

**DRAFT AMENDED ENVIRONMENTAL MANAGEMENT
PROGRAMME FOR EXXARO DORSTFONTEIN WEST
MINE AND EXPANSION PROJECT WITHIN THE
JURISDICTION OF EMALAHLENI LOCAL
MUNICIPALITY, MPUMALANGA PROVINCE**

JULY 2020



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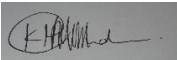

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TABLE OF CONTENTS

1	INTRODUCTION AND BACKGROUND	1
1.1	PURPOSE AND SCOPE OF THE EMPR.....	2
1.2	LOCALITY OF THE PROPOSED PROJECT	3
1.2.1	Description of the property	6
1.3	DESCRIPTION OF LAND OWNERSHIP	6
2	STRUCTURE OF THE EMPR.....	8
3	DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER INCLUDING THE APPLICANT'S DETAILS, ORGANISATIONAL STRUCTURE AND ROLES	10
3.1	DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER.....	10
3.2	DETAILS OF THE APPLICANT	11
3.3	ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES.....	12
3.3.1	Exxaro.....	12
3.3.2	Operations Manager (OM)	13
3.3.3	Environmental Control Officer (ECO)	13
3.3.4	Contractor (including Sub-Contractors).....	14
3.4	AUTHORISING DEPARTMENT	15
4	A DETAILED DESCRIPTION OF THE ASPECTS OF THE ACTIVITY THAT ARE COVERED BY THE EMPR AS IDENTIFIED BY THE PROJECT DESCRIPTION	15
4.1	DESCRIPTION OF STRUCTURES AND INFRASTRUCTURE.....	17
4.1.1	Roads, Railway lines and Power Lines	17
4.1.2	Power Lines	18
4.1.3	Conveyors and Railway.....	19
4.1.4	Mining Areas	20
4.1.5	Mine Access	28
4.1.6	Underground Mining.....	28
4.1.7	Ventilation	28
4.1.8	Plant Process	29
4.1.9	Raw Coal Handling.....	30
4.1.10	Large Coal Washing.....	30
4.1.11	Small Coal Washing	31
4.1.12	Fine Coal treatment.....	32
4.1.13	Product Handling.....	33
4.1.14	Discard and Slurry handling	33

4.1.15	Transportation of Coal.....	33
4.1.16	Proposed Conveyor Belt for coal transportation.....	34
4.2	SOLID WASTE (DOMESTIC, INDUSTRIAL AND HAZARDOUS).....	35
4.3	DIESEL AND OIL STORAGE	35
4.4	MINE WASTE (CO-DISPOSAL FACILITY).....	36
4.4.1	Proposed Discard Expansion	36
4.5	UNDERGROUND OPERATIONS.....	36
4.6	WATER MANAGEMENT AND SUPPLY (CLEAN AND DIRTY WATER AND STORM WATER PROCESSES)	36
4.6.1	Pollution Control Dam	36
4.6.2	Process Water Supply and Management.....	37
4.6.3	Clean and Dirty Water and Storm Water Processes	37
4.6.4	Sewage Management	38
4.6.5	Raw Water (Mining).....	38
4.6.6	Raw Water (Plant).....	38
4.6.7	Return Water Pumping.....	38
4.6.8	Potable Supply	38
5	A MAP AT AN APPROPRIATE SCALE WHICH SUPERIMPOSES THE PROPOSED ACTIVITY, ITS ASSOCIATED STRUCTURES, AND INFRASTRUCTURE ON THE ENVIRONMENTAL SENSITIVITIES OF THE PREFERRED SITE, INDICATING ANY AREAS THAT SHOULD BE AVOIDED, INCLUDING BUFFERS	48
6	A DESCRIPTION OF THE IMPACT MANAGEMENT OUTCOMES, INCLUDING MANAGEMENT STATEMENTS, IDENTIFYING THE IMPACTS AND RISKS THAT NEED TO BE AVOIDED, MANAGED AND MITIGATED AS IDENTIFIED THROUGH THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS FOR ALL PHASES IMPACT MANAGEMENT OUTCOMES	50
6.1	IDENTIFIED RISK THAT NEED TO BE AVOIDED.....	51
6.1.1	CONSTRUCTION PHASE	51
6.1.2	OPERATIONAL PHASE.....	52
6.1.3	DECOMMISSIONING AND REHABILITATION	54
6.2	IMPACT MANAGEMENT OUTCOMES	58
6.2.1	Pre-Construction Phase	59
6.3	CONSTRUCTION PHASE	59
6.4	OPERATIONAL PHASE	60
6.5	REHABILITATION AND CLOSURE.....	61
7	APPLICABLE LEGISLATION	63
7.1	METHOD STATEMENTS FOR THE ACTIVITIES TO BE CARRIED OUT	73
8	DESCRIPTION OF MITIGATION MEASURES	74

8.1	PRE-CONSTRUCTION MANAGEMENT PROGRAMME	75
8.1.1	Pre-Construction Activities	75
8.2	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAMME.....	76
8.2.1	Site establishment.....	76
8.2.2	Sensitive Ecology	79
8.2.3	Materials handling, use and storage	83
8.2.4	Water supply	85
8.2.5	Vehicular access and movement of construction vehicles	85
8.2.6	Movement of construction personnel and equipment.....	88
8.2.7	Protection of flora and fauna	89
8.2.8	Heritage / Archaeological sites	94
8.2.9	Servicing and re-fuelling of construction equipment.....	95
8.2.10	Waste management	97
8.2.11	Surface and groundwater management	99
8.2.12	Sensitive areas (water courses and buffers)	102
8.2.13	Hazardous materials	106
8.2.14	Oil Spill Management	111
8.2.15	Storm Water Management	112
8.2.16	Fire	116
8.2.17	Air Pollution	117
8.2.18	Noise impact	123
8.2.19	Visual impact.....	125
8.2.20	Traffic impact.....	127
8.2.21	Excavation and Groundworks	128
8.2.22	Soil and Agricultural Potential	131
8.2.23	Erosion and Control.....	132
8.2.24	Use of cement and concrete	137
8.2.25	Social Impact.....	138
8.2.26	Construction Site clean-up and rehabilitation	140
8.2.27	Monitoring of EMPr and compliance	141
8.3	OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME	142
8.3.1	Mining of Coal	142
8.3.2	Stockpiling and Transportation System.....	153
8.3.3	Control of Clean and Dirty Water Systems.....	170
8.3.4	Waste Generation and Handling	177

8.4	DECOMMISSIONING PHASE	195
8.4.1	Removal of Infrastructure	195
8.4.2	Landscaping and Rehabilitation	207
8.4.3	Closure and Residual Impact Phase	216
9	MONITORING MANAGEMENT PROGRAMME	221
9.1	HYDROLOGICAL AND HYDROGEOLOGICAL MONITORING REQUIREMENTS	221
9.1.1	APPLICABLE LICENCES	221
9.1.2	Reporting.....	221
9.2	HYDROLOGICAL MONITORING (SURFACE WATER).....	222
9.3	HYDROGEOLOGICAL MONITORING (GROUNDWATER).....	225
9.3.1	Post-Closure Phase Monitoring.....	228
9.4	DUST MONITORING.....	228
9.4.1	Applicable Licences.....	228
9.5	BIOMONITORING PROGRAMME (SASS5 AND TOXICITY TESTING).....	230
9.6	METHODOLOGY.....	230
9.6.1	Fieldwork Phase.....	230
9.6.2	Lab Analysis.....	230
9.6.3	Bi-annual Biomonitoring Report	231
9.7	NOISE.....	231
9.8	MONITORING PLAN IN TERMS OF CLIMATE CHANGE	231
9.9	MONITORING PLANS IN TERMS OF SOIL AND AGRICULTURE	231
9.10	MINE ENVIRONMENTAL AUDITS.....	232
10	ENVIRONMENTAL AWARENESS PLAN AND ENVIRONMENTAL EMERGENCY RESPONSE PLAN.....	233
10.1	EMERGENCY RESPONSE PLAN.....	233
10.1.1	Defining an Environmental Response Plan	233
10.1.2	Emergency Procedures.....	233
10.1.3	Emergency Procedure for Duty Officials	234
10.1.4	Process for Identifying Emergency Procedures	235
10.1.5	Most likely Potential Environmental Emergencies.....	236
10.1.6	Emergency Preparedness and Response.....	239
10.1.7	Reporting.....	242
10.1.8	Emergency Response Testing	242
10.1.9	Records.....	242
10.1.10	Emergency Incident Reporting	242
10.2	ENVIRONMENTAL AWARENESS PLAN.....	245
10.2.1	Communication Sectors	245

10.2.2	Management Sector	245
10.2.3	Administrative Sector	245
10.2.4	Mine Workers Sector.....	246
10.2.5	Contractors.....	246
10.3	METHODS OF COMMUNICATION	246
10.3.1	Induction.....	246
10.3.2	Environmental Symposiums.....	246
10.3.3	In-house Training	246
10.3.4	On the Job Training.....	247
10.3.5	General Training and Skills Development	247
10.3.6	Environmental Open Days	247
10.3.7	Environmental Talk Topics.....	247
10.3.8	Other	247
10.4	ENVIRONMENTAL COMMUNICATION STRATEGIES AT DORSTFONTEIN WEST	247
10.4.1	External Communication	248
10.5	EXTERNAL COMMUNICATION STRATEGIES	249
10.5.1	Evaluation of the Environmental Awareness Plan.....	256
11	GENERIC CONDITIONS	256
11.1	SITE DOCUMENTATION / MONITORING	256
11.2	FAILURE TO COMPLY WITH THE ENVIRONMENTAL CONSIDERATIONS	257
12	FINALISATION OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME	257
13	REFERENCES	258

LIST OF TABLES

Table 1: Details of the proposed site property	6
Table 2: Mineral and Surface Rights	7
Table 3: 2014 NEMA EIA Regulations EMPr Report Content	8
Table 4: Details of the Environmental Assessment Practitioner (EAP).....	10
Table 5: Details of the Applicant and Responsible Person at the mine	11
Table 6 : Aspects of the activity that are covered by the EMPr	16
Table 7: Power Supply Sequence	18
Table 8: Listed and specified activities already authorized and those being included in the amendment	42
Table 9: Summary of Sensitive Areas within and around the mining area and Buffers Created	49
Table 10: Overview of sensitivity matrix (Exxaro Annual Rehabilitation Plan, 2019).....	50
Table 11: Risks Identified for Construction	51
Table 12: Risks Identified for the Operational Phase	52
Table 13: Risks Identified for the Decommissioning and Rehabilitation Phases	55
Table 14: Approach to Impact Management.....	58
Table 15: Pre-construction Objectives.....	59
Table 16: Construction Objectives.....	59
Table 17: Operation Objectives	60
Table 18: Rehabilitation and Closure Objectives	61
Table 19 : Legislation pertaining to the proposed project.....	63
Table 20: List of Associated Policies and Guidelines	68
Table 21: Applicable Plans and Programs	70
Table 22: Responsible agents	75
Table 23: Current Surface Water Monitoring Points	223
Table 24: Surface Water Monitoring Parameters	224
Table 25: Current DCM West Groundwater Monitoring Points	226
Table 26: Proposed Groundwater Monitoring Points.....	227
Table 27: Current DCM Dust Monitoring Points	229
Table 28: Emergency Preparedness and Response at Dorstfontein West.....	240
Table 29: Environmental Incidence reporting procedures	243
Table 30: DCM West Communication Strategy	249
Table 31: Environmental Awareness Plan for the Construction Phase at Dorstfontein West.....	252
Table 32: Environmental Awareness Plan for the Operational Phase at Dorstfontein West	253
Table 33: Environmental Awareness Plan for the Decommissioning Phase at Dorstfontein West.....	255

LIST OF FIGURES

Figure 1: Locality map of the proposed project area	4
Figure 2: Locality of the Mining Right Area	5
Figure 3: S2L Seam thickness isopach map	21
Figure 4: S2U Seam thickness isopach map.....	22
Figure 5: S2L Raw CV isopach map	23
Figure 6: S4L thickness isopach map.....	24
Figure 7: S4L thickness isopach map.....	25
Figure 8:S4L Raw CV isopach map	26
Figure 9: S4U Raw CV isopach map.....	27
Figure 10: DCM West Plant Process.....	30
Figure 11: Potable water reticulation system.....	39
Figure 12: DCM West Site Layout.....	40
Figure 13: Sensitivity Map – Proposed Activities.....	48
Figure 14: Sensitivity Map – DCMW Mining Rights Area	49
Figure 15: DCM West Surface water monitoring points.....	224
Figure 16: DCM West Ground water monitoring points.....	227
Figure 17: Dust monitoring points.....	229

ACRONYMS

CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Areas
COP 21	Conference of Parties
DAFF	Department of Agriculture, Fisheries and Forestry
DCM	Dorstfontein Coal Mines
DEA	Department of Environmental Affairs
DHSWS	Department of Settlement Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECC	Exxaro Coal Central
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EM	Environmental Manager
EMPr	Environmental Management Programme
EO	Environmental Officer
GHG	Green House Gas
Ha	Hectares
HDPE	High-Density Polyethylene
HIA	Heritage Impact Assessment
HAS	Hazardous Substance Act (Act 15 OF 1973)
KM	Kilometres
LoM	Life of Mine
MDARDLEA	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs
MDEDET	Mpumalanga Department of Economic Development, Environment and Tourism
MHRA	Mpumalanga Heritage Resource Authority
MHSA	Mining Health and Safety Act
MPRDA	Mineral Petroleum Resources Development Act
MRA	Mining Right Area
MS	Method Statement

MS	Method Statement
MTPA	Million Tons Per Annum
MTPA	Mpumalanga Tourism Parks Agency
NCCAS	National Climate Change Adaptation Strategy
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMAQA	National Environmental Air Quality Act (Act 39 of 2004)
NEMBA	National Environmental Management Biodiversity Act (Act 10 of 2004)
NEMWA	National Environmental Management Waste Act (Act 36 of 2008)
NHRA	National Heritage Resources Act (Act 25 of 1999)
NWA	National Water Act (Act 36 of 1998)
OHSA	Occupational Health and Safety Act (Act of 85 of 1993)
PCD	Pollution Control Dam
RBCT	Richard's Bay Coal Terminal
ROM	Run Of Mine
RTA	Road Traffic Act 93 of 1996
SACNASP	South African Council of Natural Scientist Profession
SAHRA	South African Heritage Resources Agency
SANS	South African National Standard
SHEC	Safety Health Environment and Community
UNFCCC	United Nations Framework Convention on Climate Change
WULA	Water Use Licence Application

1 INTRODUCTION AND BACKGROUND

Exxaro Coal Central (ECC) operates four mines, namely Forzando North, Forzando South, Dorstfontein West, and East Mines. All mines are underground operations except for DCM East, which is an opencast mine. The DCM applied to the DMRE for the inclusion of two Prospecting Rights (Vlakfontein and Rietkuil) for its mining operations at the DCM West Coal Shaft, and these inclusions were granted in January 2013 and executed on the 23th of July 2013. The DCM has an allocation of 2066 Hectares of coal rights and 1230 Hectares of surface rights.

