

**SOUTH32 SA COAL HOLDINGS (PTY) LTD**

**VANDYKSDRIFT CENTRAL: MINING AND INFRASTRUCTURE DEVELOPMENT PROJECT  
REHABILITATION, DECOMMISSIONING AND MINE CLOSURE PLAN, ANNUAL  
REHABILITATION PLAN AND ENVIRONMENTAL RISK ASSESSMENT REPORT**

Report: JW261/19/G535-08 – Rev 2

## **APPENDIX B**

### **MAPS**





# WOLWEKRANS MIDDELBURG COLLIERY

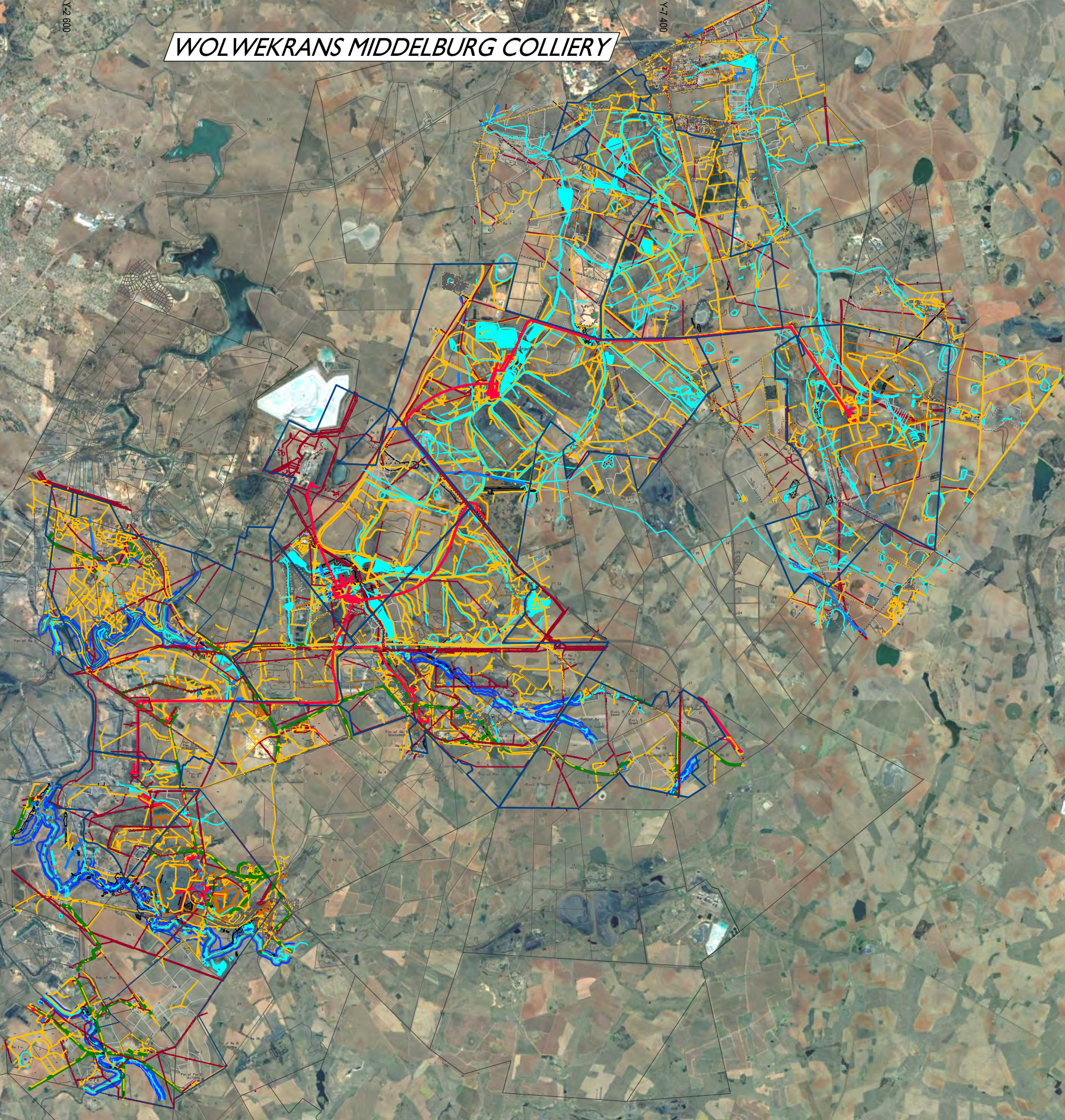
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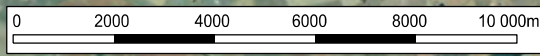


**LEGEND**

- WMC MINING RIGHTS BOUNDARY
- CONVEYOR
- ROADS
- RIVERS
- POWERLINES

**SURVEY PROJECTION:**

- \* DATUM: CAPE
- \* PROJECTION: GAUSS CONFORM
- \* CENTRAL MERIDIAN: LO29



**Jones & Wagener**  
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**South 32 Financial Provision  
Location Of The Existing Surface Infrastructure at WMC**

