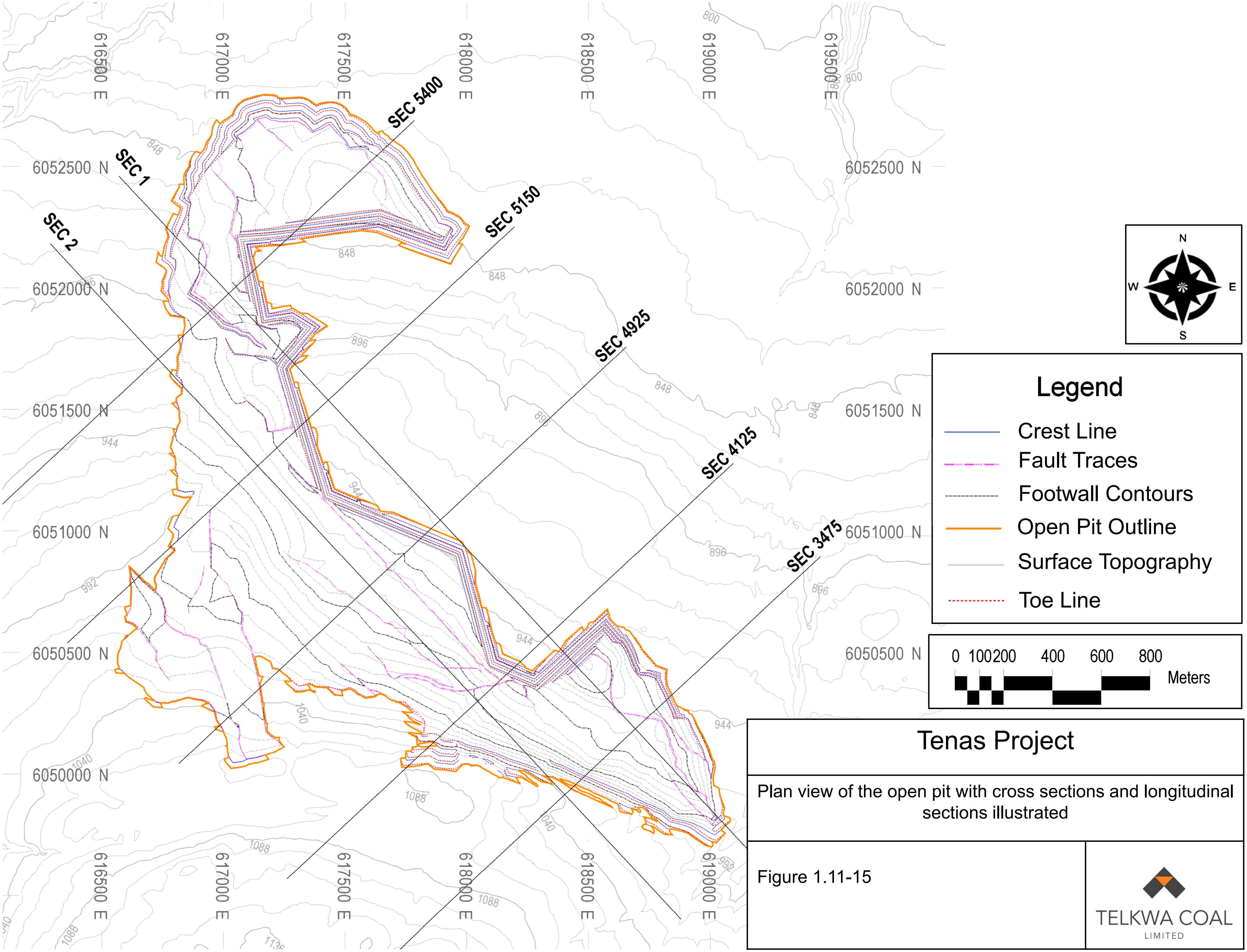
For the open pit design like all others, other factors besides economics and geotechnical parameters affect the final design shape of the open pit. Some of these factors are:

- minimum open pit bottom width of 20 m to allow for safe operation of equipment;
- minimum mining width of 20 m between original topography and the open pit design;
- minimum mining cut width of 30 m for localized areas and 60 m for much of the open pit;
- ability to access all benches using a maximum grade of 10% except for localized open pit bottom areas where ramps will be allowed to go up to 15% for maximum vertical climb of 12 m;
- avoid unfavourable intersection of coal seams with catch benches;

- offset from existing coal license and/or private property boundaries owned by TCL;
- environmental offsets due to water bodies, water courses, and sensitive environments;
- water management considerations; and
- ability for the open pit to meet the scheduled coal release targets.

In the case of the open pit, environmental offsets and water management considerations caused changes to the open pit shell determined by Whittle to be further modified. In the very southern portion of the open pit, there is a small tributary of Four Creek that the open pit would have encroached on and given the small amount of coal that would be recovered, the open pit was pulled back to maintain a 30 m offset from this tributary. The next change was made because the long finger along the east side of the open pit would intercept a large portion of Four Creek's watershed, so by expanding the open pit slightly in the southern portion of the open pit instead, the same amount of coal can be recovered without this long linear disturbance. While it is true the coal in the southern portion has a slightly higher strip ratio than the long finger portion on the east side of the open pit, this coal is far easier to mine than the long finger open pit.

After considering all the information above, the finalized open pit design for the Operation Phase of the Project was developed and a plan view is provided in **Figure 1.11-15**. Several typical cross and longitudinal sections are provided for the EA Open Pit in **Figures 1.11-16** through **1.11-22**.



Tenas Project

Plan view of the open pit with cross sections and longitudinal sections illustrated

Figure 1.11-15

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