The DCM West is an operational underground coal mine, covering two farms (Dorstfontein 71 IS and Rietkuil 588 IS), of which Exxaro Coal Central owns the surface rights. A total of four coal seams have been identified in the area (No. 2, 3, 4 and 5 coal seams). Access to coal seams is via a single box cut. Run-of-mine (ROM) coal is transported via a conveyor from underground to the beneficiation plant on the Rietkuil property at DCM West. Coal product is transported via road to DCM East where it is fed to a conveyor to DCM East Rapid Load Out, from where it is transported by Transnet trains to the Richard's Bay Coal Terminal (RBCT) for export distribution. On-site, discarded coal from the processing plant is transported via an overland conveyor to the mine's discard dump. The DCM export approximately two (2) million tons per annum (mtpa) via Richards Bat Coal Terminal (RBCT).

After procuring Total Coal assets in 2015, Exxaro undertook a re-valuation of these assets; and one such project is the Seam 4 Lower at Dorstfontein West, where the re-valuation has resulted in a change of the mining layout to include areas previously not scheduled. DCM West has mined out 2 seam and currently mining 4 seam which extends from its Dorstfontein 71 IS, Rietkuil into Vlakfontein IS. Through an intensive drilling exercise on these areas, economically viable blocks of Seam 4, Lower Coal have been defined. The 4 Seam coal is being accessed from the existing Dorstfontein West 2 seam incline. The motivation to mine 4 seam was necessitated by subsequent reduction of Reserves at Dorstfontein West 2 seam and this is being mined through board and pillar and transported from DCM 71 IS to Vlakfontein IS on the western portion of the mining rights area to the plant.

Further, it has been established that the discard dump at DCM West is coming to the end of its life, and a new dumping facility would be required by 2022.

Consequently, DCM West proposes to undertake the following activities:

- The expansion of the discard dump facility which has become necessary due to the life of the current discard dump coming to an end in 2022. The discard dump extension would cater for both slurry and discard coal and is expected to cater for the life of mine; and
- The construction of a conveyor belt from DCM West which will be linked to the conveyor systems at DCM East to ensure that coal is conveyed from West to East where it will be loaded into trains and thereafter transported to Richards Bay Coal Terminal.

The mining of the 4 seam has enabled Dorstfontein to increase production and extend the life of the mine and further responds to the commodity demand, which is driven by the need for electricity. Further, the proposed expansion of the discard dump and development of the conveyor belt as well as the construction of the already authorised PCD forms part of the new infrastructure that the mine has planned, and the objective is to accommodate the increasing production.

Therefore, Nsovo Environmental Consulting (hereafter Nsovo) has been appointed by Exxaro Coal Central (Pty) Ltd (hereafter Exxaro) to compile an Environmental Management Programme (EMPr) as part of the Environmental Impact Assessment process for the proposed expansion of Exxaro Dorstfontein West discard dump facility, and the conveyor belt from DCM West to DCM East. The EMPr will be a guideline for the mitigation and management measures to be implemented during the construction, operation, and decommissioning/closure phases of the proposed activities. Exxaro has an existing EMPr which was authorised by the Department of Mineral Resources and Energy (DMRE) in 2012 with reference number DMR ref: MP 30/5/1/2/3/2/1 (11919) MR (Conversion). As part of the Environmental Impact Assessment (EIA) process for the DCM West Expansion Project, Exxaro has requested that the existing EMPr be amended to include the new activities for which the EIA applies.

The EMPr is prepared in terms of the provisions contained within Appendix 4 of GN R. 982 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA): EIA Regulations of 2014 as detailed below aims to achieve the following.

1.1 PURPOSE AND SCOPE OF THE EMPR

An Environmental Management Programme (EMPr) is defined as an environmental management tool used to ensure that undue or reasonable avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated and that the positive benefits of the project are enhanced. The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to help ensure compliance with recommendations and conditions specified through an Environmental Impact Assessment (EIA) process, as well as to ensure continuous improvement of environmental and social sustainable performance, reducing negative impact and enhancing positive effects during the construction and operation of the dumping and conveyor belt facilities.

This EMPr is prepared to provide specific environmental guidance for the Dorstfontein Mine West constructions, operations as well as decommission phases and includes all activities taking place within the existing Dorstfontein West Mining Right Areas (119MR, 123MR). The EMPr sets out general environmental specifications, which apply to the construction, operational, and decommissioning phases associated with the project. It serves as a guideline for the management of the site and provides specifications and Regulations that must, in all instances, be adhered to. It is the responsibility of all parties, including the Exxaro, contractors, and subcontractors involved in the project, to commit themselves to the implementation of the EMPr in all phases of the project.

The EMPr has been developed to give effect to precautionary measures, which are to be in place for monitoring of the activities that will take place on-site, and to ensure compliance with the national legislative and regulatory requirements, as well as Exxaro's monitoring guidelines and implementation tools associated with their other mine.

The objectives of the EMPr are as follows:

- To outline mitigation measures and environmental specifications which are required to be implemented for the construction, operation, and decommissioning phases of the project in order to minimise the extent of environmental impacts, and manage environmental impacts associated with the mining activities.
- To ensure that the activity is undertaken in compliance with all statutory and regulatory environmental requirements;
- To identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities;

- To ensure that the most updated Exxaro Environmental Policy is underwritten at all times;
- To ensure that all landowners' special conditions are identified and taken into consideration;
- To ensure that all environmental conditions stipulated in all the EA are implemented;
- To detail mitigation measures, timeframes, and criteria for monitoring;
- To provide mechanisms for monitoring programs to ensure compliance, and preventing long-term or permanent environmental degradation;
- To provide input and strategies for environmental quality control and risk management;
- To ensure that the construction and operation activities do not result in undue or reasonable avoidable environmental impacts, and preserve the natural environment by limiting destructive actions on-site;
- To ensure appropriate restoration of areas affected by the construction and operation activities; and
- To prevent long term environmental degradation.

1.2 LOCALITY OF THE PROPOSED PROJECT

Dorstfontein West Mine is situated within the Mpumalanga Province, 5 km north of Ga-Nala (Kriel), 60 km south of Emalahleni and 145 km east of Johannesburg. The proposed activities are located within the existing Dorstfontein West (119MR) and Dorstfontein East (51MR) Mining Right Area (MRA), which covers a total of 4 436.2709 hectares. The site is within Kriel Magisterial District under the jurisdiction of the Emalahleni Local Municipality in the Mpumalanga Province of South Africa. All the activities highlighted above including the proposed activities are within the approved MRA, i.e., within the current operations at the Dorstfontein complex. Figure 1 and 2 below are the locality maps that depicts the proposed expansion project study area as well as the Mining Right area at a scale of 1:50 000 respectively.

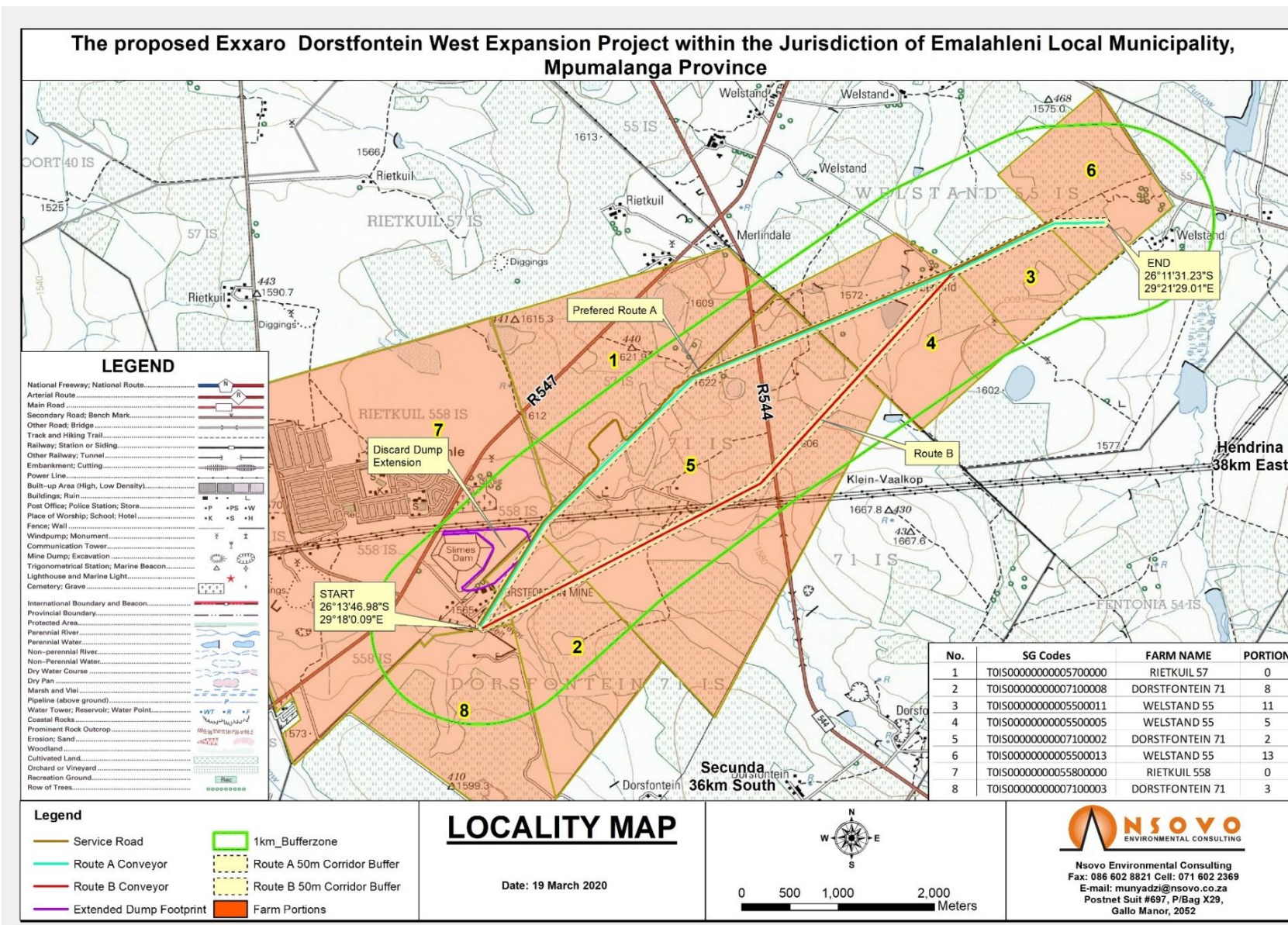


Figure 1: Locality map of the proposed project area

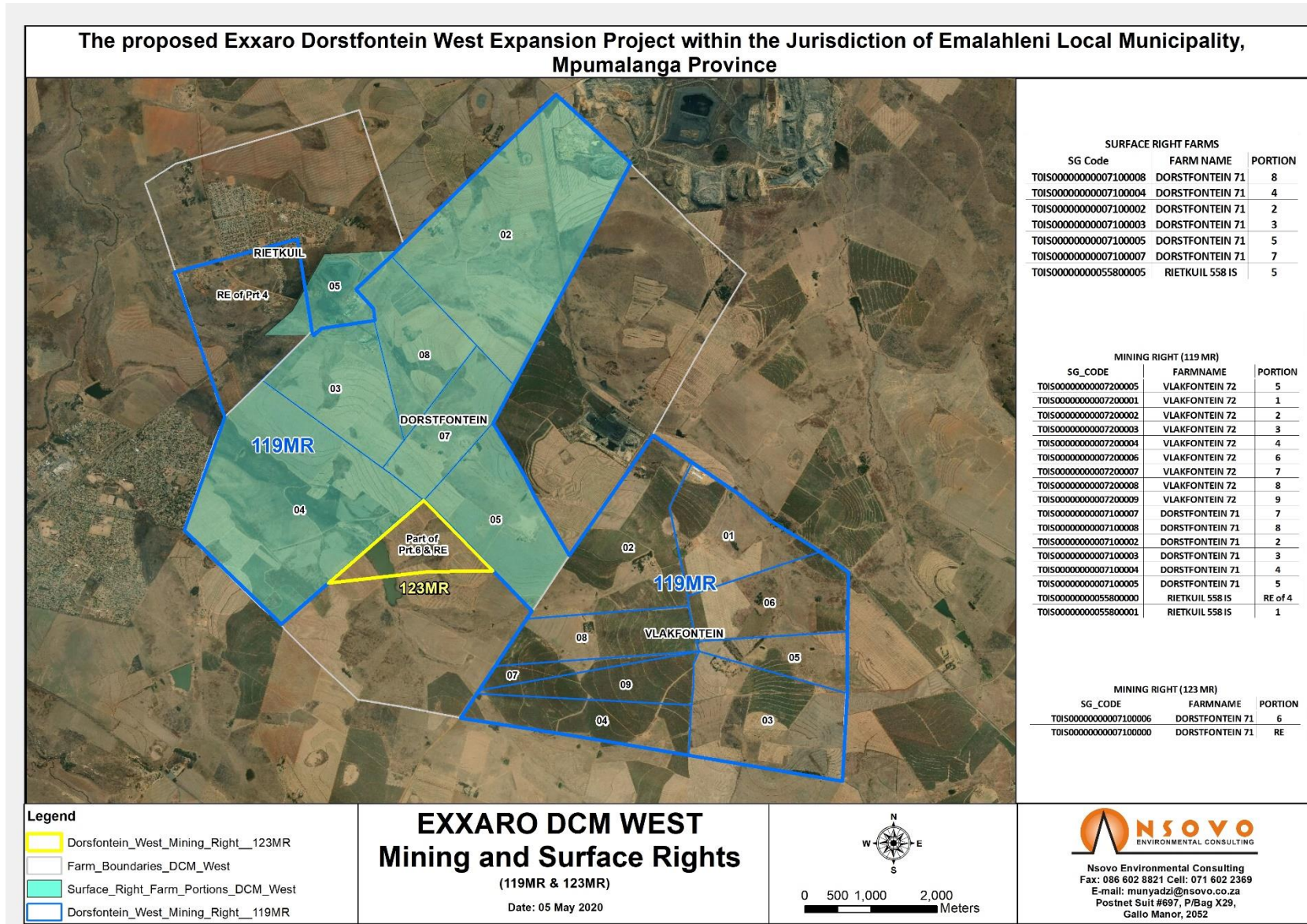


Figure 2: Locality of the Mining Right Area

1.2.1 Description of the property

The MRA traverses various farm portions that will be affected by the proposed expansion project. Table 1 below provides the Surveyor General 21 Digit Code of the affected land parcels as well as the farm names within the Dorstfontein West (119MR, 123MR) and Dorstfontein East (51MR) mining rights. As indicated above, DCM has an allocation of 2066 Hectares of coal rights and 1230 Hectares of surface rights.