**FIGURE 1-3**  
PROJECT No: F568  
SCALE 1:150 000  
REV A



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## **APPENDIX C**

### **DEMOLITION COSTING AND REHABILITATION DESIGNS**



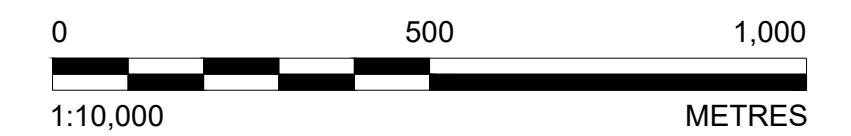
							18/05/2018			
							Financial Year 1			
MR Area	SubAreas	Inventory Item	Work Section	Work Subsection	Work Item	Notes	Unit	Qty Y1	Rate Y1	Amount Y1
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-001 4 Seam Stockpile					#N/A		#N/A	#N/A
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-002 5 Seam Stockpile					#N/A		#N/A	#N/A
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-003 Contractors Laydown Area	60 - BULK EARTHWORKS	60.1 - All earthworks	Rip previously compacted areas		m²	8373.8	3.74	31 318
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-003 Contractors Laydown Area	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Supply, deliver and spread topsoil (large quantities)	Assume 300mm	m²	2512.1	22.60	56 774
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-003 Contractors Laydown Area	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Fertilize areas		m²	8373.8	1.86	15 575
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-003 Contractors Laydown Area	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Vegetate areas - seed mix with slopes less than 1:5		m²	8373.8	2.35	19 678
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-003 Contractors Laydown Area	140 - POST-CLOSURE MAINTENAN 140.1 - Post closure maintenance		Maintenance cost fully inclusive per hectare per year	Assume 5 years	ha.yr	4.2	4 199.85	17 584
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-004 Dirty Water Drains	70 - STORM WATER DRAINAGE	70.1 - Demolish and remove storm water drainage structures	Demolish concrete from concrete-lined drains		m³	107.4	697.38	74 925
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-004 Dirty Water Drains	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Supply, deliver and spread topsoil (assume commercial sources)	Assume 300mm	m²	3499.2	515.68	1 804 467
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-004 Dirty Water Drains	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Fertilize areas		m²	11664.0	1.86	21 695
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-004 Dirty Water Drains	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Vegetate areas - seed mix with slopes less than 1:5		m²	11664.0	2.35	27 410
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-004 Dirty Water Drains	140 - POST-CLOSURE MAINTENAN 140.1 - Post closure maintenance		Maintenance cost fully inclusive per hectare per year	Assume 5 years	ha.yr	5.8	4 199.85	24 494
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-005 Dirty Water Pipelines to Vleishaft Dam	100 - PIPING	100.1 - Demolish and remove piping	Pipe (HDPE / uPVC) > 300 mm; < 400 mm dia.	Assume diameter 315mm	m	3201.0	42.88	137 259
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-005 Dirty Water Pipelines to Vleishaft Dam	100 - PIPING	100.1 - Demolish and remove piping	Excavate, expose and remove pipes (<1m dia.), backfill trenches		m	3201.0	130.59	418 019
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-005 Dirty Water Pipelines to Vleishaft Dam	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Supply, deliver and spread topsoil (large quantities)	Assume 300mm	m²	686.6	22.60	15 517
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-005 Dirty Water Pipelines to Vleishaft Dam	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Fertilize areas		m²	2288.7	1.86	4 257
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-005 Dirty Water Pipelines to Vleishaft Dam	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Vegetate areas - seed mix with slopes less than 1:5		m²	2288.7	2.35	5 378
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-005 Dirty Water Pipelines to Vleishaft Dam	140 - POST-CLOSURE MAINTENAN 140.1 - Post closure maintenance		Maintenance cost fully inclusive per hectare per year	Assume 5 years	ha.yr	1.1	4 199.85	4 806
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-006 Dirty Water Pipeline to Water Treatment Plant	100 - PIPING	100.1 - Demolish and remove piping	Pipe (HDPE / uPVC) > 300 mm; < 400 mm dia.	Assume diameter 315mm	m	6690.0	42.88	286 867
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-006 Dirty Water Pipeline to Water Treatment Plant	100 - PIPING	100.1 - Demolish and remove piping	Excavate, expose and remove pipes (<1m dia.), backfill trenches		m	6690.0	130.59	873 647
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-006 Dirty Water Pipeline to Water Treatment Plant	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Supply, deliver and spread topsoil (large quantities)	Assume 300mm	m²	1435.0	22.60	32 431
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-006 Dirty Water Pipeline to Water Treatment Plant	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Fertilize areas		m²	4783.4	1.86	8 897
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-006 Dirty Water Pipeline to Water Treatment Plant	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Vegetate areas - seed mix with slopes less than 1:5		m²	4783.4	2.35	11 241
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-006 Dirty Water Pipeline to Water Treatment Plant	140 - POST-CLOSURE MAINTENAN 140.1 - Post closure maintenance		Maintenance cost fully inclusive per hectare per year	Assume 5 years	ha.yr	2.4	4 199.85	10 045
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-007 Dragline Spoils					#N/A		#N/A	#N/A
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-008 Drains Culverts	70 - STORM WATER DRAINAGE	70.1 - Demolish and remove storm water drainage structures	Remove precast concrete pipes (<1m dia.) and culverts (<1 m x 1 m)	1 set 1.2m diameter, therefore length multiplied by a factor of 1.2/1	m	9618.4	170.86	1 643 400
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-008 Drains Culverts	70 - STORM WATER DRAINAGE	70.1 - Demolish and remove storm water drainage structures	Excavate, expose and remove concrete pipes (<1m dia.), backfill trenches	1 set 1.2m diameter, therefore length multiplied by a factor of 1.2/1	m	9618.4	126.08	1 212 688
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-008 Drains Culverts	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Supply, deliver and spread topsoil (large quantities)	Assume 300mm	m²	3110.2	22.60	70 291
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-008 Drains Culverts	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Fertilize areas		m²	10367.4	1.86	19 283
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-008 Drains Culverts	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Vegetate areas - seed mix with slopes less than 1:5		m²	10367.4	2.35	24 363
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-008 Drains Culverts	140 - POST-CLOSURE MAINTENAN 140.1 - Post closure maintenance		Maintenance cost fully inclusive per hectare per year	Assume 5 years	ha.yr	5.2	4 199.85	21 771
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-009 Future Coal Plant Infrastructure Area					#N/A		#N/A	#N/A
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-010 Mine Haul Truck Park					#N/A		#N/A	#N/A
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-011 Mixed ROM Slurry Stockpile Areas					#N/A		#N/A	#N/A
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-012 Overburden Dump					#N/A		#N/A	#N/A
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-013 Proposed 315 dia. Clean Water Pipeline	100 - PIPING	100.1 - Demolish and remove piping	Pipe (HDPE / uPVC) > 300 mm; < 400 mm dia.	315mm	m	701.0	42.88	30 059
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-013 Proposed 315 dia. Clean Water Pipeline	100 - PIPING	100.1 - Demolish and remove piping	Excavate, expose and remove pipes (<1m dia.), backfill trenches	315mm	m	701.0	130.59	91 544
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-013 Proposed 315 dia. Clean Water Pipeline	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Supply, deliver and spread topsoil (large quantities)	Assume 300mm	m²	150.4	22.60	3 398
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-013 Proposed 315 dia. Clean Water Pipeline	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Fertilize areas		m²	501.2	1.86	932
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-013 Proposed 315 dia. Clean Water Pipeline	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Vegetate areas - seed mix with slopes less than 1:5		m²	501.2	2.35	1 178
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-013 Proposed 315 dia. Clean Water Pipeline	140 - POST-CLOSURE MAINTENAN 140.1 - Post closure maintenance		Maintenance cost fully inclusive per hectare per year	Assume 5 years	ha.yr	0.3	4 199.85	1 053
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-014 Proposed 450 dia. Clean Water Pipeline	100 - PIPING	100.1 - Demolish and remove piping	Pipe (HDPE / uPVC) > 400 mm; < 500 mm dia.	450mm	m	10274.4	60.04	616 877
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-014 Proposed 450 dia. Clean Water Pipeline	100 - PIPING	100.1 - Demolish and remove piping	Excavate, expose and remove pipes (<1m dia.), backfill trenches	450mm	m	10274.4	130.59	1 341 738
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-014 Proposed 450 dia. Clean Water Pipeline	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Supply, deliver and spread topsoil (large quantities)	Assume 300mm	m²	2620.0	22.60	59 212
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-014 Proposed 450 dia. Clean Water Pipeline	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Fertilize areas		m²	8733.3	1.86	16 244
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-014 Proposed 450 dia. Clean Water Pipeline	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Vegetate areas - seed mix with slopes less than 1:5		m²	8733.3	2.35	20 523
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-014 Proposed 450 dia. Clean Water Pipeline	140 - POST-CLOSURE MAINTENAN 140.1 - Post closure maintenance		Maintenance cost fully inclusive per hectare per year	Assume 5 years	ha.yr	4.4	4 199.85	18 339
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-015 Proposed Box Cut					#N/A		#N/A	#N/A
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-016 Proposed EME Hard Park Terrace and Brake Test Ramp	50 - ROADS, PARKING AREAS AND 50.1 - Demolish roads and parking		Rip gravel roads and pavement layers		m²	60501.5	3.74	226 276
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-016 Proposed EME Hard Park Terrace and Brake Test Ramp	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Supply, deliver and spread topsoil (large quantities)	Assume 300mm	m²	18150.5	22.60	410 200
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-016 Proposed EME Hard Park Terrace and Brake Test Ramp	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Fertilize areas		m²	60501.5	1.86	112 533
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-016 Proposed EME Hard Park Terrace and Brake Test Ramp	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Vegetate areas - seed mix with slopes less than 1:5		m²	60501.5	2.35	142 179
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-016 Proposed EME Hard Park Terrace and Brake Test Ramp	140 - POST-CLOSURE MAINTENAN 140.1 - Post closure maintenance		Maintenance cost fully inclusive per hectare per year	Assume 5 years	ha.yr	30.3	4 199.85	127 049
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-017 Proposed Evaporators	10 - STRUCTURAL AND BUILDING	10.1 - Demolish buildings and structures	Reinforced concrete foundations	Assume 28 evaporators	m²	403.2	769.73	310 355
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-017 Proposed Evaporators	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Supply, deliver and spread topsoil (large quantities)	Assume 300mm	m²	403.2	22.60	9 112
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-017 Proposed Evaporators	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Fertilize areas		m²	1344.0	1.86	2 500
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-017 Proposed Evaporators	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Vegetate areas - seed mix with slopes less than 1:5		m²	1344.0	2.35	3 158
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-017 Proposed Evaporators	140 - POST-CLOSURE MAINTENAN 140.1 - Post closure maintenance		Maintenance cost fully inclusive per hectare per year	Assume 5 years	ha.yr	0.7	4 199.85	2 822
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-017 Proposed Evaporators	60 - BULK EARTHWORKS	60.1 - All earthworks	Rip previously compacted areas		m²	1344.0	3.74	5 027
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-018 Proposed Explosive Magazine	10 - STRUCTURAL AND BUILDING	10.1 - Demolish buildings and structures	Reinforced concrete foundations		m²	39.4	769.73	30 340
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-018 Proposed Explosive Magazine	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Supply, deliver and spread topsoil (large quantities)	Assume 300mm	m²	9151.2	22.60	206 817
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-018 Proposed Explosive Magazine	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Fertilize areas		m²	30504.0	1.86	56 737
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-018 Proposed Explosive Magazine	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Vegetate areas - seed mix with slopes less than 1:5		m²	30504.0	2.35	71 684
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-018 Proposed Explosive Magazine	140 - POST-CLOSURE MAINTENAN 140.1 - Post closure maintenance		Maintenance cost fully inclusive per hectare per year	Assume 5 years	ha.yr	15.3	4 199.85	64 056
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-018 Proposed Explosive Magazine	60 - BULK EARTHWORKS	60.1 - All earthworks	Rip previously compacted areas		m²	30504.0	3.74	114 085
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-019 Proposed Haul Roads	50 - ROADS, PARKING AREAS AND 50.1 - Demolish roads and parking		Rip gravel roads and pavement layers		m²	613840.0	3.74	2 295 762
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-019 Proposed Haul Roads	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Supply, deliver and spread topsoil (large quantities)	Assume topsoil in berms	m²	0.0	22.60	0
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-019 Proposed Haul Roads	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Fertilize areas		m²	613840.0	1.86	1 141 742
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-019 Proposed Haul Roads	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Vegetate areas - seed mix with slopes less than 1:5		m²	613840.0	2.35	1 442 524
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-019 Proposed Haul Roads	140 - POST-CLOSURE MAINTENAN 140.1 - Post closure maintenance		Maintenance cost fully inclusive per hectare per year	Assume 5 years	ha.yr	306.9	4 199.85	1 289 018
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-020 Proposed Modular Water Treatment Plant	10 - STRUCTURAL AND BUILDING	10.1 - Demolish buildings and structures	Reinforced concrete foundations		m²	66.0	769.73	50 802
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-020 Proposed Modular Water Treatment Plant	60 - BULK EARTHWORKS	60.1 - All earthworks	Rip previously compacted areas		m²	200.0	3.74	748
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-020 Proposed Modular Water Treatment Plant	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Supply, deliver and spread topsoil (large quantities)	Assume 300mm	m²	60.0	22.60	1 356
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-020 Proposed Modular Water Treatment Plant	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Fertilize areas		m²	200.0	1.86	372
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-020 Proposed Modular Water Treatment Plant	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Vegetate areas - seed mix with slopes less than 1:5		m²	200.0	2.35	470
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-020 Proposed Modular Water Treatment Plant	140 - POST-CLOSURE MAINTENAN 140.1 - Post closure maintenance		Maintenance cost fully inclusive per hectare per year	Assume 5 years	ha.yr	0.1	4 199.85	420
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-021 Proposed Security Fencing	20 - FENCING AND WALLS	20.1 - Demolish fencing, walls and gates	2.4 m High security fence complete	Excludes from contract??	m	4405.0	97.75	430 589
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-022 Service Roads	50 - ROADS, PARKING AREAS AND 50.1 - Demolish roads and parking		Rip gravel roads and pavement layers		m²	93592.0	3.74	350 034
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-022 Service Roads	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Supply, deliver and spread topsoil (large quantities)	Assume topsoil from	m²	0.0	22.60	0
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-022 Service Roads	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Fertilize areas		m²	93592.0	1.86	174 081
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-022 Service Roads	110 - VEGETATION AND IRRIGATIC 110.2 - Establish vegetation		Vegetate areas - seed mix with slopes less than 1:5		m²	93592.0	2.35	219 941
WVK - Wolvekrans Colliery	WVK - VDDC Proposed Infrastructure	VDDC-022 Service Roads	140 - POST-CLOSURE MAINTENAN 140.1 - Post closure maintenance							



# UNIVERSAL COAL CONCEPTUAL LANDFORM DESIGN FOR VANDYKSDRIFT CENTRAL SOUTH 32



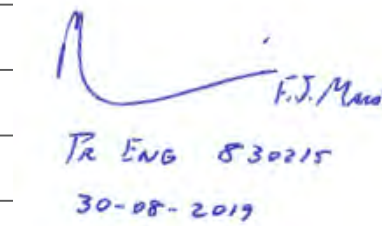
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SHEET TITLE	SHEET NUMBER
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General Arrangement	19119414-GA-001
Initial Box Cut Development - South	19119414-LS002
Mined out Topography - South	19119414-LS-003
Initial Box Cut - North Shaping and Leveling - South	19119414-LS-004
Mined Out Topography - North And Post Mining Landform - South	19119414-LS-005
Mined Out Topography - North Level and Shaping - North	19119414-LS-006
VDDC Post Mining Landform	19119414-LL-007




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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A1

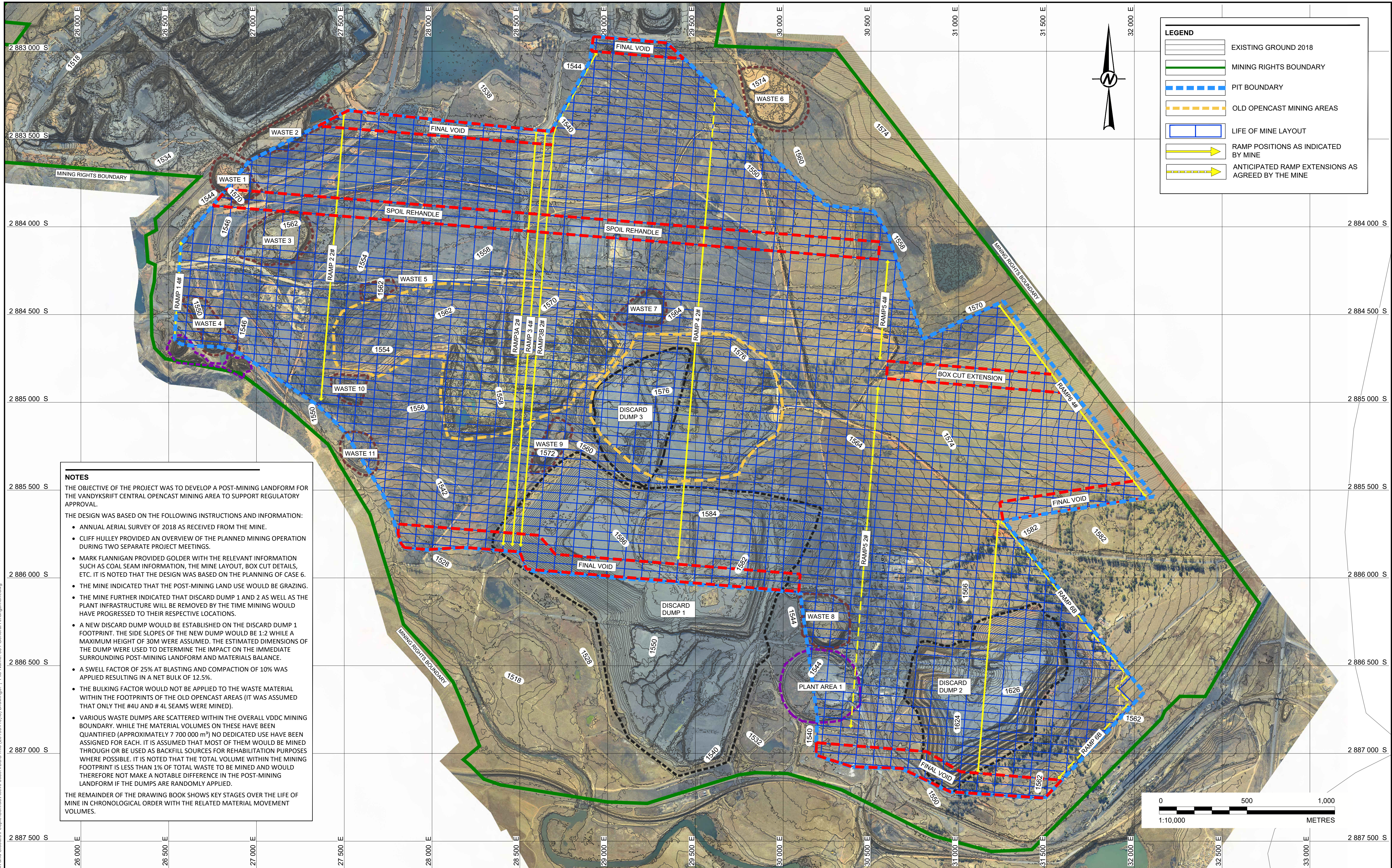
A	2019-08-30	ISSUE FOR INFORMATION	CB	PB	PB
Rev.	YYYY-MM-DD	DESCRIPTION	PREPARED	DESIGN	REVIEW APPROVED