Table 1: Details of the proposed site property

Farm Name	Portion Number	Surveyor General 21 Digit Code
Rietkuil 57	Portion 0	T01S000000000570000
Rietkuil 558	Portion 0	T01S000000000558000
Dorstfontein 71	Portions 2, 3, 8	T01S000000000710002 T01S000000000710003 T01S000000000710008
Welstand 55	Portions 5, 11, 13	T01S000000000550005 T01S000000000550011 T01S000000000550013
Vlakfontein 72 IS	Portions 1,2,3,4,5,6,7, 8, 9	T01S000000000720001 T01S000000000720002 T01S000000000720003 T01S000000000720004 T01S000000000720005 T01S000000000720006 T01S000000000720007 T01S000000000720008 T01S000000000720009

1.3 DESCRIPTION OF LAND OWNERSHIP

The DCM currently owns all of the surface rights overlying the mining rights area. The DCM owns all the mineral rights under consideration in the project having successfully transferred the rights from “old order” to “new order” under the requirements of the MPRDA. The status of the mineral and surface rights holdings, as well as the status of the land ownership are specified in Table 2.

The DCM also owns the mining rights on the farms Rietkuil 57IS and Vlakfontein 72IS as mentioned before. The inclusion of these areas under Section 102 of the MPRDA into the DCM West Expansion Project approval process has been suggested by the Department of Mineral Resources and Energy (DMRE) to include the prospecting rights into the existing mining rights for DCM. The areas mined underground at the DCM operations will have no surface impact on areas outside of the existing mining rights area.

Table 2: Mineral and Surface Rights

Farm	Portion	Area (Ha)	Nature of Rights	Held Under	Leases
Mineral Rights					
Dorstfontein 71 IS	Portion 2	673.7267	Mining License (Conversions pending with DMRE)	33/98	
Dorstfontein 71 IS	Portion 2	673.7267	Freehold	T26263/04	Zelpy 1100 Pty Ltd (Dewald te Water)
Dorstfontein 71 IS	Remaining Extent of Portion 3	235.7951	Mining License (Conversions pending with DMRE)	33/98	
Dorstfontein 71 IS	Remaining Extent of Portion 3	235.7951	Freehold	T26263/04	Mr Andries Cronje
Dorstfontein 71 IS	Portion 4	635.8822	Freehold	T26263/04	Mr Andries Cronje
Dorstfontein 71 IS	Portion 4	635.8822	Mining License (Conversions pending)	33/98	
Dorstfontein 71 IS	Portion 5	256.9596	Mining License (Conversions pending)	33/98	
Dorstfontein 71 IS	Portion 5	256.9596	Freehold	T26263/04	Mr Andries Cronje
Dorstfontein 71 IS	Portion 7 (a portion of portion 3)	171.3064	Mining License (Conversions pending)	T26263/04	
Dorstfontein 71 IS	Portion 7 (a portion of portion 3)	171.3064	Freehold	T26263/04	Mr Andries Cronje
Dorstfontein 71 IS	Portion 8 (a portion of portion 3)	207.2807	Mining License (Conversions pending)	33/98	
Dorstfontein 71 IS	Portion 8 (a portion of portion 3)	207.2807	Freehold	T26263/04	Zelpy 1100 Pty Ltd (Dewald te Water)

Farm	Portion	Area (Ha)	Nature of Rights	Held Under	Leases
Dorstfontein 71 IS	Mineral Area 2	99.3996	Mining License (Conversions pending)	33-2003	
Vlakfontein72 IS 1	1 (THE OAKS)	206.8596	Mining Rights	T 79190/98	Gerhard de Wet
Vlakfontein72 IS	RE 2	320.1701	Mining Rights	T 79190/98	Kobus Pieterse
Vlakfontein72 IS	RE 3	301.9119	Mining Rights	T96490/2002	Edmund Muller
Vlakfontein72 IS	RE 4 (of 3)	170.8997	Mining Rights	T131928/97	Kobus Pieterse
Vlakfontein72 IS	5 (of 1)	111.8032	Mining Rights	T96490/2002	Edmund Muller
Vlakfontein72 IS	6 (of 1)	206.8553	Mining Rights	T40836/2000	Gerhard de Wet
Vlakfontein72 IS	7 (of 2)	48.1386	Mining Rights	T131928/97	Kobus Pieterse
Vlakfontein72 IS	8	-	Mining Rights	-	Kobus Pieterse
Vlakfontein72 IS	9 (of 4)	123.1678	Mining Rights	T131928/97	Kobus Pieterse
Rietkuil 558IS	Remaining Extent of Portion 4 of the farm Rietkuil 57 IS	883.1541	Rights	T94883/95	Kobus Pieterse
Rietkuil 57 IS	0	-	Prospecting Rights	T7298/2005	

2 STRUCTURE OF THE EMPR

This report has been compiled in terms of the provisions contained within Appendix 4 of GN R. 982 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA): EIA Regulations of 2014, as amended. The requirements thereof are cross-referenced with the various sections contained in this report, as detailed in Table 3 below.

Table 3: 2014 NEMA EIA Regulations EMPr Report Content

No	Requirement	Reference
1(1)(a)	Details of- i) The EAP who prepared the report; and ii) The expertise of the EAP, including curriculum vitae;	Section 3
1(1)(b)	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 4
1(1)(c)	A map at an appropriate scale which superimposes the proposed activity, its associated	Section 5

No	Requirement	Reference
	structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	
1(1)(d)	A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including- (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Section 6
1(1)(e)	A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Section 7
1(1)(f)	A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to- (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Section 8
1(1)(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 8
1(1)(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 8
1(1)(i)	An indication of the persons who will be responsible for the implementation of the impact management actions;	Section 8
1(1)(j)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 8
1(1)(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 9
1(1)(l)	A program for reporting on compliance, taking into account the requirements as prescribed	Section 9

No	Requirement	Reference
	by the Regulations;	
1(1)(m)	An environmental awareness plan describing the manner in which- (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 10
1(1)(n)	Any specific information that may be required by the competent authority.	Section 11

3 DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER INCLUDING THE APPLICANT'S DETAILS, ORGANISATIONAL STRUCTURE AND ROLES

3.1 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nsovo has been appointed as the independent Environmental Assessment Practitioner (EAP) for the proposed project and meets the general requirements as stipulated in Regulations 13 (3) of the NEMA EIA 2014 Regulation as amended. Nsovo therefore is:

- Independent and objective;
- Has expertise in conducting EIAs;
- Takes into account all relevant factors relating to the application; and
- Provides full disclosure to the applicant and the relevant environmental authority.

Table 4 below provides the details of the EAP and relevant experience. A detailed CV and qualifications of the EAP is attached as **Appendix E1**.

Table 4: Details of the Environmental Assessment Practitioner (EAP)

Name of Company	Nsovo Environmental Consulting
Person Responsible	Munyadziwa Rikhotso
Professional Registration	South African Council for Natural Scientific Professions (SACNASP)
Postal Address	P/Bag x29 Post net Suite 697 Gallo Manor 2052
Telephone Number	011 041 3689
Fax Number	086 602 8821
Email	munyadzi@nsovo.co.za

Qualifications & Experience	<ul style="list-style-type: none"> • BA Environmental Management • 16 years of experience
Project Related Expertise	<p>In terms of project related expertise, the EAP has worked on the following projects:</p> <ul style="list-style-type: none"> • EIA for the proposed Shongweni substation and Hector - Shongweni 400kV powerline in KwaZulu Natal Province. • EIA for the proposed Inyaninga substation and Inyaninga – Mbewu 400kV powerline in KwaZulu Natal Province. • EIA for the proposed Tubatse strengthening Phase 1 – Senakangwedi B integration within the jurisdiction of Greater Tubatse Local Municipality in Limpopo Province. • EMPr, WULA and EA amendment for the proposed Juno - Gromis 400kV power line. • Basic Assessment for the proposed Decommissioning and Demolition of Verwoedberg Substation and 275kV power.

3.2 DETAILS OF THE APPLICANT

This EMPr is a living document that guides the day to day activities throughout the lifecycle of the project; it may from time to time, require revisions as may be dictated by the course of construction, operation and rehabilitation / decommission activities. It is therefore imperative that precaution measures are taken to ensure that environmental degradation is minimised while the project is undertaken. This will take a concerted effort from the project team and proper planning is of the utmost importance. This document is applicable to all Exxaro employees, contractors and subcontractors.

This section of the EMP Report provides the reader with details of Dorstfontein Coal Mines (Pty) Ltd as well as the details of the responsible persons at mine (Table 5 below).

Table 5: Details of the Applicant and Responsible Person at the mine

Details of Applicant	
Name of Company	Dorstfontein Coal Mines (Pty)Ltd
Name of Mine	Dorstfontein Coal Mines (Pty)Ltd
Physical Address	Exxaro Coal Central Dorstfontein West, Regional Offices Dorstfontein Farm 711S R547 Ga-Nala (Kriel)

Details of Applicant		
Postal Address	Exxaro Coal Central Dorstfontein West, Regional Offices Dorstfontein Farm 71IS R547 Ga-Nala (Kriel)	
Contact Details	011 441 6890	
Details of Responsible Persons at the Mine		
Role	Business Unit Manager	SHEC Manager
Contact Person	Daniel Stapelberg	William Seabi
Telephone Number	011 441 6890	011 441 6857
Mobile Number	084 548 6744	0794963304
Email	Daniel.Stapelberg@exxaro.com	William.Seabi@exxaro.com

3.3 ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES

To effectively and efficiently operate with utmost care of the environment within which Exxaro operates, it is important that all parties understand their duties and responsibilities throughout all phases of the project lifecycle. Exxaro and their duly appointed contractors and subcontractors are fully responsible for all activities taking place and ensuring that they are undertaken in compliance with the project's EA and EMPr as well as world best practice. The following sections describe the roles and responsibilities of the key team members.

3.3.1 Exxaro

As the proponent, Exxaro must ensure that the implementation of the mining facility complies with the requirements of any and all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation throughout the project lifecycle and this would include the following:

- Ensuring that all team members are aware of their roles and responsibilities;
- Taking overall responsibility for all activities that occur in the proposed project and associated infrastructure;
- Ensuring that all commitments/conditions contained in the EA and EMPr are communicated and adhered to by Exxaro employees to all team members and contractors.

Exxaro's role during the different phases of the project is summarized below:

- Appoint a Project Management Team to oversee the Contractor and act as a liaison between the
- Appoint an independent Environmental Control Officer (ECO) and the Contractor;

- Ensure that the Contractor is aware of and adheres to the provisions of this EMPr;
- Ensure that the Contractor remedies problems timeously and to the satisfaction of the authorities;
- Appoint an independent and suitably qualified ECO to ensure that the Contractor abides by the EMPr; and
- Ensure that an independent ECO monitors and audits the site to ensure compliance with the respective authorisation, permits and licenses.

3.3.2 Operations Manager (OM)

The Operations Manager will report to the Exxaro Management and will:

- Be fully knowledgeable with the contents of this EMPr and conditions of the environmental authorization, and other permits;
- Be fully knowledgeable with the contents of all relevant environmental legislations and ensure effective compliance;
- Ensuring that Exxaro and its contractors are made aware of all stipulations in the EMPr;
- Has overall responsibility of the EMPr and its implementation;
- Ensure compliance with the EMPr and EA commitments and any other legislative requirements as applicable to their operations.
- Ensure there is effective communication with the Project Manager, the environmental control officer and relevant engineers on matters concerning the environment; and
- Adhering to any instructions issued by the Project Manager on advice of the ECO.

3.3.3 Environmental Control Officer (ECO)

An independent ECO must be appointed prior to commencement of the construction activities. The ECO shall be responsible for monitoring, reviewing, and verifying compliance by the Contractor with the environmental specifications. In addition, the ECO shall be responsible for the planning and management of all environmental activities to ensure effective implementation of EA, EMPr, landowner conditions and applicable permits and licences. More specifically the ECO will undertake the following responsibilities:

3.3.3.1 Communication Services

- To liaise closely with Exxaro and the Contractor's Environmental Officer (EO).
- To ensure that the landowner agreed General and Special Conditions are implemented.
- To agree with landowner on the bush clearing method.
- To assist in conflict resolution.
- To ensure that the Contractor rehabilitates any damage caused during construction.
- After the final rehabilitation has been completed on a property, to obtain the immediate release from the landowner.

3.3.3.2 Environmental Management (EM)

- Monitoring of site environmental progress in respect of time, deliverables and quality.
- Liaison between Authorities, Exxaro and Contractor on environmental matters.
- Recommending EMPr modifications to Exxaro as and when the particular site conditions warrant it.
- Communicating changes of the EMPr to all relevant parties.
- Issuing Contractors Communications and site instructions.

- Monitoring performance of Contractor and sub-contractors to ensure compliance with environmental and statutory requirements.
- Checking the Contractor EO's record of environmental incidents (spills, impacts, legal transgressions, etc.) as well as corrective and preventive actions taken.
- Checking the Contractor EO's complaints register in which all complaints are recorded, as well as actions taken.
- Compiling and completing the environmental management related component of the handing-over documentation and any other related documents.
- Timeously identifying any sensitive site issues which may affect environmental aspects and the reporting of this to Exxaro.
- Monitoring that good housekeeping practices are followed and maintained by the Contractor.
- Monitoring that the ground rehabilitation is initiated on time, complying with the EA, EMPr and to the satisfaction of the landowner.
- Assisting the Contractor and Exxaro EO with the environmental awareness training course to all site staff, targeted at the level of the workers so that they have a basic understanding of the environment that they are working in.
- Monitoring that sensitive areas are demarcated within or alongside the construction areas i.e. sites identified in the EMPr, EA.

3.3.3.3 Monitoring

- Validating the site environmental monitoring plan.
- Carrying out environmental surveillances.
- Validating and recording of certificates proving the legal disposal of waste streams.

3.3.3.4 Reporting

- To complete a daily diary and monthly reporting.
- To prepare monthly monitoring reports for submission to Exxaro and the DMRE, Environmental Compliance Section as and when required.
- Manage the compliance of the Contractor according to the EA, EMPr and landowner conditions. The reports are to include photographic images of compliances, non-compliances and special occurrences taking place during the reporting period.
- To attend site meetings as required.
- To inform Exxaro of any activity that is not in accordance with the EA and respective Conditions, the EMPr and Landowner' agreed general and special conditions or detrimental to the environment.

3.3.3.5 Administration

- To assure a proper site ECO administration function to cater for all environmental site related correspondence.
- To execute environmental responsibilities as per Exxaro's Risk Management System.
- To promote and maintain sound relationships with the landowner, community, Contractors and suppliers.