F.J. Munn  
Tr Eng 530015  
30-08-2019

<p>CLIENT UNIVERSAL COAL SOUTH 32 VANDYKSDRIFT CENTRAL</p> <p>CONSULTANT  <b>GOLDER</b></p> <p style="font-size: x-small;">GOLDER ASSOCIATES AFRICA (PTY) LTD SECOND FLOOR, 43 INGERSOL ROAD PODIUM AT MENLYN, 0181 SOUTH AFRICA [+28] (0) 11 254 4800 www.golder.com</p>	<p>PROJECT CONCEPTUAL LANDFORM DESIGNS FOR VANDYKSDRIFT CENTRAL SOUTH 32</p> <p>TITLE <b>COVER PAGE</b></p> <p>PROJECT No. 19119414    CONTROL CP    Rev. 1 of 8    004</p>
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**NOTES**

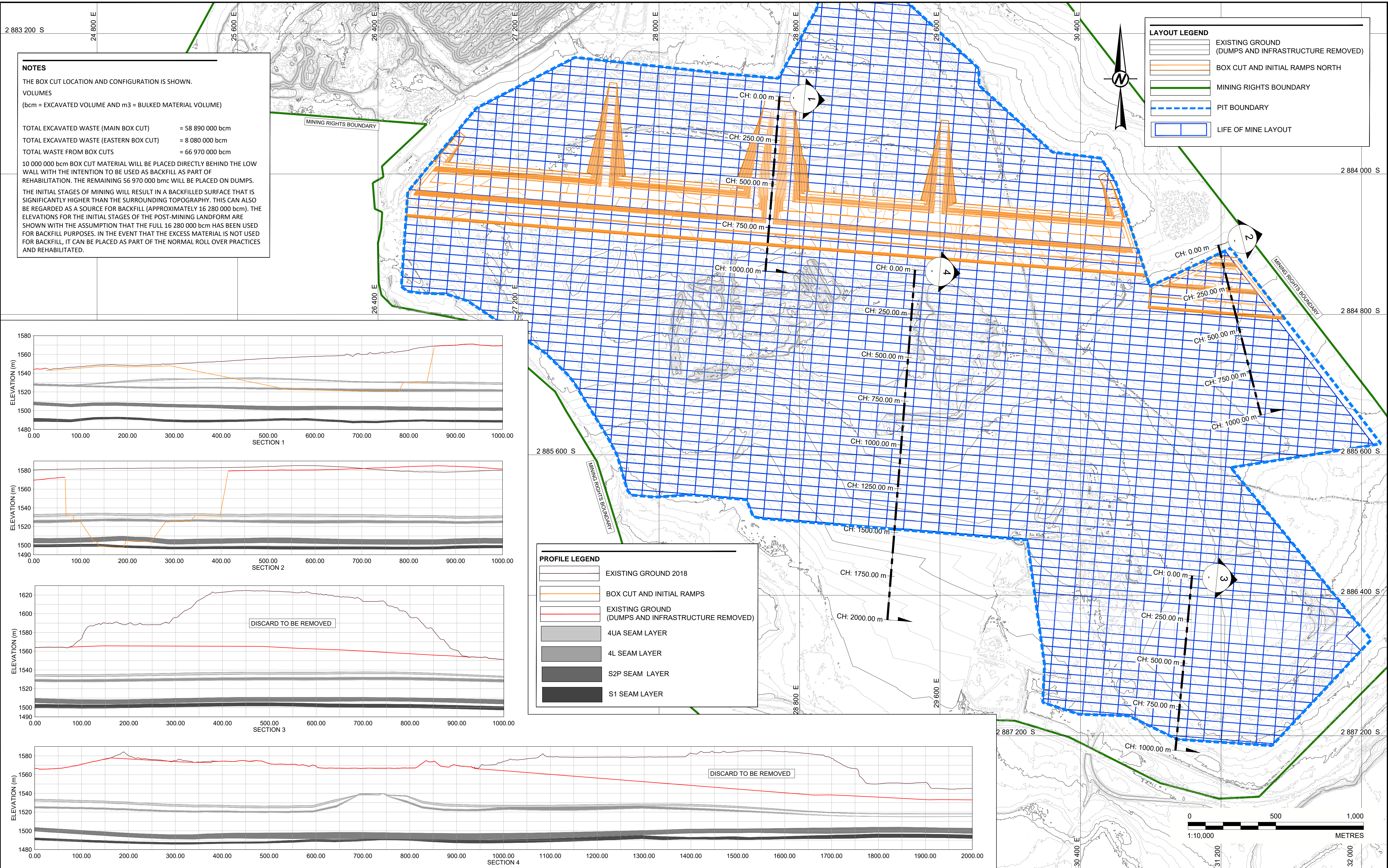
THE OBJECTIVE OF THE PROJECT WAS TO DEVELOP A POST-MINING LANDFORM FOR THE VANDYKSDRIFT CENTRAL OPENCAST MINING AREA TO SUPPORT REGULATORY APPROVAL.

THE DESIGN WAS BASED ON THE FOLLOWING INSTRUCTIONS AND INFORMATION:

- ANNUAL AERIAL SURVEY OF 2018 AS RECEIVED FROM THE MINE.
- CLIFF HULLEY PROVIDED AN OVERVIEW OF THE PLANNED MINING OPERATION DURING TWO SEPARATE PROJECT MEETINGS.
- MARK FLANNIGAN PROVIDED GOLDR WITH THE RELEVANT INFORMATION SUCH AS COAL SEAM INFORMATION, THE MINE LAYOUT, BOX CUT DETAILS, ETC. IT IS NOTED THAT THE DESIGN WAS BASED ON THE PLANNING OF CASE 6.
- THE MINE INDICATED THAT THE POST-MINING LAND USE WOULD BE GRAZING.
- THE MINE FURTHER INDICATED THAT DISCARD DUMP 1 AND 2 AS WELL AS THE PLANT INFRASTRUCTURE WILL BE REMOVED BY THE TIME MINING WOULD HAVE PROGRESSED TO THEIR RESPECTIVE LOCATIONS.
- A NEW DISCARD DUMP WOULD BE ESTABLISHED ON THE DISCARD DUMP 1 FOOTPRINT. THE SIDE SLOPES OF THE NEW DUMP WOULD BE 1:2 WHILE A MAXIMUM HEIGHT OF 30M WERE ASSUMED. THE ESTIMATED DIMENSIONS OF THE DUMP WERE USED TO DETERMINE THE IMPACT ON THE IMMEDIATE SURROUNDING POST-MINING LANDFORM AND MATERIALS BALANCE.
- A SWELL FACTOR OF 25% AT BLASTING AND COMPACTION OF 10% WAS APPLIED RESULTING IN A NET BULK OF 12.5%.
- THE BULKING FACTOR WOULD NOT BE APPLIED TO THE WASTE MATERIAL WITHIN THE FOOTPRINTS OF THE OLD OPENCAST AREAS (IT WAS ASSUMED THAT ONLY THE #4U AND #4L SEAMS WERE MINED).
- VARIOUS WASTE DUMPS ARE SCATTERED WITHIN THE OVERALL VDDC MINING BOUNDARY. WHILE THE MATERIAL VOLUMES ON THESE HAVE BEEN QUANTIFIED (APPROXIMATELY 7 700 000 m<sup>3</sup>) NO DEDICATED USE HAVE BEEN ASSIGNED FOR EACH. IT IS ASSUMED THAT MOST OF THEM WOULD BE MINED THROUGH OR BE USED AS BACKFILL SOURCES FOR REHABILITATION PURPOSES WHERE POSSIBLE. IT IS NOTED THAT THE TOTAL VOLUME WITHIN THE MINING FOOTPRINT IS LESS THAN 1% OF TOTAL WASTE TO BE MINED AND WOULD THEREFORE NOT MAKE A NOTABLE DIFFERENCE IN THE POST-MINING LANDFORM IF THE DUMPS ARE RANDOMLY APPLIED.

THE REMAINDER OF THE DRAWING BOOK SHOWS KEY STAGES OVER THE LIFE OF MINE IN CHRONOLOGICAL ORDER WITH THE RELATED MATERIAL MOVEMENT VOLUMES.





**NOTES**  
 THE BOX CUT LOCATION AND CONFIGURATION IS SHOWN.  
**VOLUMES**  
 (bcm = EXCAVATED VOLUME AND m3 = BULKED MATERIAL VOLUME)

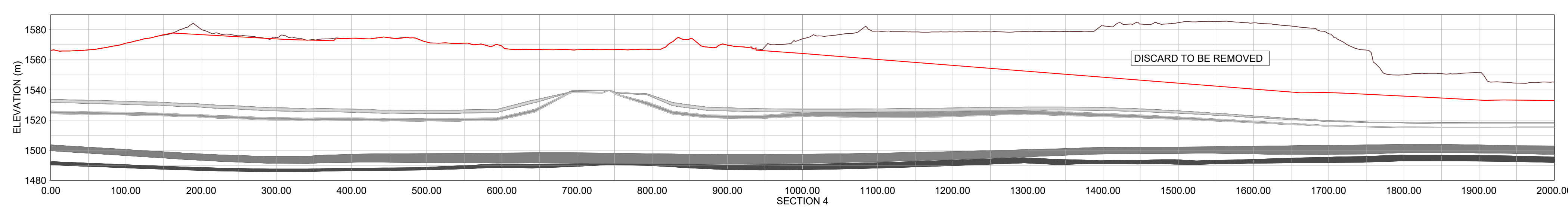
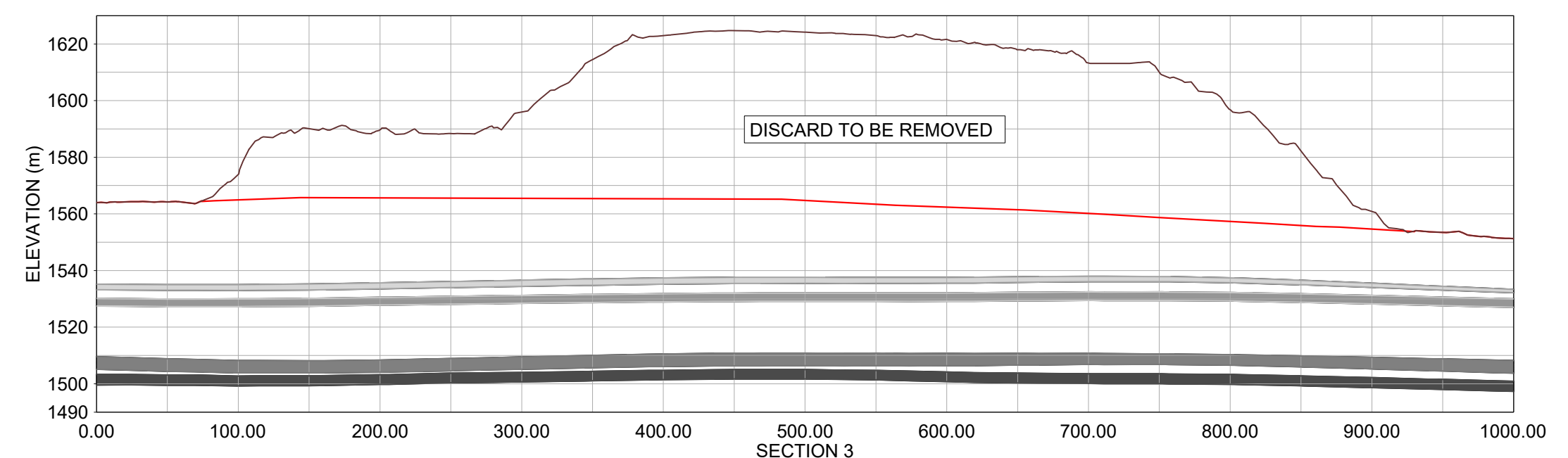
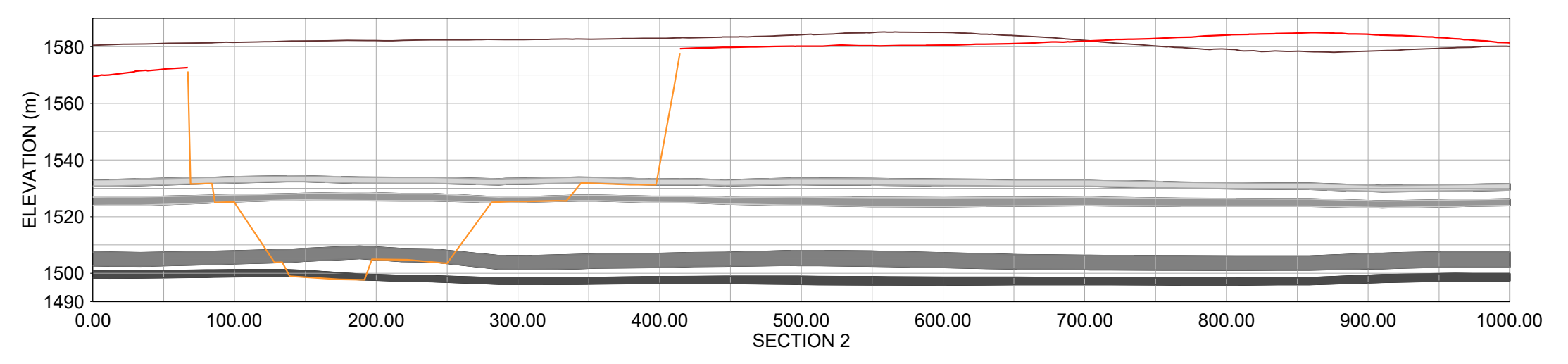
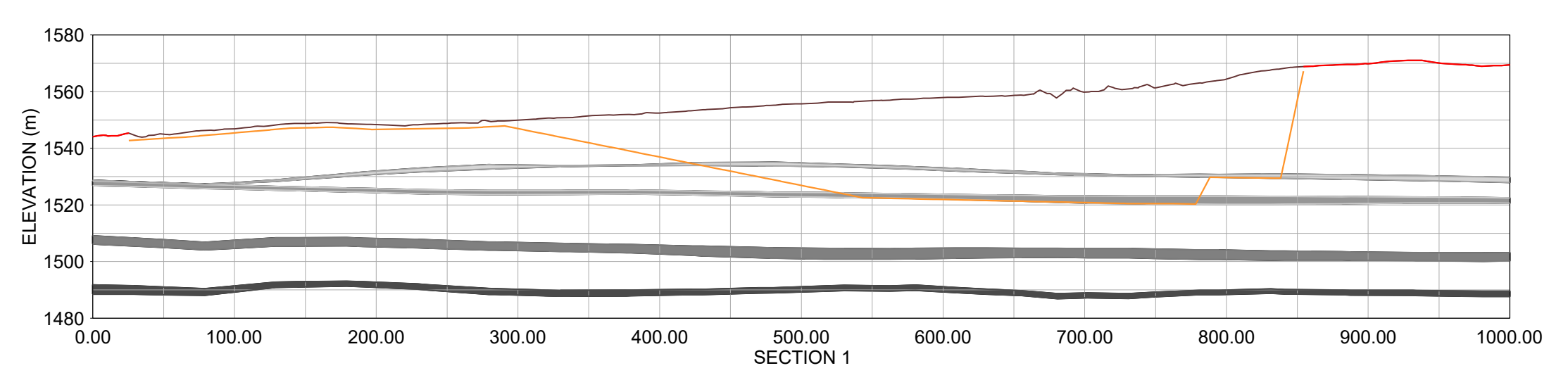
TOTAL EXCAVATED WASTE (MAIN BOX CUT) = 58 890 000 bcm  
 TOTAL EXCAVATED WASTE (EASTERN BOX CUT) = 8 080 000 bcm  
 TOTAL WASTE FROM BOX CUTS = 66 970 000 bcm

10 000 000 bcm BOX CUT MATERIAL WILL BE PLACED DIRECTLY BEHIND THE LOW WALL WITH THE INTENTION TO BE USED AS BACKFILL AS PART OF REHABILITATION. THE REMAINING 56 970 000 bcm WILL BE PLACED ON DUMPS.

THE INITIAL STAGES OF MINING WILL RESULT IN A BACKFILLED SURFACE THAT IS SIGNIFICANTLY HIGHER THAN THE SURROUNDING TOPOGRAPHY. THIS CAN ALSO BE REGARDED AS A SOURCE FOR BACKFILL (APPROXIMATELY 16 280 000 bcm). THE ELEVATIONS FOR THE INITIAL STAGES OF THE POST-MINING LANDFORM ARE SHOWN WITH THE ASSUMPTION THAT THE FULL 16 280 000 bcm HAS BEEN USED FOR BACKFILL PURPOSES. IN THE EVENT THAT THE EXCESS MATERIAL IS NOT USED FOR BACKFILL, IT CAN BE PLACED AS PART OF THE NORMAL ROLL OVER PRACTICES AND REHABILITATED.

**LAYOUT LEGEND**

- EXISTING GROUND (DUMPS AND INFRASTRUCTURE REMOVED)
- BOX CUT AND INITIAL RAMPS NORTH
- MINING RIGHTS BOUNDARY
- PIT BOUNDARY
- LIFE OF MINE LAYOUT



**PROFILE LEGEND**

- EXISTING GROUND 2018
- BOX CUT AND INITIAL RAMPS
- EXISTING GROUND (DUMPS AND INFRASTRUCTURE REMOVED)
- 4UA SEAM LAYER
- 4L SEAM LAYER
- S2P SEAM LAYER
- S1 SEAM LAYER

Rev.	2019-08-30	ISSUE FOR INFORMATION	CB	PB	PB
	YYYY-MM-DD	DESCRIPTION	PREPARED	DESIGN	REVIEW APPROVED

CLIENT  
 UNIVERSAL COAL SOUTH 32  
 VANDYKSDRIFT CENTRAL

CONSULTANT  
**GOLDER**

GOLDER ASSOCIATES AFRICA (PTY) LTD  
 SECOND FLOOR, 43 INGERSOL ROAD  
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 SOUTH AFRICA  
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 www.golder.com

PROJECT  
 CONCEPTUAL LANDFORM DESIGNS FOR  
 VANDYKSDRIFT CENTRAL SOUTH 32

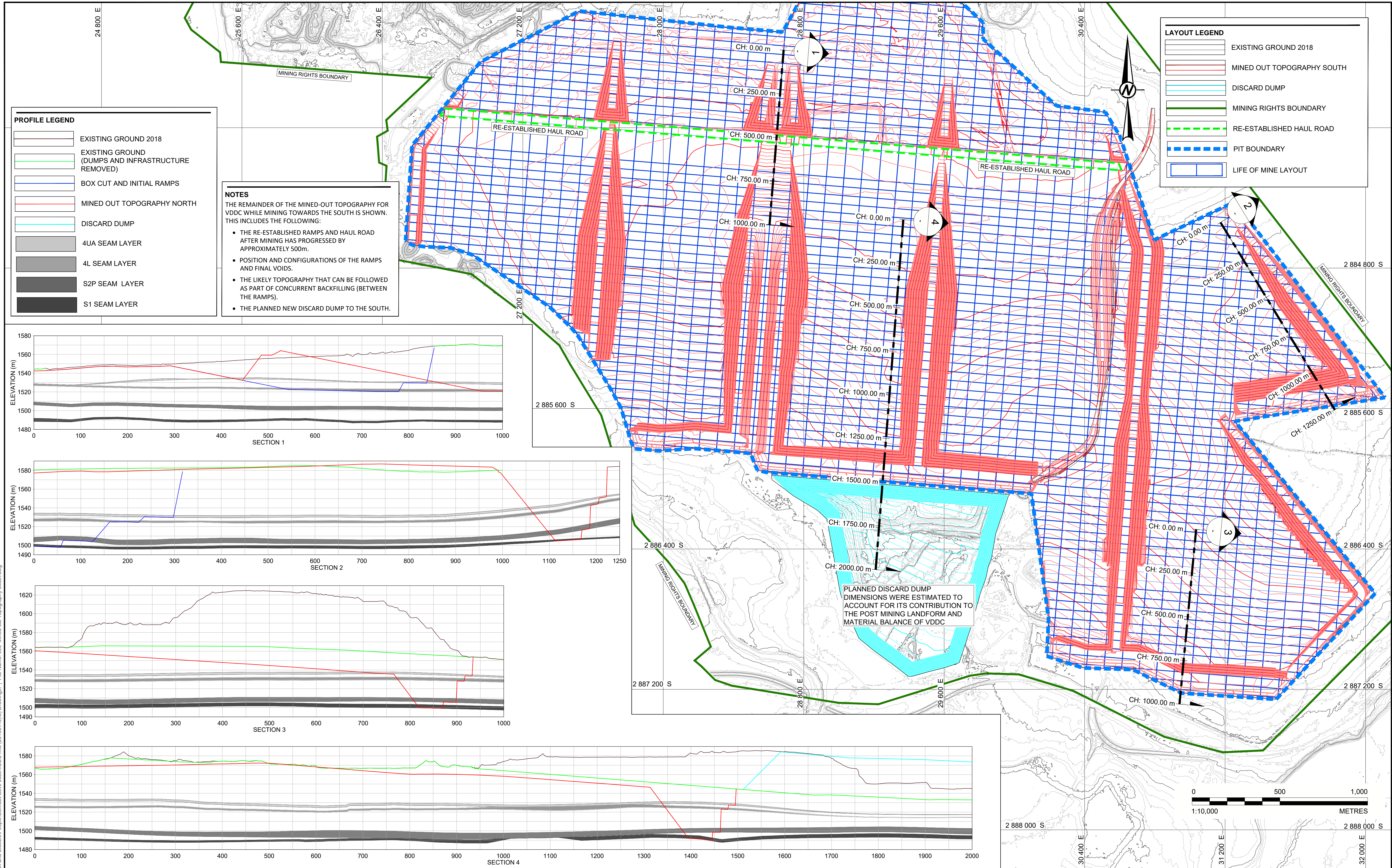
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**INITIAL BOX CUT DEVELOPMENT - SOUTH**

PROJECT No. 19119414 CONTROL LS Rev. 3 of 8 002

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25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A1