3.3.4 Contractor (including Sub-Contractors)

The Contractor (including Sub-Contractors) will report to the Project Management Team and be responsible for:

- The appointment of an Environmental Representative/Environmental Officer who will ensure that all construction activities on site are undertaken in accordance with the EMPr ;
- To fulfil all obligations as per the agreed contract;
- To implement the projects as per the approved project plan;
- Drafting Environmental Method Statements for all activities to mitigate environmental impacts;
- Informing the workforce of their roles and responsibilities in terms of the EMPr ;
- Ensuring that the workforce and sub-contractors comply with this EMPr;
- Ensuring compliance with the EMPr and EA commitments and any other legislative requirements as applicable to their activities;
- Adhering to any instructions issued by the Project Manager on advice of the ECO;
- Preparation and timeous submission of environmental compliance reports that including updated incident and complaints registers;
- Induction and training of their works force as well as subcontractors prior to the commencement of construction, taking cognisance of this EMPr and EA.
- To inform and educate all employees about the environmental risks associated with the different construction activities through toolbox talks, environmental notices and other methods with specific focus on environmental topics throughout the project.
- To provide all necessary supervision during the execution of the project and be available on site at all times;
- To ensure that implementation is conducted in line with the EA and EMPr;
- To comply with special conditions as stipulated by Landowners during the negotiation process; and
- Ensure compliance with pertinent environmental legislations and other legally binding documents.

3.4 AUTHORISING DEPARTMENT

The authorising Department is the Department of Mineral Resources and Energy (DMRE) and their role is to enforce compliance with the EA and the EMPr conditions.

4 A DETAILED DESCRIPTION OF THE ASPECTS OF THE ACTIVITY THAT ARE COVERED BY THE EMPR AS IDENTIFIED BY THE PROJECT DESCRIPTION

Exxaro has an existing EMPr, which was authorised by the DMRE in 2012 with reference number DMR ref: MP 30/5/1/2/3/2/1 119(123) MR (Conversion). This EMPR is part of the Environmental Impact Assessment (EIA) process for the DCM West Expansion Project, and it consolidates the proposed activities into the authorised activities that were authorised as part of the EMPR by the DMRE. Subsequently, the EMPr incorporates measures for the construction, operation, and decommissioning activities associated with the following proposed project which includes the following:

- The expansion of the discard dump facility which has become necessary due to the life of the current discard dump coming to an end in 2022. The discard dump extension would cater for both slurry and discard coal and is expected to cater for the life of mine; and
- The construction of a conveyor belt and associated service road to convey coal from DCM West to DCM East where the coal will be loaded onto trains and transported to Richards Bay Coal Terminal.

Other activities that will form part of the construction phase include the pollution control dam which was authorised in 2012.

Furthermore, Table 6 below summarises the authorised activities which are categorised into operations, water and waste management systems, and these are associated with the current operations and proposed future approved projects at DCM West. A detailed map of the surface structures and infrastructure at DCM West is presented as Figure 6 and attached as **Appendix A**.

Table 6 : Aspects of the activity that are covered by the EMPr

Aspect	Method/System
Mining and Beneficiation	
Life of Mine	<ul style="list-style-type: none"> • The expected LOM for DCM West is up to November 2043 as stipulated in the Mining Right 119MR and 123MR.
Mining via shafts	<ul style="list-style-type: none"> • 2 and 4 seam mining Underground operations 4 Seam coal accessed via incline mined from 2 seam to 4 seam. • The DCM West's access to coal seams is via a single box cut (One incline shaft). • Borrow pit.
Current Coal Beneficiation	<ul style="list-style-type: none"> • Two ventilation shafts, for the above underground operations. • Conveyors, transporting the coal from underground to the coal beneficiation plant, as well as discard from the plant to the discard dump. • Proposed Conveyor belt from DCM West to East to ensure that coal is conveyed from West to East.
Support Infrastructure	<ul style="list-style-type: none"> • Workshops, offices and administration buildings; • Transportation (i.e. roads and conveyors); • Access roads; • Various gravel roads; • Ancillary infrastructure: <ul style="list-style-type: none"> ○ Change house and additional security facilities; ○ Diesel storage facilities; ○ Explosive Magazine; and ○ Washing plant and associated infrastructure.
Soil Stockpiles	<ul style="list-style-type: none"> • Soil is stripped and stockpiled from each area where construction of the mine infrastructure

	takes place.
Water Supply	<ul style="list-style-type: none"> Water supply from existing underground mining operations and the Kriel pipeline.
Electricity	<ul style="list-style-type: none"> Power supply from Eskom.
Waste Management	
Discard and Slurry	<ul style="list-style-type: none"> One co-disposal facility (discard and slurry), with a current footprint area of roughly 28 hectares. Proposed expansion of the discard dump which is coming to end of its life by 2022; the expansion will accommodate the disposal of the discard and slurry for the next 15 years of the Life of Mine (LOM).
Run of Mine	<ul style="list-style-type: none"> The ROM stockpile, and one product stockpile.
Domestic and Industrial Waste	<ul style="list-style-type: none"> All waste sorting areas bunded, and wash bay areas equipped with oil traps.
Water Management	
River Diversions	<ul style="list-style-type: none"> The road from the box cut to the coal stockpile area crosses an unnamed tributary of the Steenkoolspruit, which has culverts in the banks of the spruit.
Sewage	<ul style="list-style-type: none"> Sewage emanating from the change house and office areas is treated at the Kriel Municipal sewage works.
Clean and dirty water management systems	<ul style="list-style-type: none"> Three pollution control dams, all are HDPE-lined, and have an approximate capacity of 30 368 m³. The capacities of the individuals dams are as follows (PCD1=9620m³ ,PCD2=9450m³ ,PCD3=11 298m³ .The fourth PCD has been authorised and will be constructed in the coming year with the total capacity of approximately 15000m³. Groundwater, which is pumped from the underground workings to maintain mining operations, is used in the coal beneficiation plant, as well as for dust suppression. The pumped water is temporarily stored in three pollution control dams (PCDs), which also have a design capacity to store dirty storm water runoff from the mine's operations area. Furthermore, seepage generated from the co-disposal facility is also routed to these PCDs. The co-disposal facility has a dedicated herringbone under drain system, penstock drains, paddocks and a cut-off trench to manage contaminated storm water runoff and seepage cut off drain around the facility.

4.1 DESCRIPTION OF STRUCTURES AND INFRASTRUCTURE

4.1.1 Roads, Railway lines and Power Lines

The DCM area and the town of Ga-Nala (Kriel) have a common boundary on the western side of the reserve. The Ga-Nala (Kriel)-Witbank main road (R547) passes parallel to the northwest boundary of the reserve. The Bethal-Witbank main road (R544) passes on the southwestern boundary of the farm Boschkrans (of the new mining area in the East Mine). This road also bisects the mining area on the farm, Dorstfontein 71 IS. There are only dirt roads, allowing farmers access to their lands and homesteads, found on the

properties. The existing mine complex in the west is serviced by tarredone (1) road, which runs from the main office complex in a north-easterly direction until it terminates on the R547 Ga- Nala (Kriel)-Witbank road. There are other gravel roads in the mining area that allow access to the mining complex, the plant complex, and the existing discard facility (referred to as Discard Dump 1). All-access roads are located outside the 1:50 year flood lines, except where they cross a stream. The causeway over the stream is constructed to cater for a 1:50 year storm event.

All additional roads that will be constructed within the mine area will be 7.2m (40m wide for haul roads) wide gravel roads and will cater for the movement of heavy vehicles and machinery between the mining areas, the washing plant and supporting infrastructure. Access road to the mine is from the R547 and it extent to various areas within the mine:

- Incline mine shaft;
- Mechanical, Electrical and Diesel workshops;
- Oil and Chemical storage buildings;
- Workshops, administration and other buildings ;
- DCM Regional Office building;
- DCM management buildings;
- Laundry and Change houses;
- Clinic - Container buildings;
- Discard Dump Contractor Building - Container;
- Training Offices; and
- Plant areas Offices.

A new conveyor service road is proposed, and it will run along the proposed conveyor belt, and it will be 2.5 m wide.

4.1.2 Power Lines

Currently, Eskom provides the existing DCM complex with power via a single overhead line to the Dorstfontein sub-station on the Rietkuil property. Secondary overhead power lines from Eskom reticulate the power to the mining complex. The power lines used within the mining area are for farming and domestic purposes only. The high tension Komati-Matla power line bisects the mining area. There is a servitude No.1033/6/S, which was superseded by No.188/1991 in the name of Eskom for this power line. The servitude runs in a west-easterly direction, less than 1km north of the West Mine.

In terms of power supply, the Emalahleni Local Municipality provides power to DCM West from Kriel substation. There is an existing 5MVA, 6.6kV powerline, which supplies the existing DCM Mine infrastructure.

Table 7: Power Supply Sequence

Run of Mine		
Underground Mining	Conveyor CV 02 Motor Control Centre	315 kVA
	Boxcut Main 550 V substation	630 kVA

	Underground 1 000 V Substation	1 250 kVA
	Mine Complex	2 x 630 kVA
	Total	3455 kVA

All surface distribution transformers are of oil-filled type, while underground transformers operating at a distance greater than 200m from the working face are of the dry type. All transformers required to operate closer than 200m from the working face are of the flameproof type.

4.1.3 Conveyors and Railway

There are no railway lines in the mining area. Coal for export is transported by trucks to DCM East where it is offloaded onto the product stockpile and then transported via conveyor belt to DCM East RBCT loading station where it is loaded onto railway trucks to the Richards Bay Coal Terminal. Currently, DCM West has one conveyor on-site that transports coal from the underground mining operations to the RoM Stockpile.

The RoM coal from underground sections is transported via overland conveyor to the processing plant. Discard and slurry arising from the processing plant is disposed onto the co-disposal dump situated on the northern side of the plant. The current project proposes the establishment of an overland conveyor between the DCM West and East Mines to transfer RoM or beneficiated coal to the plant at the East Mine.

Other buildings that exist within the mine and are currently in use include the following:

- Mechanical, Electrical and Diesel workshops;
- Oil and Chemical storage buildings;
- Workshops, administration and other buildings ;
- DCM Regional Office building;
- DCM Mine management buildings;
- Laundry and Change houses;
- Clinic - Container buildings;
- Discard Dump Contractor Building - Container;
- Training Offices;
- Plant areas Offices;
- Explosive Magazine area;
- Stores;
- Fuel ;
- Various other container offices for contractors; and
- Security Offices.

No staff is presently, or will be, housed on the mine property, but will continue to reside in established municipal areas nearby.

4.1.4 Mining Areas

The resource blocks have been divided into two areas, namely the West Mine and the East Mine. The West Mine covers the resources within the vicinity of the existing DCM operation, and the East Mine covers the resources to the north and east of the Steenkoolspruit. DCM West previously mined 2 Seam and is now mining 4 Seam via bord and pillar underground mining method on the western portion of their mining rights. Two coal seams are present in the DCMW area and they are discussed below:

4.1.4.1 S2 SEAM GROUP

The pre-Karoo topography controls the distribution of the S2-Group. S2 Resources are confined to:

- An approximately north-south trending palaeo-valley that widens and opens up southwards, in the Western Limb;
- A NNW - SSE palaeo-valley in the Eastern Limb; and
- A relatively flat-lying higher elevated area, namely the Central Plateau, which is situated in the area between the upper Western Limb and the Eastern Limb.

S2 is not well developed over the Central Plateau area due to the seam pinch-out against the higher pre-depositional palaeo-topography. This seam is homogenous over most of the width, consisting mainly of centimeter thick intercalated bands of lustrous and bright coal. Only the top section of the seam contains some un-textured dull coals, sometimes carbonaceous shale. In-seam partings are rare and do not persist laterally.

Where present, these consist of centimeter thick bands of shale or, very occasionally, fine-grained sandstone. The S2 is often split into S2L and S2U.

Three types of stratigraphically controlled seam geometries can be identified, namely:

- Coals which are thin to absent over palaeo-high areas;
- Extensively split and eroded coals above the axes of palaeo-valleys. These show variation in sub-seam thickness and parting thickness; and
- Thick coal with minor splits in palaeo-valley flanks.

In the Western Limb's central area, whereas a seam thickness greater than 2.00m would reflect a zone of maximum in-seam parting thickness, in other areas, a seam thickness in excess of 2.00m would reflect the development of thick coal rather than thick in-seam parting. In the northern part of the Western Limb the decrease in seam thickness, both eastwards and westwards, is caused by a pinch-out against the palaeo-high. The decrease in seam thickness towards the southwest is ascribed to a greater rate of subsidence during peat accumulation.

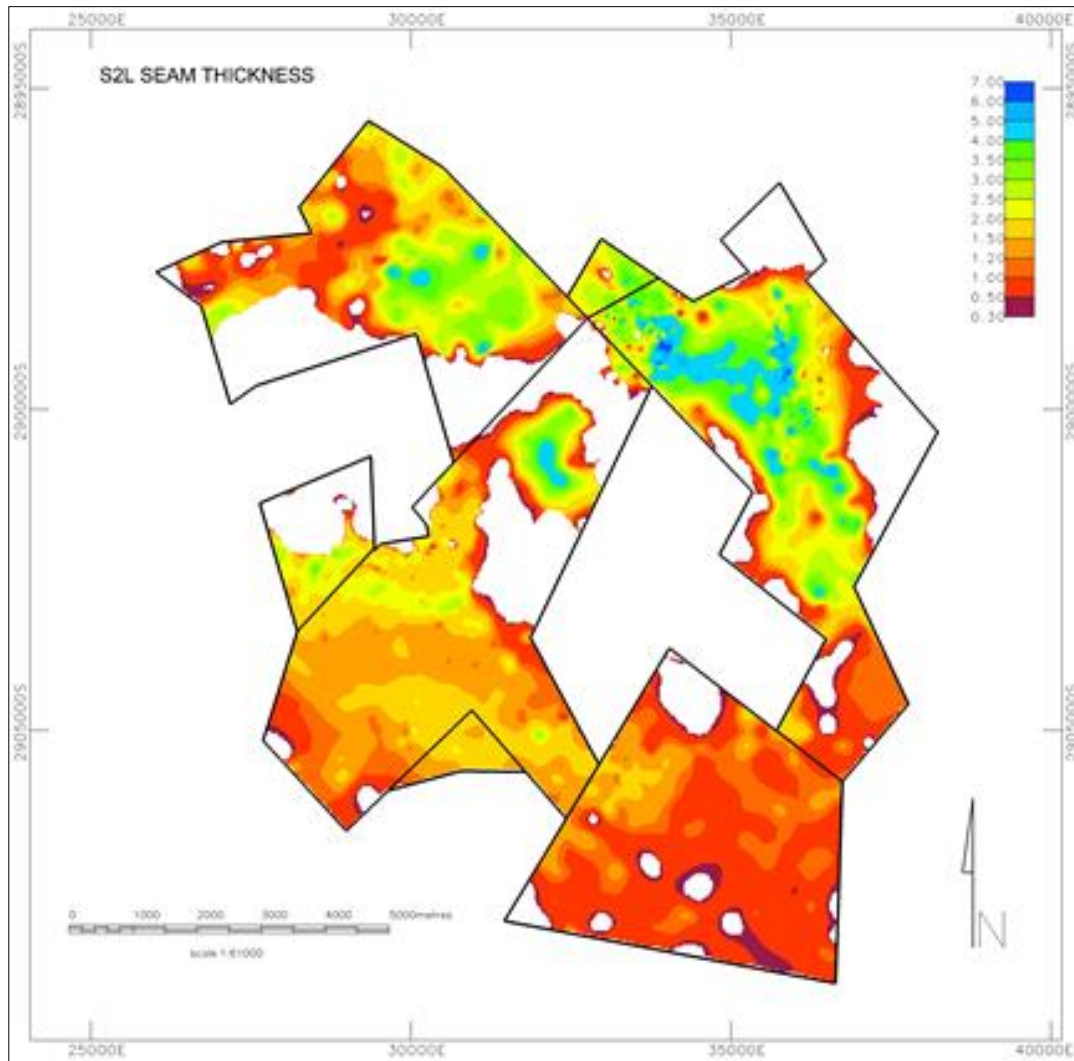


Figure 3: S2L Seam thickness isopach map

4.1.4.2 NO. 2 LOWER SEAM

S2L is thinnest over palaeo-highs and thickest over troughs of palaeo-valleys. Three S2L thickness domains are given below:

1. Western Limb - minimum 0.03 m, maximum 5.00m, and the average 1.50m.
2. Eastern Limb - minimum 0.20 m, maximum 6.00m, and the average 2.50m.
3. Central Plateau - S2L not developed.