**LAYOUT LEGEND**

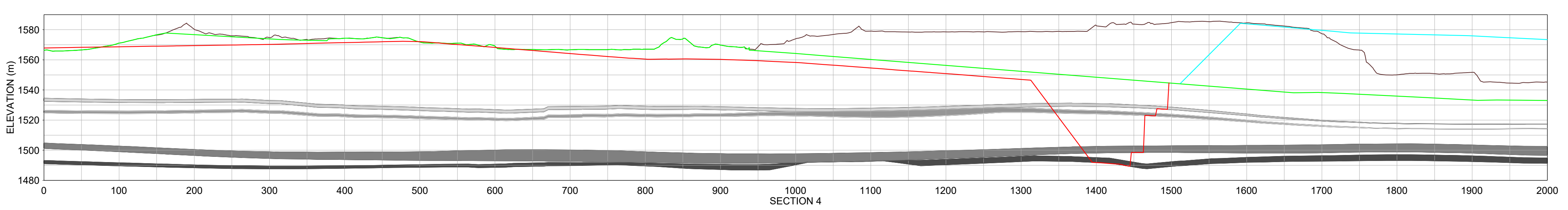
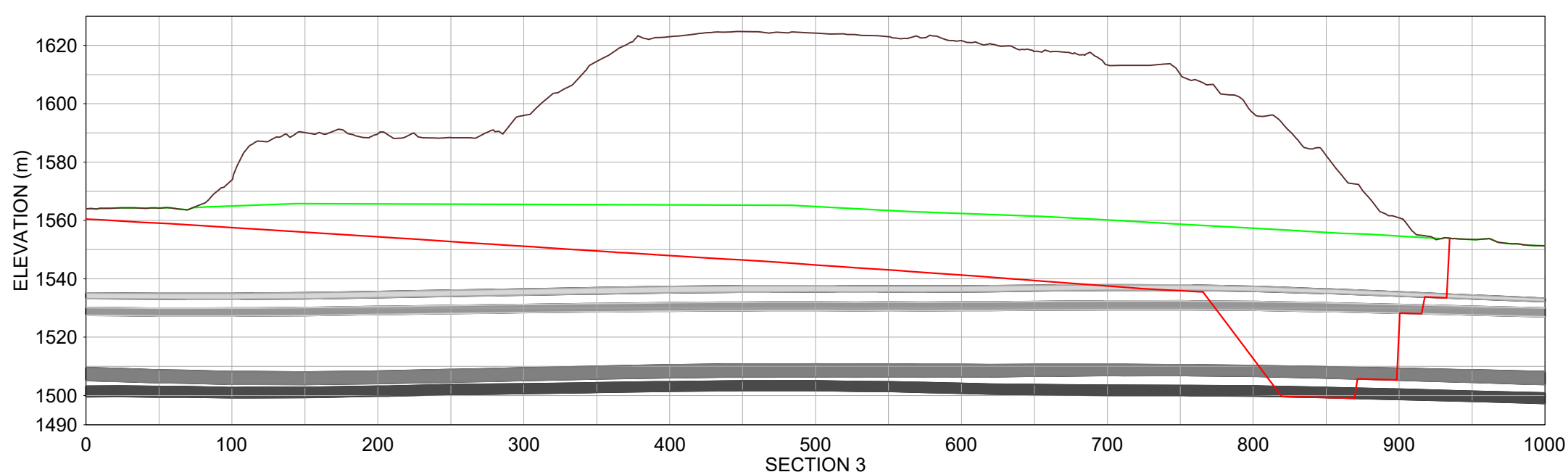
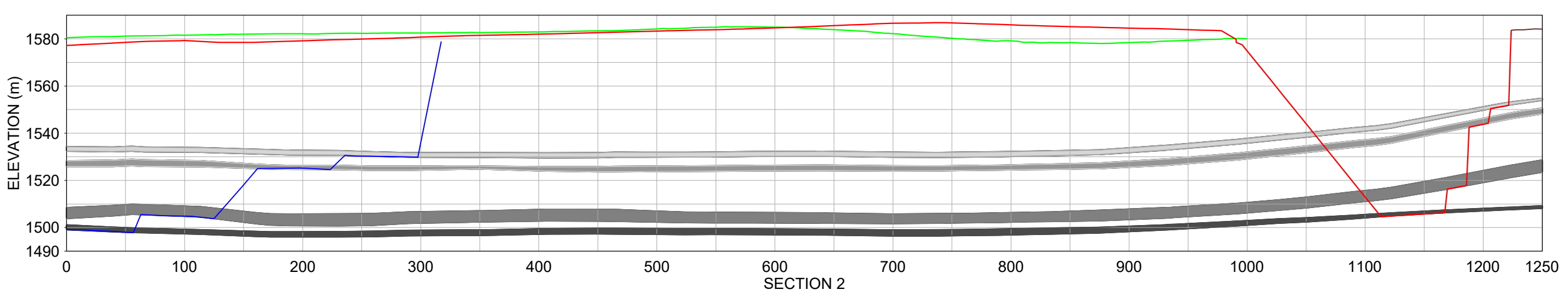
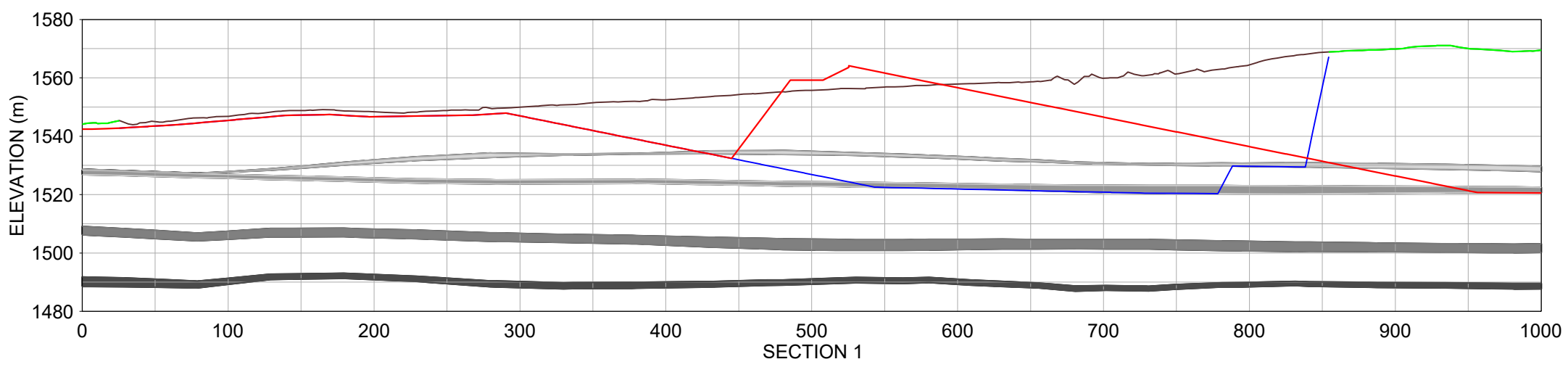
- EXISTING GROUND 2018
- MINED OUT TOPOGRAPHY SOUTH
- DISCARD DUMP
- MINING RIGHTS BOUNDARY
- RE-ESTABLISHED HAUL ROAD
- PIT BOUNDARY
- LIFE OF MINE LAYOUT

**PROFILE LEGEND**

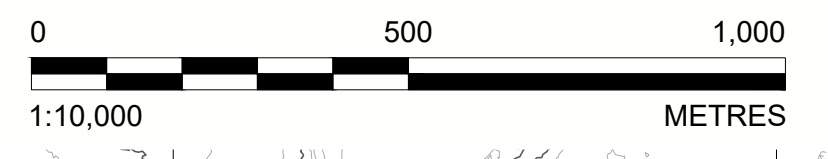
- EXISTING GROUND 2018
- EXISTING GROUND (DUMPS AND INFRASTRUCTURE REMOVED)
- BOX CUT AND INITIAL RAMPS
- MINED OUT TOPOGRAPHY NORTH
- DISCARD DUMP
- 4UA SEAM LAYER
- 4L SEAM LAYER
- S2P SEAM LAYER
- S1 SEAM LAYER

**NOTES**  
 THE REMAINDER OF THE MINED-OUT TOPOGRAPHY FOR VDDC WHILE MINING TOWARDS THE SOUTH IS SHOWN. THIS INCLUDES THE FOLLOWING:

- THE RE-ESTABLISHED RAMPS AND HAUL ROAD AFTER MINING HAS PROGRESSED BY APPROXIMATELY 500m.
- POSITION AND CONFIGURATIONS OF THE RAMPS AND FINAL VOIDS.
- THE LIKELY TOPOGRAPHY THAT CAN BE FOLLOWED AS PART OF CONCURRENT BACKFILLING (BETWEEN THE RAMPS).
- THE PLANNED NEW DISCARD DUMP TO THE SOUTH.



PLANNED DISCARD DUMP DIMENSIONS WERE ESTIMATED TO ACCOUNT FOR ITS CONTRIBUTION TO THE POST MINING LANDFORM AND MATERIAL BALANCE OF VDDC



CLIENT	UNIVERSAL COAL SOUTH 32 VANDYKSDRIFT CENTRAL
CONSULTANT	GOLDER
PROJECT	CONCEPTUAL LANDFORM DESIGNS FOR VANDYKSDRIFT CENTRAL SOUTH 32
TITLE	MINED OUT TOPOGRAPHY - SOUTH
PROJECT No.	19119414
CONTROL	LS
Rev.	4 of 8
	002

CLIENT  
 UNIVERSAL COAL SOUTH 32  
 VANDYKSDRIFT CENTRAL

CONSULTANT  
**GOLDER**

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PROJECT No. 19119414  
 CONTROL LS  
 Rev. 4 of 8  
 A

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 YYY-MM-DD DESCRIPTION  
 CB PB PB  
 PREPARED DESIGN REVIEW APPROVED

25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A1



**NOTES**

IT IS PLANNED THAT THE MINING DIRECTION CHANGES TO THE NORTH WHEN THE SOUTHERN PORTION HAS BEEN MINED AND INCLUDES THE FOLLOWING:

- ESTABLISHMENT OF A NEW BOX CUT JUST TO THE NORTH OF THE ORIGINAL BOX CUT.
- ESTABLISHMENT OF NEW LOW WALL RAMPS AND A HAUL ROAD.
- REHABILITATION OF THE SOUTHERN AREA BY SHAPING OF STEEPER SLOPES TO THE REQUIRED SLOPES.
- MAKING USE OF THE 10 000 000 bcm AND OTHER SOURCES TO BACKFILL AND REHABILITATE THE SOUTHERN AREA WHERE REQUIRED.

INDICATIVE REPROFILING OF THE NEW DISCARD DUMP IS ALSO SHOWN. IT IS NOTED THAT SOME OF THE DISCARD IS LIKELY TO BE SHAPED INTO THE FINAL VOID TO ACHIEVE FLATTER AND MORE STABLE SIDE SLOPES, THEREBY REDUCING THE BACK FILL REQUIRED TO ENSURE THE FINAL VOID IS FREE DRAINING.

THE FOLLOWING DEFINITIONS HAVE BEEN USED:

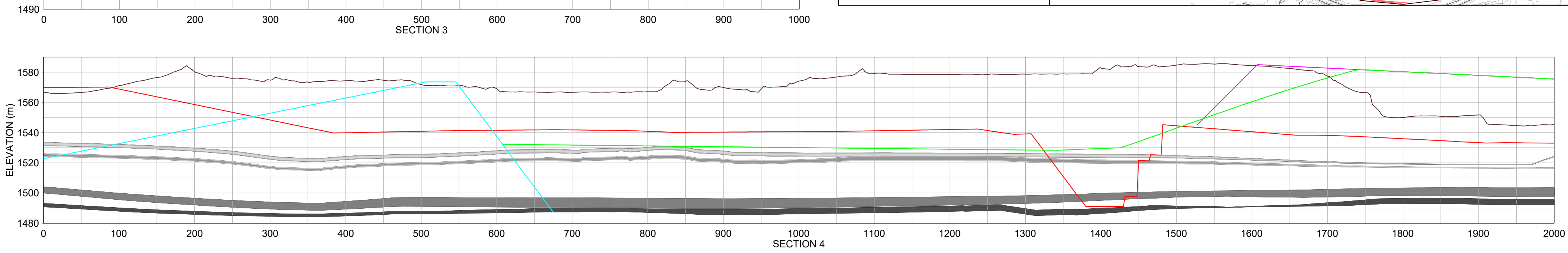
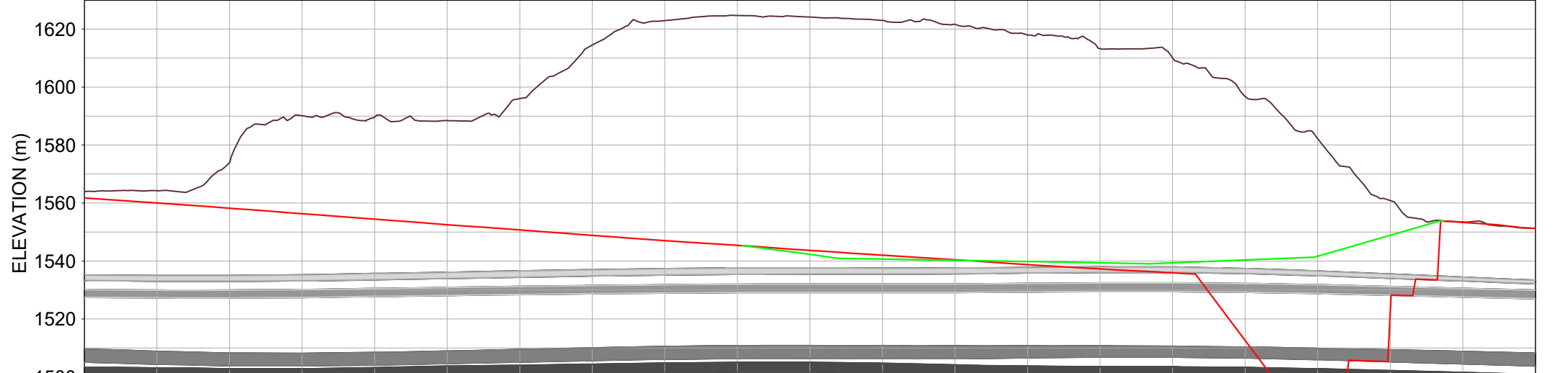
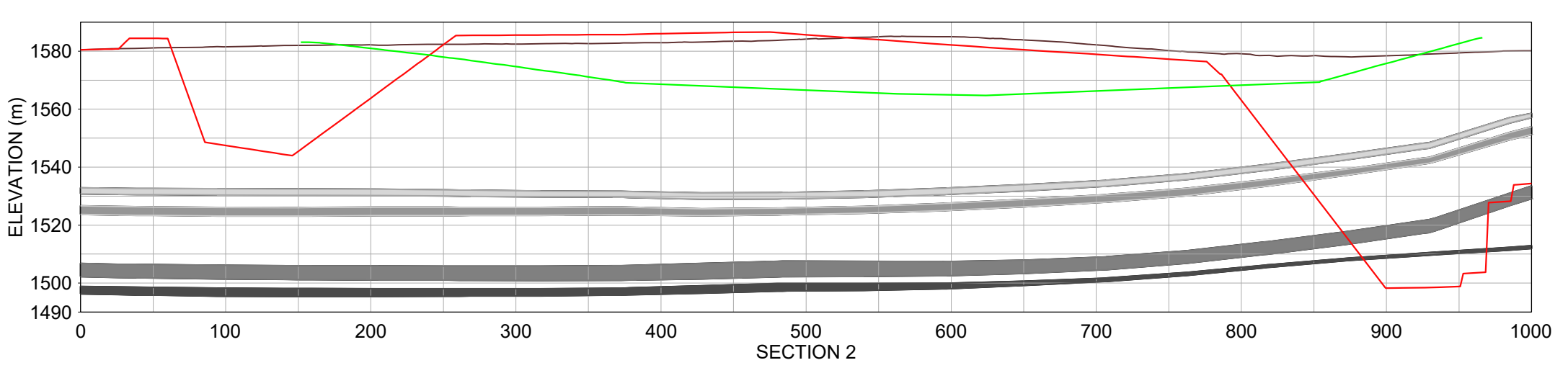
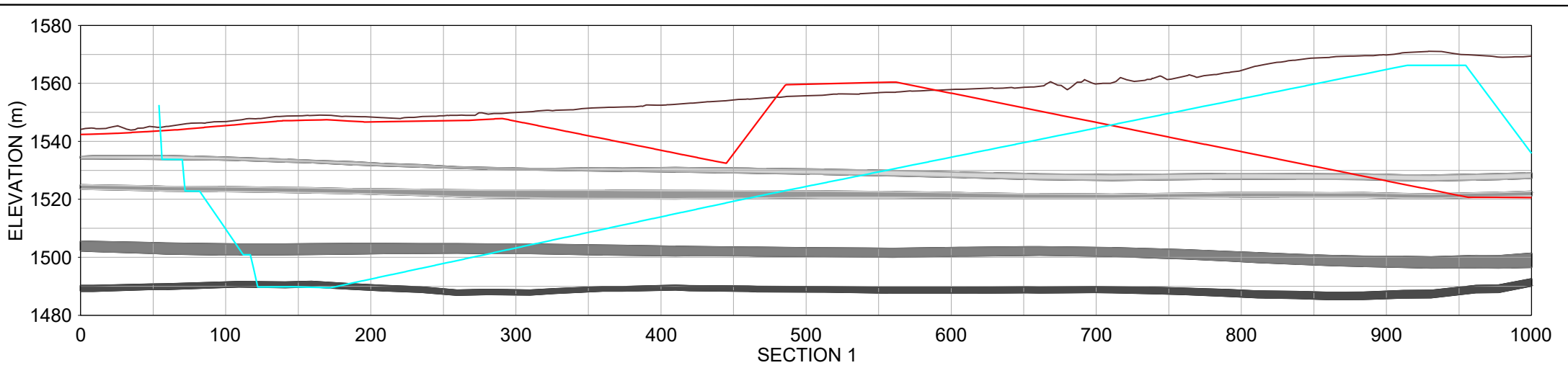
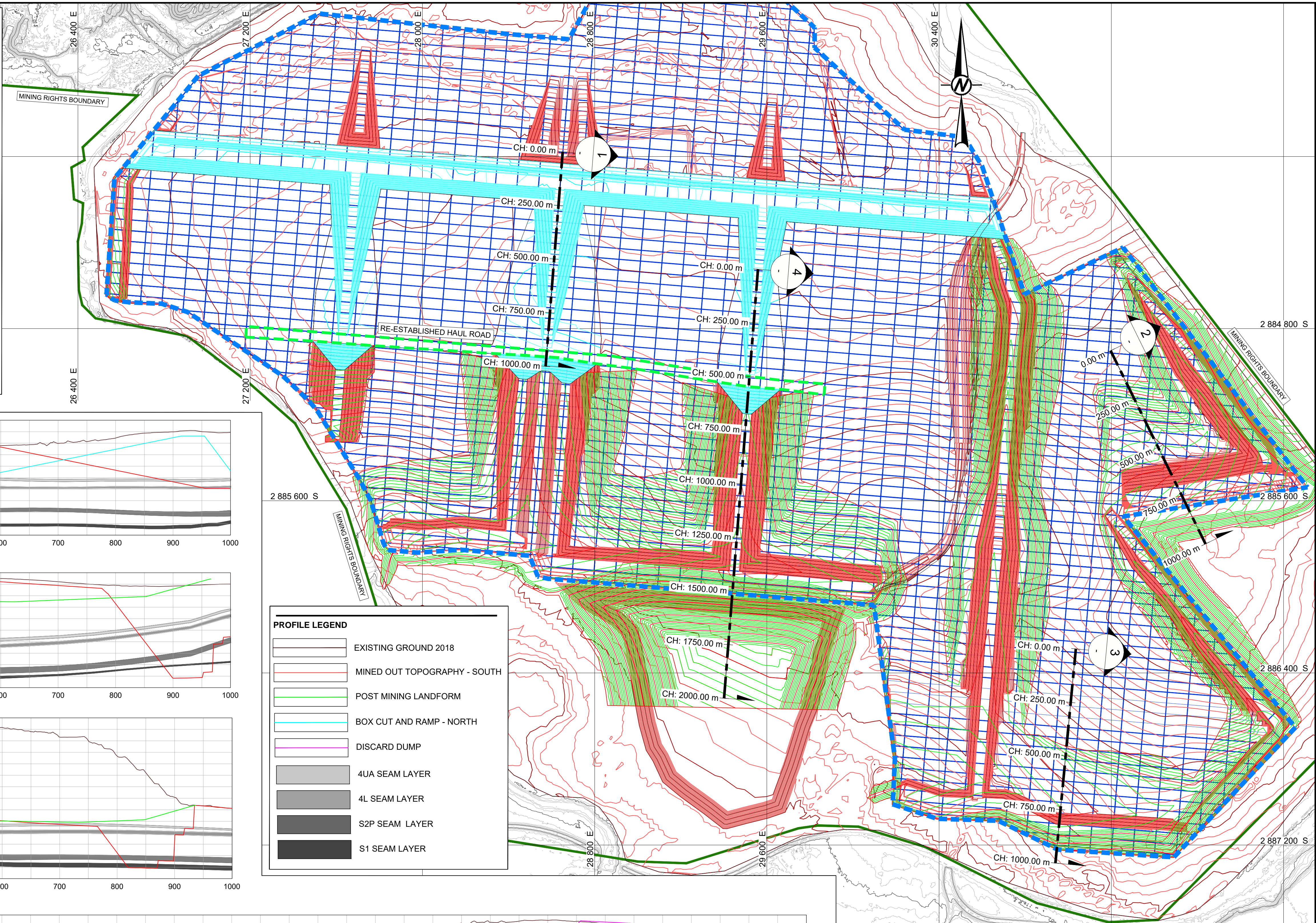
SHAPING: REFERS TO MATERIAL MOVEMENT OF THE IMMEDIATE SURROUNDING MATERIAL FROM HIGHER TO LOWER ELEVATIONS TO ACHIEVE THE REQUIRED ALLOWABLE SLOPES. IN PRACTICE, EVERYTHING CAN BE MOVED DOWNHILL WITH A DOZER IF EFFICIENCY OVER DOZING DISTANCE IS NOT ACCOUNTED FOR. TYPICAL MAXIMUM MOVEMENT DISTANCE IS 250m.

BACKFILL: REFERS TO MATERIAL MOVED BY LOAD AND HAUL FROM WASTE DUMPS.

VOLUMES  
(bcm: EXCAVATED VOLUME AND m<sup>3</sup>: BULKED MATERIAL VOLUME)

BOX CUT AND RAMPS ESTABLISHMENT  
TOTAL EXCAVATION (BOX CUT AND RAMPS) = 34 100 000 m<sup>3</sup>  
TOTAL MATERIAL REQUIRED TO RE-ESTABLISH RAMPS AND NEW HAUL ROAD = 21 660 000 m<sup>3</sup>  
REMAINING MATERIAL FOR BACKFILL = 12 450 000 m<sup>3</sup>

REHABILITATION  
TOTAL SHAPING OF VDDC SOUTHERN AREA = 35 860 000 m<sup>3</sup>  
TOTAL BACKFILL REQUIRED TO FILL THE REMAINING LOW-LYING AREAS (PONDING AREAS) AFTER SHAPING = 29 730 000 m<sup>3</sup>



**PROFILE LEGEND**

	EXISTING GROUND 2018
	MINED OUT TOPOGRAPHY - SOUTH
	POST MINING LANDFORM
	BOX CUT AND RAMP - NORTH
	DISCARD DUMP
	4UA SEAM LAYER
	4L SEAM LAYER
	S2P SEAM LAYER
	S1 SEAM LAYER