In the north of the Western Limb, the S2L exists as a single coal horizon, which is generally devoid of stone partings. To the south of this block, an arenaceous parting splits the seam into an upper and lower sub-seam. This parting is positioned towards the top of the seam and splits the seam into a relatively thin S2L-top and a thicker S2L-bottom. Over the Western Limb, the parting ranges in thickness from not being developed to 0.75m with an average parting thickness of 0.38m. Parting separating S2U and S2L in both the Western and Eastern Limbs attains a maximum thickness of 4.50m in the northern portion of the limbs, a minimum of 0.15m, and an average of 1.50m. Parting comprises an upward coarsening sequence of predominantly siltstones, with interlaminated, centimetre

thickly banded siltstones and fine-grained sandstones indicating a typical transgressive environment that ends a period of renewed peat accumulation. In terms of mining, the parting between the two sub-seams forms a rather weak roof, and support is a requirement. In the Central Plateau, the parting is absent, and the coal is present as a single seam

4.1.4.3 NO. 2 UPPER SEAM

In the Western Limb, the S2U occurs in the deepest part of the valley but never exceeds 1.23m in thickness. It occurs in two areas (i.e., north and south) in the Eastern Limb. In the northern area of the Eastern, Limb S2U has a thickness that varies from 0.24m to more than 5.00m, while the variation in seam thickness in the southern area is 0.22m to 1.13m. In other areas, the seam exists only as a thin shale band with thin coal laminations. S2U is considered uneconomic to mine by underground methods. However, it is included in the open-castable blocks.

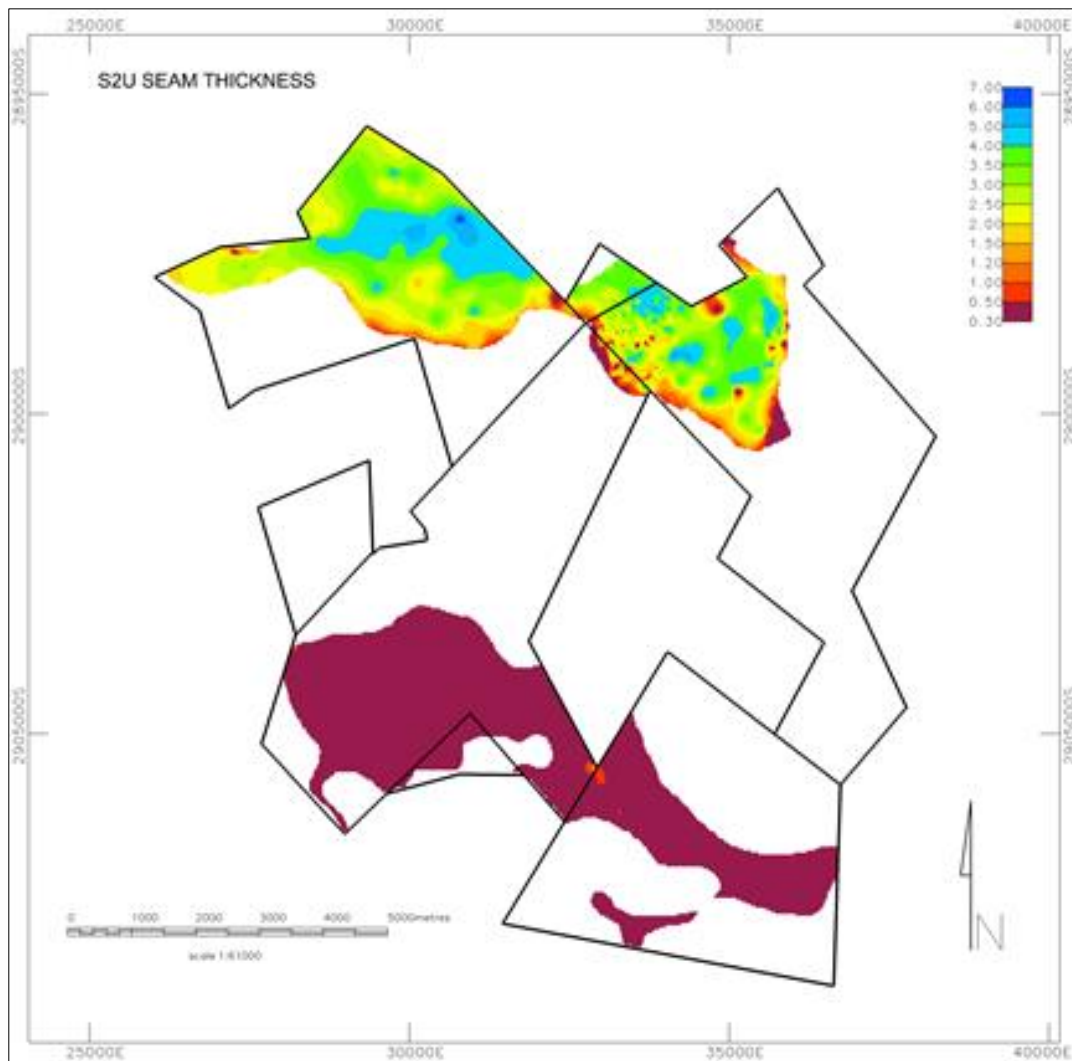


Figure 4: S2U Seam thickness isopach map

Generally, S2L is the thicker of the two sub-seams and has better quality coal. It, therefore, follows that S2L is theoretically the mining target. However, practical mining of S2L often proves to be problematic due to parting between the two sub-seams, S2L and S2U. In

some areas, S2L is just too thin to be mined on its own, leading to the simultaneous extraction of both S2L and S2U together with the parting. In other areas, S2 exists only as a thick seam with no marked differentiation into S2U or S2L. Coal quality, where S2 exists without any marked parting, is significantly lower towards the top of the seam.

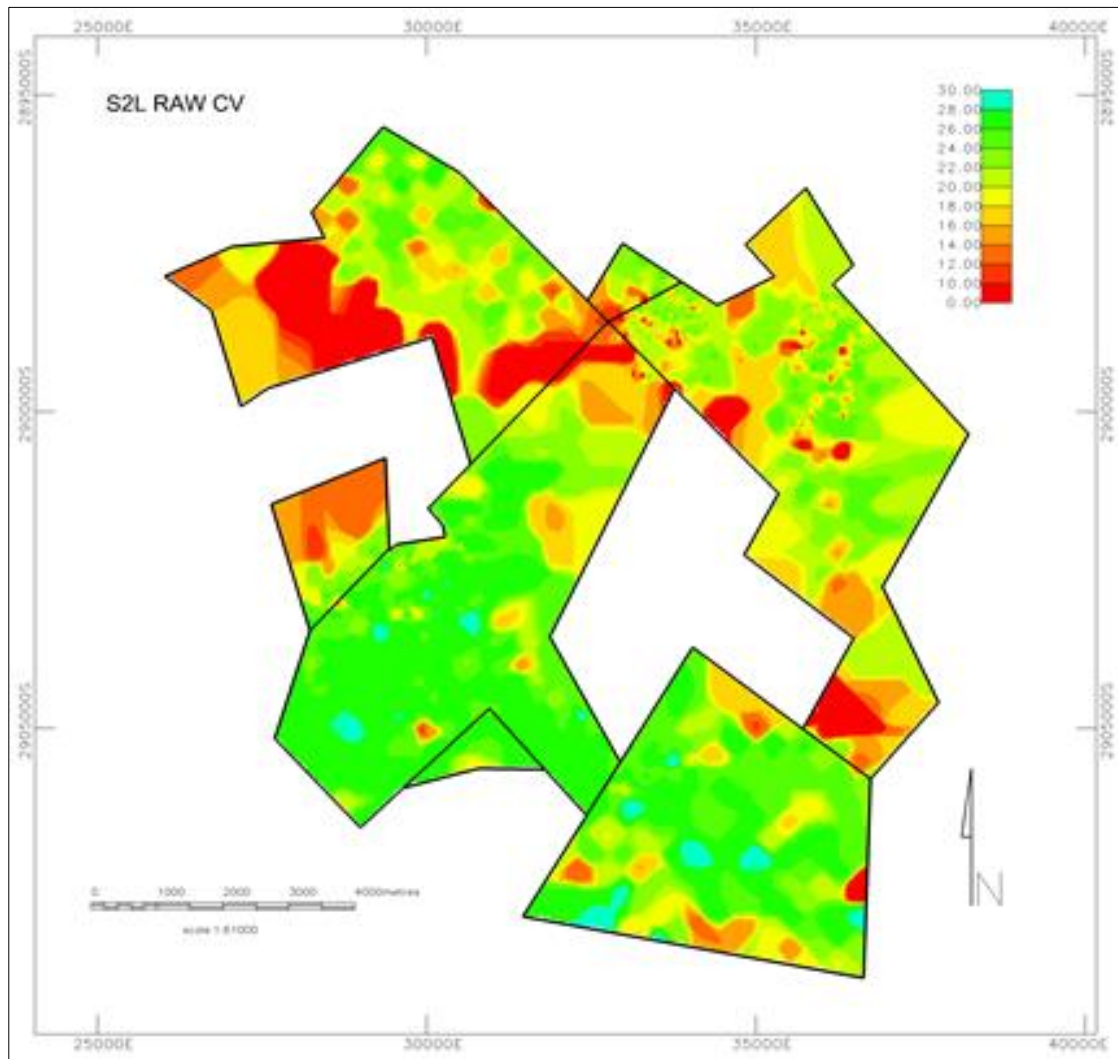


Figure 5: S2L Raw CV isopach map

However, practical mining of S2L often proves to be problematic due to parting between the two sub-seams, S2L and S2U. In some areas, S2L is just too thin to be mined on its own, leading to the simultaneous extraction of both S2L and S2U together with the parting. In other areas, S2 exists only as a thick seam with no marked differentiation into S2U or S2L. Coal quality, where S2 exists without any marked parting, is significantly lower towards the top of the seam.

4.1.4.4 S4 SEAM

The S4 Group is laterally relatively consistent over most of the area. In the Eastern Limb, it is limited to the northwest and northeast of the area by palaeo-topographic highs against which it thins or pinches out. In the Western Limb, the S4 Group does not occur towards the northwest and southeast, where it pinches out against the palaeo-highs. S4 thins in a southerly direction with the palaeo-

topography being the main controlling factor for the physical and chemical properties of the seam as well as its spatial distribution. Seam splitting occurs in the northern part of the deposit.

Furthermore, in the Western Limb, S4 exists generally as a single coal horizon. In some areas, the thickness is more than 5.00 m, with no significant clastic partings being present within the seam. Eastwards, over the Eastern Limb, across the farm, Welstand 55 IS the seam progressively splits into the S4U and S4L. A parting separates the two units with an average thickness of 1.00m. Further south, the parting between the S4U and the S4L increases to more than 3.00 m, and a second significant parting splits the seam into the S4L, S4U, and S4A. S4 changes over a relatively short distance from a single composite horizon to a zone containing three discrete seams separated by major partings.

Over the Eastern Limb, S4 thins and pinches out against the palaeo-highs. The thickest areas are over the palaeo-valley axis reaching up to more than 10.00m in places. In the Western Limb, the thicker seam intersections extend from the center to the northern portion of this area with seam thicknesses above 6.00m. S4 thins southwards to just more than 2.00m.