**LAYOUT LEGEND**

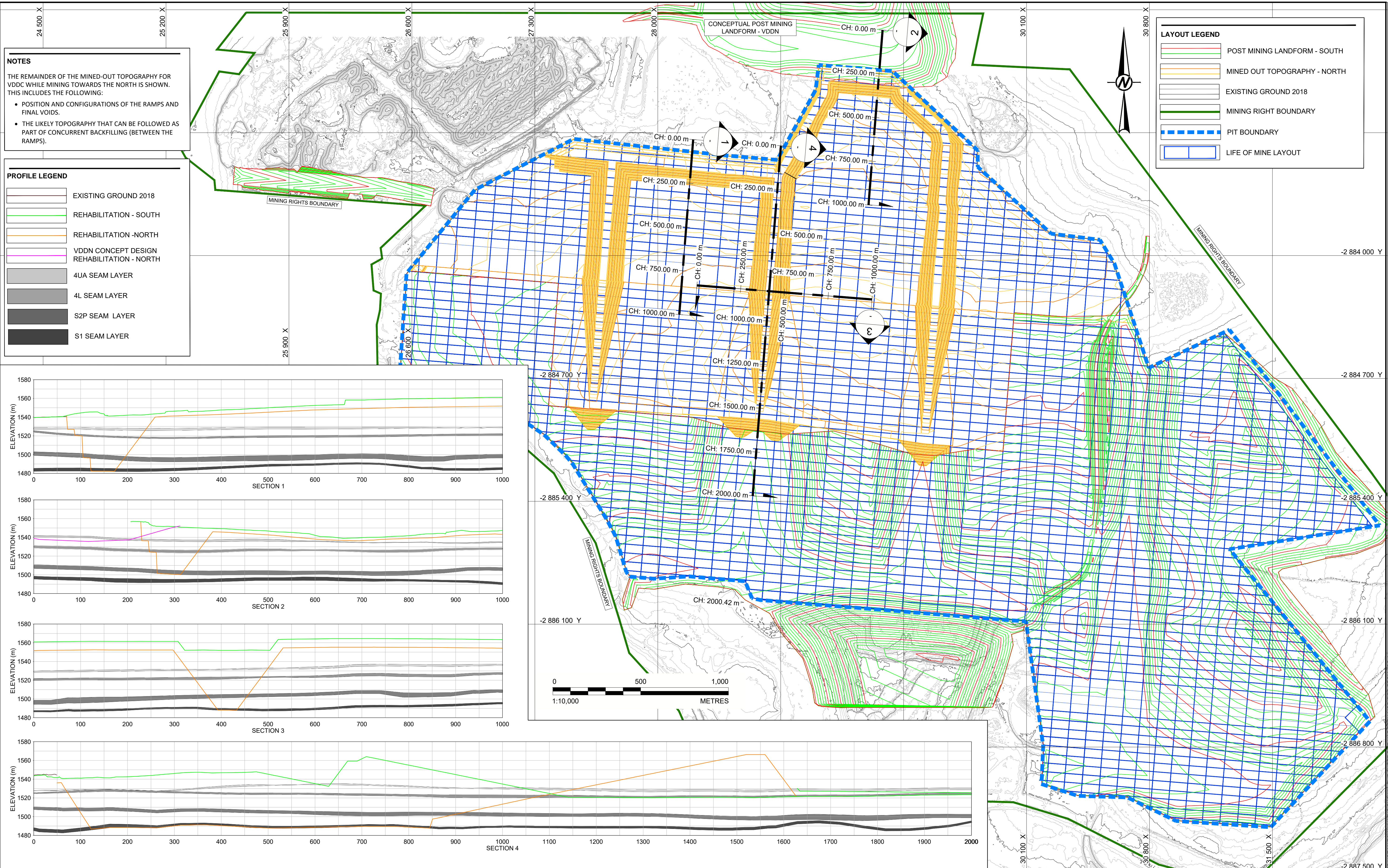
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	MINED OUT TOPOGRAPHY - NORTH		MINING RIGHTS BOUNDARY
	MINED OUT TOPOGRAPHY - SOUTH		PIT BOUNDARY
	ADD RAMP		LIFE OF MINE LAYOUT
	REHABILITATION - SOUTH		

CLIENT	UNIVERSAL COAL SOUTH 32 VANDYKSDRIFT CENTRAL
CONSULTANT	GOLDER
PROJECT	CONCEPTUAL LANDFORM DESIGNS FOR VANDYKSDRIFT CENTRAL SOUTH 32
TITLE	INITIAL BOX CUT - NORTH SHAPING AND LEVELING - SOUTH
PROJECT No.	19119414
CONTROL	LS
Rev.	5 of 8
Rev.	A
Rev.	002

Rev.	2019-08-30	ISSUE FOR INFORMATION	CB	PB	PB	
Rev.	YYYY-MM-DD	DESCRIPTION	PREPARED	DESIGN	REVIEW	APPROVED

25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A1





**NOTES**

THE REMAINDER OF THE MINED-OUT TOPOGRAPHY FOR VDDC WHILE MINING TOWARDS THE NORTH IS SHOWN. THIS INCLUDES THE FOLLOWING:

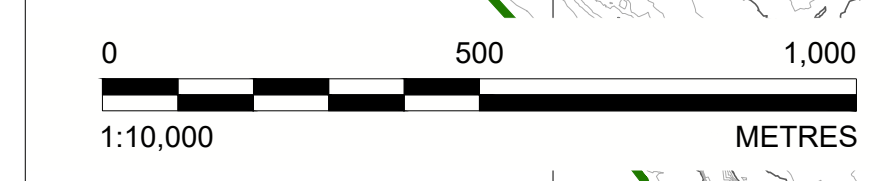
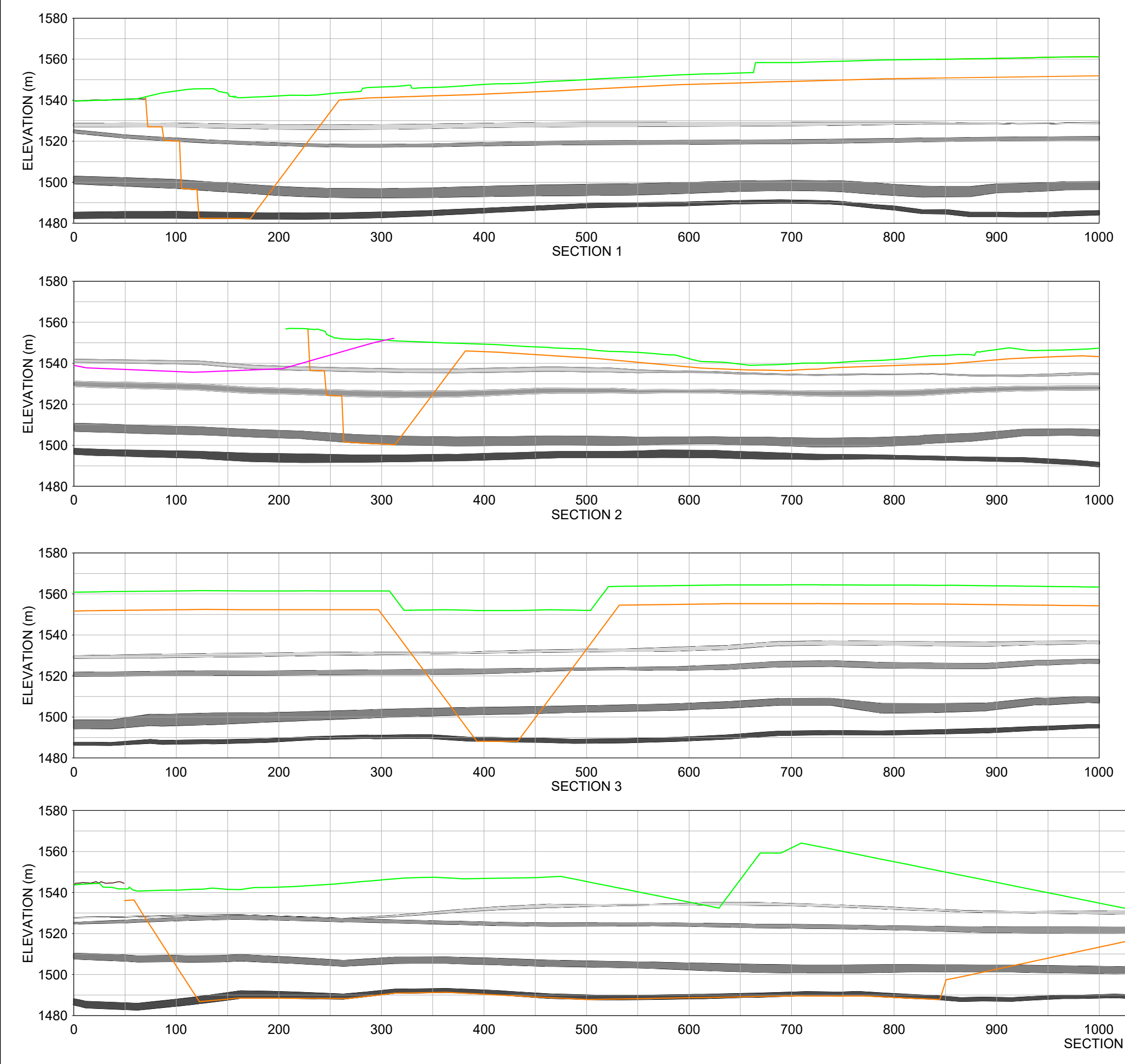
- POSITION AND CONFIGURATIONS OF THE RAMP AND FINAL VOIDS.
- THE LIKELY TOPOGRAPHY THAT CAN BE FOLLOWED AS PART OF CONCURRENT BACKFILLING (BETWEEN THE RAMP).

**PROFILE LEGEND**

- EXISTING GROUND 2018
- REHABILITATION - SOUTH
- REHABILITATION - NORTH
- VDDN CONCEPT DESIGN REHABILITATION - NORTH
- 4UA SEAM LAYER
- 4L SEAM LAYER
- S2P SEAM LAYER
- S1 SEAM LAYER

**LAYOUT LEGEND**

- POST MINING LANDFORM - SOUTH
- MINED OUT TOPOGRAPHY - NORTH
- EXISTING GROUND 2018
- MINING RIGHT BOUNDARY
- PIT BOUNDARY
- LIFE OF MINE LAYOUT



Rev.	2019-08-30	ISSUE FOR INFORMATION	CB	PB	PB
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					APPROVED

CLIENT  
UNIVERSAL COAL SOUTH 32  
VANDYKSDRIFT CENTRAL

CONSULTANT  
**GOLDER**

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PROJECT  
CONCEPTUAL LANDFORM DESIGNS FOR  
VANDYKSDRIFT CENTRAL SOUTH 32

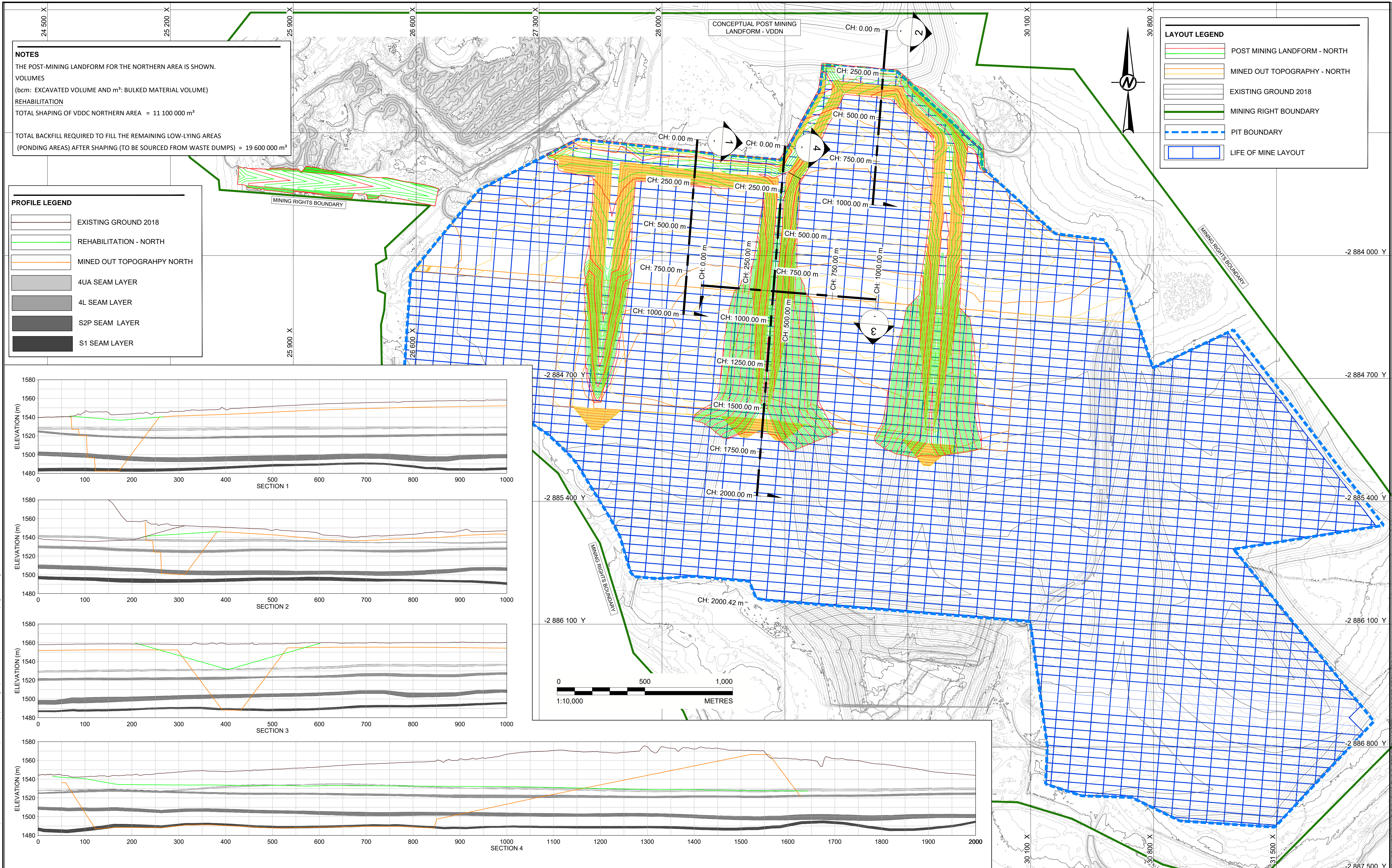
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**MINED OUT TOPOGRAPHY - NORTH AND  
POST MINING LANDFORM - SOUTH**