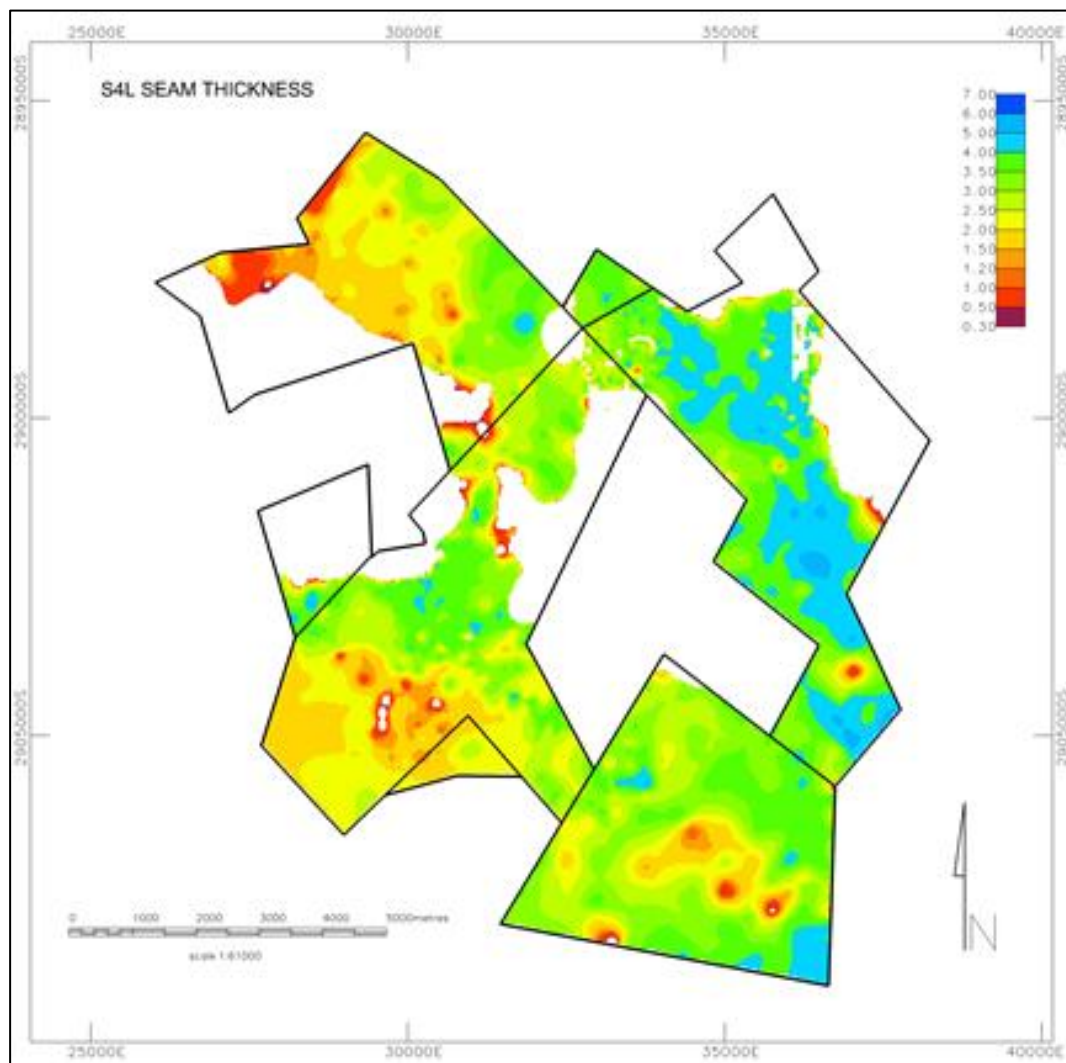


Figure 6: S4L thickness isopach map

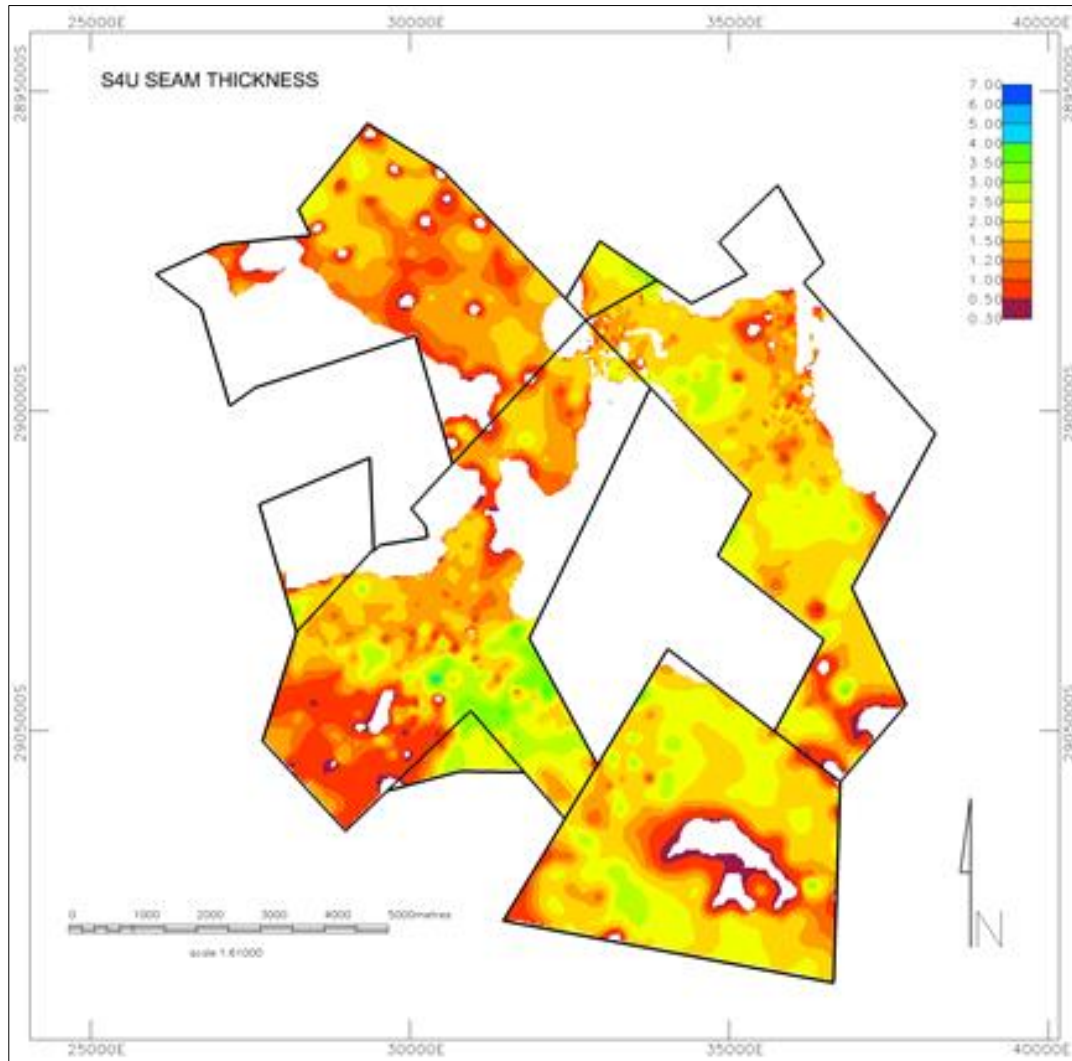


Figure 7: S4L thickness isopach map

Depositional events responsible for the splitting of the S4 are important as they explain variations in thickness and coal quality. Petrographic characteristics of the S4U and S4L are distinctly different from individual units being visually distinguishable than in areas where seam splitting is absent.

4.1.4.5 S4L SEAM

Based on the on-seam thickness and coal quality, the S4L is the main underground exploitation target within the S4 Group. S4 comprises coal and minor in-seam partings as a result of a relatively long period of basin stability, which resulted in limited clastic input. The coal is characteristically banded with alternating dull and bright shades.

Pyrite is present in the form of nodules or disseminated forms. Fluvial activity during peat formation resulted in the deposition of shaly partings. The seam contains one in-seam parting of significant thickness and lateral extent with a thickness average of 0.15m but can reach 0.50m. This in-seam parting comprises carbonaceous siltstone or shale with arenaceous lenses also common. This top parting

divides the seam into a lower and upper coal ply with the upper coal ply, rarely exceeding 0.90 m and the lower coal ply ranging in thickness between 0.02m to 4.99m. Coal thicknesses greater than 5.00m occur only in the eastern part of the DCM Complex, where a better-balanced equilibrium of peat accumulation and subsidence is posited to have prevailed. Generally, the thickness of S4L ranges from 0.05m to 5.00m, with an average of 3.00m.

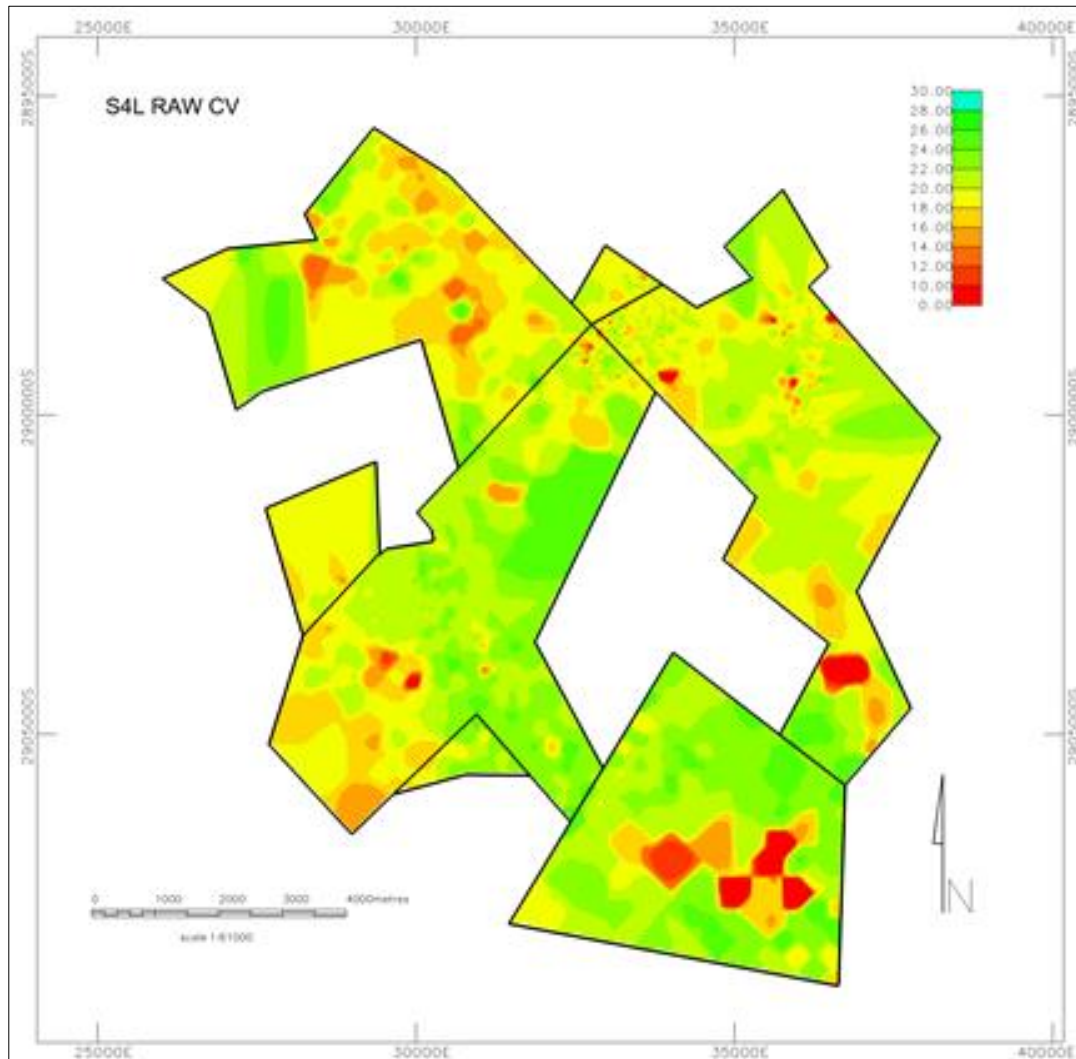


Figure 8:S4L Raw CV isopach map

In the Western Limb, the thickest seam extends from the centre to the north-eastern portion averaging 4.90m. S4L thins southwards over the central part with thickness ranging from 1.00m to 2.00m.

In the Eastern Limb, the thicker seam of more than 4.00m occurs over the palaeo-valley axis with seam thinning towards the flanks of the palaeo-high. The minimum, maximum, and average thicknesses in the Eastern Limb are 1.80m, 5.00m, and 3.50m, respectively.

Over the Central Plateau, the minimum thickness is 1.10m, the maximum 4.00m, and the average 2.90m.

4.1.4.6 S4U SEAM

S4U has an average thickness of 1.70m with a minimum of 0.06m and a maximum thickness of 4.61m. Thickest seam is found to the northwest of the Western Limb at 3.00m while the seam thins southwards to a minimum thickness of 0.05m. The average seam thickness on this limb is 1.55m.

In the Eastern Limb, the thickness is generally more than 1.00m, and in the centre of the palaeo-valley, it attains thicknesses greater than 3.00m. Seam thickness ranges from 0.30m to 3.80m, with an average thickness of 2.00 m.

The average thickness across the Central Plateau is 1.50m, while minimum and maximum thicknesses are 0.60m and 3.00m, respectively.

S4U contains numerous centimeters to decimetre thick bands of a shaly to silty nature. The high prevalence of dull coal bands, resulting in a marked vertical lithological change within the seam. This higher amount of non-carbonaceous layers in the S4U results in higher ash content and, thus, a lower calorific value of S4U compared to S4L.

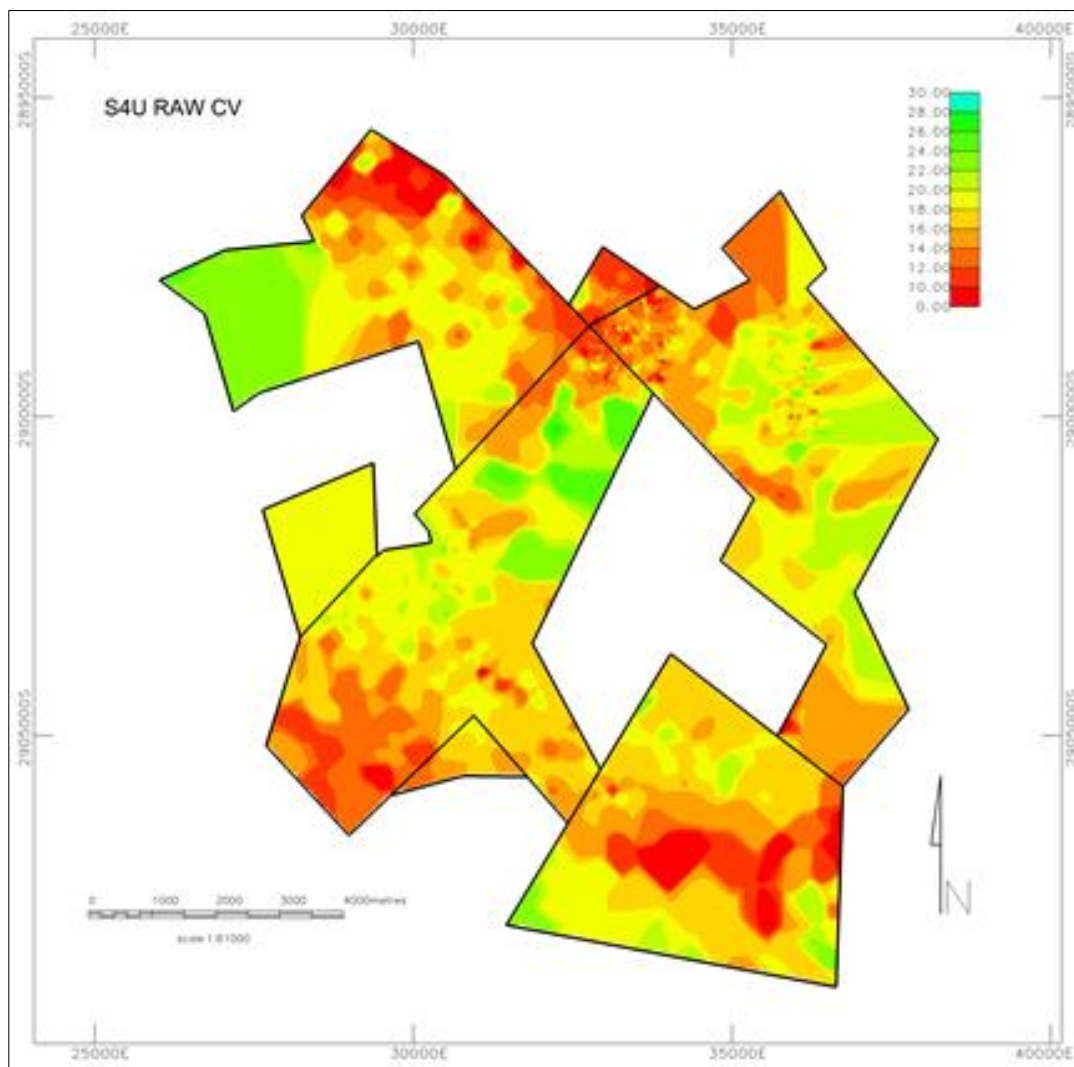


Figure 9: S4U Raw CV isopach map

4.1.4.7 S4A SEAM

This seam is absent over the Western Limb. S4A is only developed over the Eastern Limb, flanking palaeo-highs. Seam thickness varies from 0.02m to 0.70m, with an average thickness of 0.22m.

4.1.4.8 Mine Sequencing

The sequencing of the underground mine development is advancing in a southerly direction with production section panels being developed in both an easterly and westerly direction. When the northern limit of the uplifted block is reached in 2021, the stone development section will construct five (5) inclines of 60m, each while production continues to the south of the initial mining block. After completion of the declines, the continuous miner section will continue to advance in a southerly direction as a production unit to the southern limit of the uplifted block. After that, the stone development section will construct five (5) declines of 60m each to access the second mining block. This sequence is required to ensure that the declines are completed before the depletion of the initial mining block. The construction of the inclines, the main development in the uplifted block, and the construction of the declines are estimated to take 31 months. The time frame to complete the production in the initial mining block after access to the uplifted block has been achieved in 66 months. Therefore ample time is available to prepare the development to the second mining block before the production section reverts to the uplifted block.

4.1.5 Mine Access

Access to the uplifted underground mining block is through inclines at 7° over a distance of 60m, and access to the southern underground mining block from the uplifted block is through declines at 7° over a distance of 60m. To align with the ventilation requirements, three inclines and three declines are required to cater for both intake and return air to support one production section. The area in which the inclines and declines have been positioned are identified as having potentially incompetent overburden, and additional geotechnical work is required to establish the feasibility of establishing inclines and declines in these areas.

4.1.6 Underground Mining

The access to the underground workings is through the construction of a 10m wide decline ramp and a 45m by 20m boxcut base. The boxcut caters for the five (5) ventilation airways with three roadways established in the high wall and two (2) roadways established in each sidewall of the boxcut. This configuration caters for one fan station located in the left roadway into the high wall and the left sidewall roadway.

4.1.7 Ventilation

The DCM recently completed exploiting the No. 2 Seam. It is envisaged that at the completion of the DCM No. 2 Seam reserves, coal could be extracted from the West Mine resource through the extension of the underground mining infrastructure. The mining method used for coal winning is by the bord-and-pillar method utilising a continuous miner section. The main development parameters of the mining block consist of 11 roadways (6 intakes) and the production section of 9 roadways (7 intakes).

The average velocity required in the return air adit based on the LoM air requirements for the mining block is below 3.0m/s, and complies with the required design parameters. The main fan stations will consist of two independent vane axial flow fan stations, each fitted in an adit. Both fans will connect to the underground workings via a bulkhead in the return adit off the box cut high wall. The

selected fans will be high efficiency, axial fan units fitted with inlet safety screen; self-closing door; inlet and outlet attenuator and a vertical discharge evase.

Fan noise must be considered in the design of the fan station due to the proximity of other adit infrastructure in the general area. To reduce the fan noise from the fan station, provision is made for both an inlet and outlet silencer on each fan. Each fan is also designed to have a vertical discharge to direct fan noise upwards and to also prevent the recirculation of air due to prevailing wind directions.

4.1.8 Plant Process

The DCM coal preparation plant comprises of raw coal handling and product out-loading, a large coal heavy media drum washer, a small coal heavy media cyclone washer and a spiral plant for the treatment of the fines. The plant is reported to be rated at 200tph, and historical operating data substantiates that the plant is capable of achieving the reported throughput. The plant throughput is, however, sensitive to the RoM size grading, and a higher proportion of -25mm fraction in the plant feed reporting to the cyclone circuit would result in an overall lower plant feed. The plant can process 1 160 000 tons per annum. This is based on 6280 coal hours per annum, overall utilisation of 73.7% with an average plant feed rate of 185tph. Figure 4 below illustrates the processing layout, which is discussed in further detail.

Underground ROM material is transported using shuttle cars to feeder breakers, where ROM is sized to -100mm. Sectional conveyors direct ROM material to the mainline conveyor, which transports coal to a ROM stockpile on the surface. Coal is fed into a Bivitech screen, whereby -6mm and +6mm - 80mm sizes are separated.

ROM is fed into the Bivitech screen, which separates to the sizes of -6mm, (-80+6mm) and +80mm. The -6mm material is bypassed as Bivitech duff product. The +80mm fraction is then fed to a roller crusher which crushes down to -50mm. Crusher product combines with the -80+6mm fraction feed to plant. Feed to plant is further classified by a sizing screen, where the -50+25mm material is fed to the Dense Medium Separation (DMS). The -25mm material is then deslimed at 0.63mm, where the -25+0.63mm is beneficiated with the DMC and fines with the spirals. Final plant product is screened and classified into large nuts, small nuts, jumbo peas, peas and duff. Discard from the plant is then conveyed to the discard dump and slurry is pumped to the slurry pond.

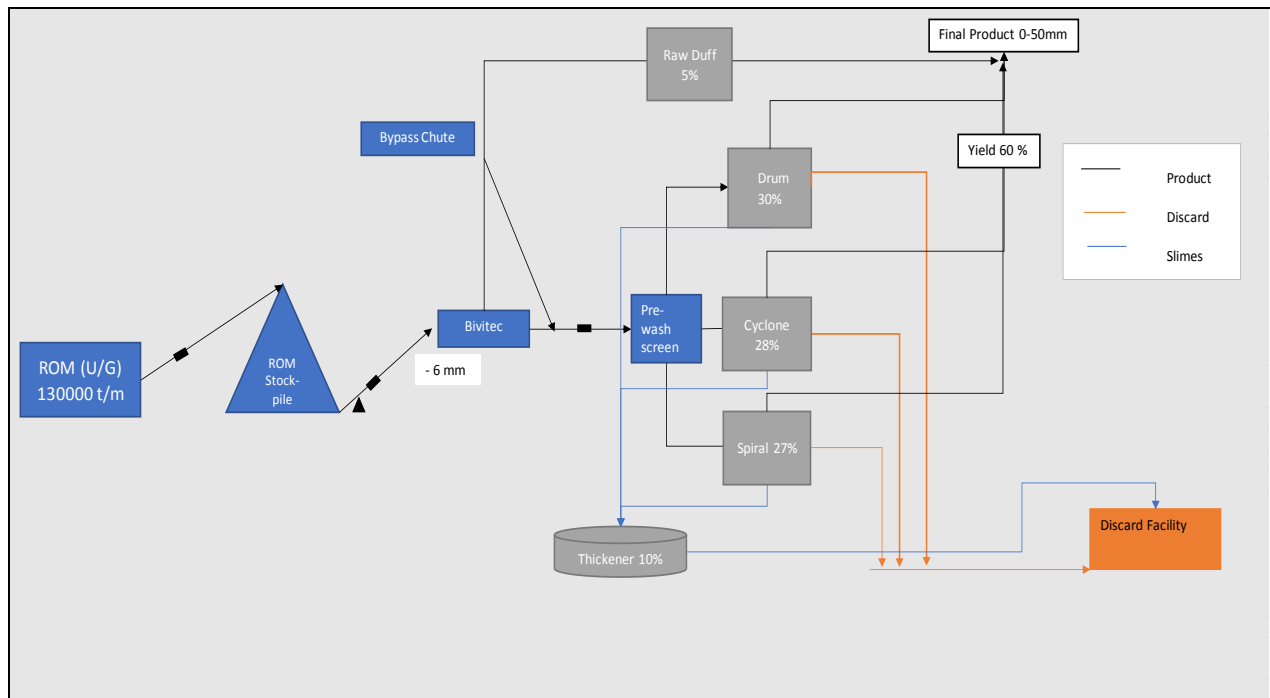


Figure 10: DCM West Plant Process

4.1.9 Raw Coal Handling

RoM coal nominally sized at 0 x 300mm is delivered by the incline conveyor to the RoM static grizzly set at 100mm wide spacing. The +100mm oversize is fed to the primary raw coal double roll crusher where it is reduced to –100mm. The crushed coal and grizzly underflow are collected on the 1050mm wide overland conveyor rated at 1100t/h and delivered onto a 500t live capacity conical raw coal stockpile. Raw coal is drawn from the stockpile at an average feed rate of 200t/h by two vibrating stockpile reclaim feeders and conveyed by the 900mm wide reclaim conveyor to the secondary static grizzly set at 90mm wide spacing. The +90mm oversize is fed to the secondary raw coal double roll crusher where it is reduced to –90mm. The crushed coal and grizzly underflow are collected on the 1050mm wide plant feed conveyor and delivered to the pre-wet screen in the coal preparation plant. The reclaim conveyor is fitted with a tramp iron magnet for the removal of foreign metallic material from the feed. The plant feed conveyor is fitted with a four idler belt scale for the recording of plant feed tonnage.

4.1.10 Large Coal Washing

The 0 x 90mm raw coal is discharged from the feed conveyor into a feed launder where it is pulped with magnetic separator effluent and fed to the 15o inclined pre-wet screen fitted with a 25mm polyurethane deck. The coal is sprayed with clarified water to remove adhering fines. The –25mm underflow reports to the cyclone plant de-sliming screen sieve bend.

The +25mm raw coal is fed by chute into a 3m diameter by 2.44m long heavy medium drum where it is separated by gravity into clean coal and discard fractions using magnetite in water suspension. The clean coal floats fraction from the drum is discharged via a weir overflow over a fixed sieve onto a large coal drain and rinse screen with a split deck for clean coal and discard. The discard sinks fraction is picked up by lifters and discharged into the sinks launder. The discard is flushed with medium and fed via a fixed sieve onto

the discard section of the drain and rinse screen. Large clean coal and discard are manually sampled from the end of the screen. The large clean coal is fed by chute to the large clean coal screen, and the discard is fed onto the common discard conveyor.

The fixed sieves are fitted with a 2mm slot aperture deck and the drain and rinse screen a 1.2mm slot aperture deck. The first section of the drain and rinse screen is used to recover the correct medium, and the second section is used to rinse coal of adhering magnetite. To remove the magnetite, primary rinse water from the magnetic separator effluent circuit is added via a flood-box and secondary rinse water from the clarified water circuit via sprays. The correct medium is collected from the fixed sieves and the drainage section of the drain and rinse screen in an underpan and gravitates to the correct medium tank. The dilute medium is collected in an underpan and gravitates to the magnetic separator.

The correct medium is pumped to a headbox where it is distributed to the drum feed, the drum sinks launder, bleed-off to the magnetic separator, and overflow back to the correct medium tank. Medium-density is measured and controlled by a nucleonic density controller fitted to the correct medium pump delivery line. Medium-density is controlled by the automatic addition of clarified dilution water into the correct medium pump suction.

The magnetic drum separator is fed with dilute medium from the rinse section of the drain and rinse screen and heavy medium bleed from the correct medium circuit, which is required to maintain density in the correct medium circuit. Over dense magnetite is recovered by the separator and gravitates to the correct medium tank. Effluent from the magnetic separator gravitates to a settling cone. Underflow from the settling cone is pumped to the pre-wet screen for use as pulping water. Overflow from the settling cone together with clarified water is pumped via a dirty water tank to the drum plant and cyclone plant drain and rinse screen flood boxes for rinsing of product and discard coal.

Fresh magnetite and clarified water are added via a floor sump to the magnetite make-up tank where it is mixed to the required density. The correct medium is pumped to the drum plant and cyclone plant correct medium tanks as required.

4.1.11 Small Coal Washing

The -25mm underflow from the drum plant pre-wet screen gravitates to the desliming screen sieve bend. The overflow from the sieve bend is fed onto the desliming screen, where clarified water is added via sprays to remove any remaining fines. The sieve bend is fitted with 1.6mm wedge wire and the desliming screen with 0.8mm wedge wire panels to remove the -0.8mm fine coal.

The -0.8mm underflow from the sieve bend and desliming screen is collected in the slurry tank and pumped to the degrit cyclones.

The 0, 8 x 25mm small coal from the desliming screen is discharged into the cyclone pump tank where it is pulped with a correct medium then pump fed to the 700mm diameter heavy media cyclone. The raw coal is separated in the cyclone by density and centrifugal force into clean coal and discard fractions using magnetite in water suspension. The clean coal overflow fraction from the cyclone is discharged via the vortex finder over a fixed sieve onto a small coal drain and rinse screen. The cyclone underflow fraction is discharged via the spigot over a fixed sieve onto the discard drain and rinse screen. Small clean coal and discard are manually sampled from the end of the screen. The small clean coal is fed by conveyor to the Dabmar double deck sizing screen, and the discard is fed onto the common discard conveyor.

The fixed sieves are fitted with a 0.8mm slot aperture deck, and the drain and rinse screen a 0.63mm slot aperture deck. The first section of the drain and rinse screen is used to recover the correct medium, and the second section is used to rinse coal of adhering magnetite. To remove the magnetite, primary rinse water from the dirty water circuit in the drum plant is added via a flood-box and secondary rinse water from the clarified water circuit via sprays. The correct medium is collected from the fixed sieves and the drainage section of the drain and rinse screen in an underpan and gravitates to the correct medium tank. The dilute medium is collected in an underpan and gravitates to the magnetic separator.

The correct medium is pumped to a head box where it is distributed to the cyclone pump tank feed, cyclone pump tank overflow back to the correct medium tank and bleed-off to the magnetic separator. Medium density is measured and controlled by a nucleonic density controller fitted to the correct medium pump delivery line. Medium density is controlled by the automatic addition of clarified dilution water into the correct medium tank.

The magnetic drum separator is fed with dilute medium from the rinse section of the drain and rinse screen and heavy medium bleed from the correct medium circuit, which is required to maintain density in the correct medium circuit. Over dense magnetite is recovered by the separator and gravitates to the correct medium tank. Effluent from the magnetic separator gravitates to the settling cone in the drum plant.

Any spillage is collected in a floor spillage sump and pumped to the rinse section on the discard side of the drain and rinse screen.