PROJECT No. 19119414 CONTROL LS Rev. 6 of 8 002  
A

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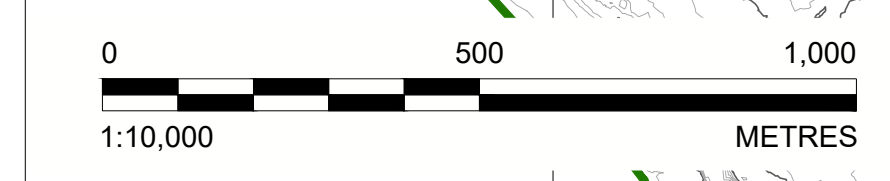
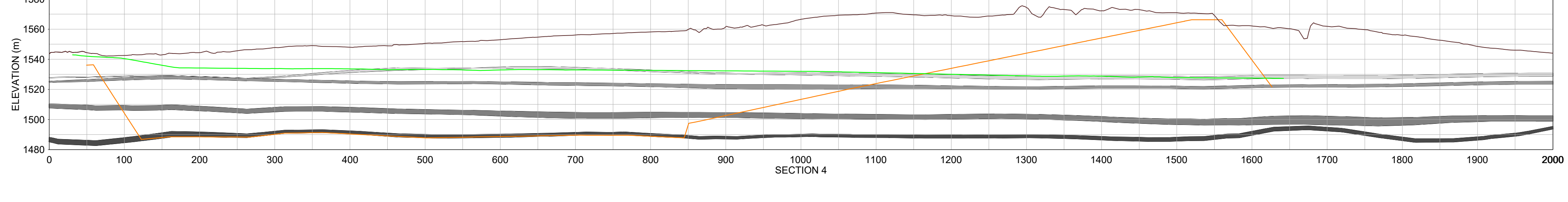
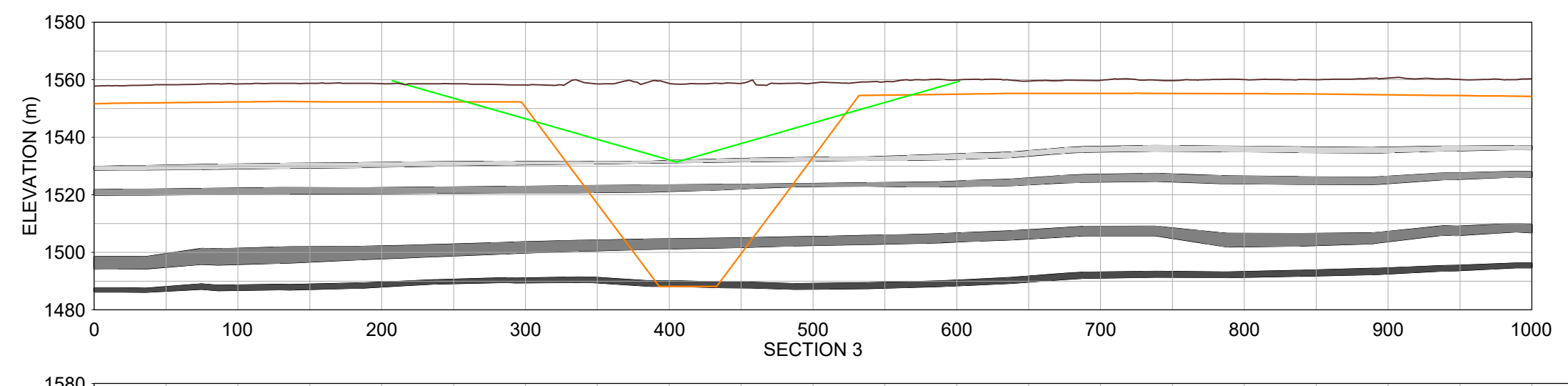
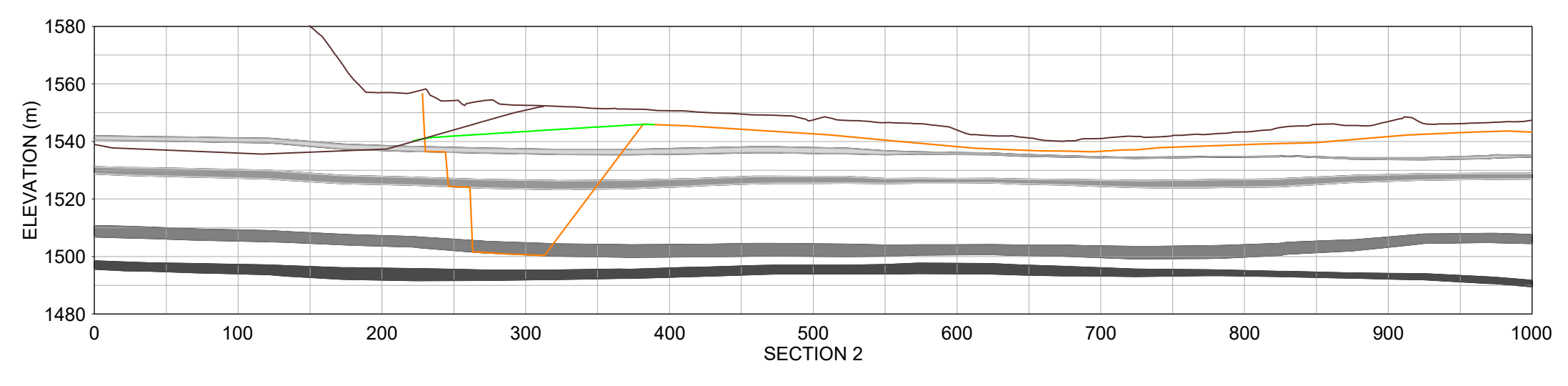
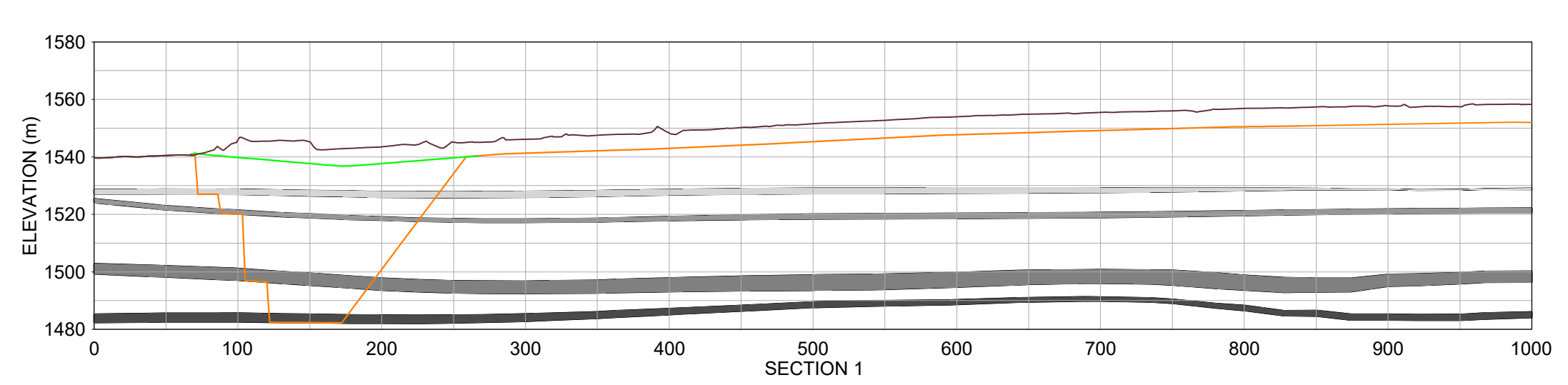
**NOTES**  
 THE POST-MINING LANDFORM FOR THE NORTHERN AREA IS SHOWN.  
**VOLUMES**  
 (bcm: EXCAVATED VOLUME AND m³: BULKED MATERIAL VOLUME)  
**REHABILITATION**  
 TOTAL SHAPING OF VDDC NORTHERN AREA = 11 100 000 m³  
 TOTAL BACKFILL REQUIRED TO FILL THE REMAINING LOW-LYING AREAS  
 (PONDING AREAS) AFTER SHAPING (TO BE SOURCED FROM WASTE DUMPS) = 19 600 000 m³

**LAYOUT LEGEND**

- POST MINING LANDFORM - NORTH
- MINED OUT TOPOGRAPHY - NORTH
- EXISTING GROUND 2018
- MINING RIGHT BOUNDARY
- - - PIT BOUNDARY
- LIFE OF MINE LAYOUT

**PROFILE LEGEND**

- EXISTING GROUND 2018
- REHABILITATION - NORTH
- MINED OUT TOPOGRAPHY NORTH
- 4UA SEAM LAYER
- 4L SEAM LAYER
- S2P SEAM LAYER
- S1 SEAM LAYER



<p>CLIENT UNIVERSAL COAL SOUTH 32 VANDYKSDRIFT CENTRAL</p> <p>CONSULTANT <b>GOLDER</b></p> <p>GOLDER ASSOCIATES AFRICA (PTY) LTD SECOND FLOOR, 43 INGERSOL ROAD PODIUM AT MENLYN, 0181 SOUTH AFRICA [+28] (0) 11 254 4800 www.golder.com</p>	<p>PROJECT CONCEPTUAL LANDFORM DESIGNS FOR VANDYKSDRIFT CENTRAL SOUTH 32</p> <p>TITLE <b>MINED OUT TOPOGRAPHY - NORTH LEVELING AND SHAPING - NORTH</b></p> <p>PROJECT No. 19119414    CONTROL LS    Rev. 7 of 8    002</p>	<p>Rev. 2019-08-30    ISSUE FOR INFORMATION    CB    PB    PB</p> <p>Rev. YYYY-MM-DD    DESCRIPTION    PREPARED    DESIGN    REVIEW    APPROVED</p> <p style="text-align: right;">         F.J. Mawj        PR ENG 830115        30-08-2019     </p>
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25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A1





**LEGEND**

- EXISTING GROUND 2018
- VDDC POST MINING LANDFORM
- MINING RIGHTS BOUNDARY
- PIT BOUNDARY
- CRITICAL DRAINAGE PATHS

Path: \\pnt1\451\gsadata\Projects\09703 - Reclamation and Closure\People\Conrad\Active Jobs\VDDC info (2019041016)\Drawings\1 File Name: 007 Post Mining Landform.dwg

25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A1

<p>CLIENT UNIVERSAL COAL SOUTH 32 VANDYKSDRIFT CENTRAL</p> <p>CONSULTANT  <b>GOLDER</b></p> <p>GOLDER ASSOCIATES AFRICA (PTY) LTD SECOND FLOOR, 43 INGERSOL ROAD PODIUM AT MENLYN, 0181 SOUTH AFRICA [+28] (0) 11 254 4800 www.golder.com</p>		<p>PROJECT CONCEPTUAL LANDFORM DESIGNS FOR VANDYKSDRIFT CENTRAL SOUTH 32</p> <p>TITLE <b>VDDC POST MINING LANDFORM</b></p> <p>PROJECT No. 19119414    CONTROL LL    Rev. 8 of 8    004</p>	
<p>A    2018-08-30    ISSUE FOR INFORMATION</p>	<p>CB    PB    PB</p> <p>PREPARED    DESIGN    REVIEW    APPROVED</p>	<p><i>F.J. Mavji</i> TR ENG 830215 30-08-2019</p>	