4.1.12 Fine Coal treatment

Slurry from the cyclone plant slurry tank is pumped to 2 x 350mm diameter degrit cyclones and is classified into a -0.1mm cyclone overflow and 0,1 x 0,8mm cyclone underflow. The cyclone overflow gravitates to the thickener.

The cyclone underflow, together with clarified water dilution, is gravity fed to the primary bank of rougher spirals. Discard from the rougher spirals gravitates to the fines discard sump. Rougher clean coal and middlings gravitate to the secondary cleaner spirals and are separated into clean coal, middlings, and discard. Discard from the cleaner spirals gravitates to the fines discard sump, clean coal to the fine clean coal sump, and middlings to either the discard or clean coal sump, depending on quality.

Clean coal from the clean coal sump is pumped to a 250mm diameter dewatering screen. The overflow gravitates to the thickener and the underflow to the fine coal centrifuge. The fine clean coal product from the fine coal centrifuge is fed onto the duff out-loading conveyor. Underflow from the centrifuge is collected in the underflow sump and pumped back to the clean coal sump.

The degrit and dewatering cyclone overflows gravitate to the 11.6m diameter thickener. Flocculant is mixed with clarified water in a flocculant mixing tank then transferred to a flocculant dosing tank. Flocculant is added to the thickener feed by a flocculant dosing pump via a splitter box.

Thickened solids from the thickener underflow are pumped to the slurry ponds. Dam return water is pumped from the slurry ponds to the thickener or the clarified water tank. Thickener overflow is collected in the clarified water tank and redistributed via the clarified water pump system back into the plant. Municipal make-up water is added to the clarified water tank to compensate for any plant

losses. Clarified water sprays are fitted to the Dabmar screen to remove breakage fines from the clean coal. The fines are collected in the dewatering screen underflow sump.

A thickener sump spillage pump delivers any spillage in the thickener area to the fines discard sump.

4.1.13 Product Handling

Clean coal from the drum plant is screened on the large clean coal double deck sizing screen. The top deck is fitted with 60mm and the bottom deck 30mm square aperture woven wire. The 50 x 90mm top deck product is conveyed to the large nuts stockpile, and the bottom deck 25 x 50mm product is conveyed to the small nuts stockpile.

The –25mm underflow from the sizing screen and the small clean coal from the cyclone plant report to the Dabmar feed conveyor and are delivered to the small coal double deck sizing screen. The top deck is fitted with 18mm and the bottom deck with 8mm square aperture woven wire. The 18 x 25mm top deck product is conveyed to the jumbo peas stockpile, the 8 x 15mm bottom deck product is conveyed to the peas stockpile. The – 8mm underflow product, together with the fines from the spiral plant, are collected on the duff conveyor and discharged onto the duff stockpile.

All products are reclaimed by front end loader into hauling trucks and weighed over a road weighbridge on leaving the mine.

Large and small discard from the drum and cyclone plant are collected on a common discard conveyor and conveyed to the 50t capacity discard bin. Discard from the bin is transported by truck to the discard dump.

Slurried fines from the spiral plant and thickener are pumped to slurry ponds for final disposal.

4.1.14 Discard and Slurry handling

The DCM West has been re-mining slurry since 2013, where applicable and based on the tons that are required by local customers. The re-mining occurs only when there is a need. Alternatively, slurry that is re-mined is blended in the product coal where required.

4.1.15 Transportation of Coal

The mined coal is currently transported from the underground workings using conveyors to the box-cuts. Coal is then transported from the boxcut to the plant RoM stockpile; from there, the RoM coal is transported into the plant for washing. The washed coal is transported from the plant, via existing road networks to DCM East.

4.1.15.1 Surface Coal Hauling

In order to accommodate the size reduction in RoM production and surges in RoM from underground operations, the following has been designed:

- RoM production from underground is conveyed via an incline belt to a common surface transfer station;
- RoM is fed from this transfer station to a second transfer station; and
- RoM is fed from this transfer station to the existing crushing station.

4.1.15.2 Underground Coal Handling

RoM coal from the underground production section is conveyed out of the mine on a 1200mm wide conveyor, speed at 2.5m/sec, to a surface ROM stockpile. The surface ROM stockpiles have a capacity of 3500t. Vibratory feeders will control the feed from the stockpile onto the surface conveyors feeding the existing conveyor, to the coal processing plant.

The overland conveyor belt feeding the RoM stockpile and the tertiary crusher at the plant is utilised.

4.1.15.3 Final Product Transportation

Currently, coal is transported via Road (Witbank/Kriel Road), onto Rensburgshoop road past the TNC village into the East Mine plant area from where the final product will be loaded on the new Conveyor. However, the proposed conveyor will convey beneficiated coal from DCM West to DCM East, thus reducing road transportation.

4.1.16 Proposed Conveyor Belt for coal transportation

The DCM West proposes the proposed overland conveyor belt and the associated service road to transfer ROM or beneficiated coal from DCM West to the plant at DCM East.

The conveyor belt will be constructed following a site walk down, and the construction will entail the fabrication, installation modifications, and commissioning of 7.5km overland conveyors to link mining operations from the current Coal Seam 4 Dorstfontein West Mine to their East Mine. The conveyor belt is approximately 2.5m. The activities associated with the construction of the conveyor belt include the following:

4.1.16.1 Civil works

These civil works cover the groundworks and service roads along the conveyor route as well as ground works and concrete plinths for the conveyor support (outside wetlands area):

- Excavation needs to be done every 4m for the conveyor support structure on all areas outside the indicated wetlands areas as indicated on the conveyor route drawing with the following specifications:
 - 2m long x 400mm wide x 400mm deep.
 - G5 material to be inserted into the hole and compacted.
 - 1.2m x 300mm x 250mm concrete plinths to be installed on the leveled G5 base.
 - Steel conveyor gantry structure to be installed on the concrete plinths.

Groundworks and piles for the conveyor support (inside wetlands area):

- Pile holes to be done drilled every 6m for the conveyor support structure in the wetlands areas as indicated on the conveyor route drawing with the following specifications:
 - 2 x Diameter 300mm holes to be drilled 3m to 4m deep in the existing soil every 6m inside the wetlands area.
 - 2 x Diameter 300mm concrete piles to be installed in the holes and leveled to 300mm protrusion above ground level.
 - Steel conveyor gantry structure to be installed on the concrete piles.

Groundworks and concrete plinths for the conveyor transfer steel structures (outside wetlands area):

- Excavation need to be done for 2 x conveyor transfer steel support structure on the areas outside the indicated wetlands as indicated on the conveyor route drawing with the following specifications:
 - Excavation holes for the support foundation as per the drawings to be dig to 1m deep.
 - G5 material to be inserted into the holes and compacted.
 - Concrete plinths to be installed on the leveled G5 base.
 - Steel conveyor transfer structure to be installed on the concrete plinths.

4.1.16.2 Mechanical works

The mechanical conveyor structure will fit on top of the concrete plinths and piles as per the drawings. The conveyor steel transfer structures will be built on the conveyor route.

4.1.16.3 Service road

Primary access to the mine is through the Regional Road 547 (R547) to Kriel, and this is the same access to the proposed project areas that are within the mine. Secondary access will be other public roads as well as private farm roads negotiated with landowners. However, where there is no access, roads may need to be established. The service road for the construction and maintenance of the overland conveyor (7.6km) will be 2.5m wide using existing farm roads and level the paths with grader along the conveyor where the farm roads are more than 15m away from the conveyor routing. Further, the proposed project will require secondary access that will be developed as part of the project scope, and this will include the construction of a service road along the approved conveyor route that will be approximately 3.9km and 2.5m wide. This single-lane service road (2.5m wide) will be graded and will avoid the wetland areas and utilize the existing farm roads, as indicated on the conveyor routing drawing. No material will be excavated for the road.

4.2 SOLID WASTE (DOMESTIC, INDUSTRIAL AND HAZARDOUS)

The DCM disposes of their domestic waste at Ga-Nala (Kriel) Municipality's domestic waste handling facility. A contractor is employed to remove this waste.

Industrial waste is contained in steel skips or bins and removed by a licensed contractor and disposed of in a licensed industrial waste disposal site located off the mine's property. As the mine expands, the projects will be included in the waste management strategy that's currently in place.

4.3 DIESEL AND OIL STORAGE

The following Diesel Tanks are located on the mine:

- 3 x 23 000 litres

The following Oil Tanks are stored on the mine:

- 12 000 litres
- 5 600 litres
- 5 000 litres

- 2 800 litres

4.4 MINE WASTE (CO-DISPOSAL FACILITY)

The mine residue is sent to the existing discard dump, the facility capacity is designed to the design height of 46m. The discard dump is designed to hold the slurry pool within the outer wall of the course discard. Various components include, clean water diversion trench and berm walls, dirty water and leachate interception drains, and Pollution Control Dams (PCDs). The footprint of the existing discard dump is approximately 18,5ha.

4.4.1 Proposed Discard Expansion

The proposed expansion project include the extension of the existing discard dump which is coming to the end of its life by 2022. The extension of the discard dump facility is required to accommodate the disposal of the discard and slurry for the next 15 years of the Life of Mine. The proposed discard dump expansion will necessitate the expansion of the existing access road which will be compliant with a Type 6 gravel road; which comprises of 6 meters wide raised gravel extended with meadow drainage in flat terrain, with additional meters to cater for the 'V' type drainage in rolling terrain. Where necessary, suitable erosion control measures such as the construction of gabions and culverts to control storm-water will be implemented.

4.4.1.1 Barrier design

According to the Waste Disposal Facility Study Report (2017) and the preliminary designs (2019) by Jones & Wagner, the development of the discard dump will entail the removal of topsoil within the footprint and stockpiling for use during the rehabilitation phase. Following the removal of the topsoil, the barrier system will be constructed and will comprise the following layers from excavation level upwards:

- Substrate preparation layer: the substrate will be ripped and re-compacted to 90% of MOD AASHTO density with a moisture content of -2 to +2% of optimum.
- Primary impermeable layer: 2 x 150 mm layers of clay compacted to 98% of Standard Proctor density at a moisture content of +1 to +3% of optimum moisture content in order to have a permeability (k) of less than 1×10^{-6} cm/s.
- Primary geomembrane layer: 1.5 mm HDPE double textured geomembrane layer.
- Protection layer: 200 mm layer of fine sand that will protect the geomembrane against damage from the coarse discard.
- Leachate collection layer and drains: 400 mm layer of coarse discard with HDPE pipe drainage network

4.5 UNDERGROUND OPERATIONS

The seepage into the underground workings will only be pumped to the surface in times of water need.

4.6 WATER MANAGEMENT AND SUPPLY (CLEAN AND DIRTY WATER AND STORM WATER PROCESSES)

4.6.1 Pollution Control Dam

There are three pollution control dams on site (PCD), and all are lined capture all water emanating from (Plant and discard dump) areas and are designed to contain 30 368m³. The fourth PCD has been authorised and will be constructed pending water use licenses

approval. The PCD's on site collect contaminated storm water and seepage from the discard areas and will cater for the proposed expansion of the discard dump. The total capacity of the proposed PCD below the dam will be 15 000m³.

A pump station will be installed at the fourth PCD and the contaminated water is pumped to the plant raw water reservoir. It should be noted that the PCD is equipped with a sump due to the close proximity to the river. The PCD will be lined with a 2.0mm HDPE liner and underlain with a HI-DRAIN blanket to intercept any leakage and pump it back to the dam

The pollution control dams also act as reservoirs for the plant requirements and are operated in such way to prevent overflows.. An emergency spill way will be provided for in the unlikely event of spillage occurring and this will be placed away from the highest section of the wall, at a level of 0,8m above maximum design level.

4.6.2 Process Water Supply and Management

The water use strategy is based on prioritization of dirty water for use at the plant and also for water suppression. Dirty water for the plant is sourced from the following source via pollution control dams:

- Decant water from the discard dump channeled via dirty water drains into the pollution control dams.
- Dewatering activities from underground workings into the pollution control dams.
- Rain water falling into the dirty water areas and diverted to the pollution control dams.
- Decant water from the oil traps pumped via dirty water systems to the pollution control dams.
- Seepage water intercepted via the seepage drain into the sump and then pumped into the v-drain and then to the pollution control dams.

The DCM acquires a significant amount of its water during the mining process, which is pumped to the surface and circulated through the washing plant and dirty water system. Should there be any water problems from underground workings water will be sourced from the municipality line as a last resort.

4.6.3 Clean and Dirty Water and Storm Water Processes

Clean and dirty water V-drains and cut-off drains exist at DCM and will continue to be used, and be extended to the new expansions.

Storm water control measures will also be constructed and implemented on the West Expansion Project. The DCM will follow all guidelines according to Government Notice 704. Government Notice No. 704, published in terms of the National Water Act (Act No. 36 of 1998) requires the following, and will be adhered to for all purposes on DCM:

- All clean water systems must be designed and operated in such a manner that they are at all times capable of handling the 1:50 year flood event on top of their mean operation level without spilling;
- Any water arising from an area, which causes, has caused or is likely to cause pollution of a water resource, including polluted storm water, must be contained within a dirty water system. In order to reduce the volume of polluted water, contaminated areas should be minimised. While clean water should be diverted to natural water courses, polluted water should be re-used wherever possible, thereby reducing the use of clean water; and

- Design, construct, maintain and operate any dam or discard facility that forms part of a dirty water system to have a minimum freeboard of 0.8m above full supply level.

Three pollution control dams exist downslope of the plant and discard dump at the existing operations. These dams capture all water emanating from these areas and are designed to contain 24 000m³.

4.6.4 Sewage Management

The use of toilets, laundry services, kitchen services, and bathing activities in the change houses on the mine generates sewage water. The sewage water so generated is deposited via a sewage line is connected to the system of maintenance holes that ultimately run behind the pollution control dam 1, 2, and 3 and directed towards the Kriel water treatment plant at Roedebloem. In a case where a mobile toilet system is used, a contractor collects full buckets for disposal to a registered facility.

4.6.5 Raw Water (Mining)

Return water, including extra make-up water from the underground workings, is pumped via de-watering pumps in the sections to underground return water receiving storage areas. From the underground storage areas, water is pumped out to surface via a 150mm pipe column to the silt traps/settling ponds to the box-cut storage dams. This represents a closed-loop system.

4.6.6 Raw Water (Plant)

Raw water requirements to the plant are sourced from the pollution control dams or directly from the underground storage facility.. Water is pumped to the plant header tank which services the processing plant and product stockpile areas. All spillage, stormwater and return water is pumped back to the plant header tank via silt traps and settling ponds.

4.6.7 Return Water Pumping

Return water, which includes additional underground water accumulated, will be pumped to an underground transfer dam. From the underground return water dam, the dirty water will be pumped via a 150mm diameter Klambon pipe column to the surface settling dam.

This represents a closed-loop system. All stormwater and wash down within the box cut area will be drained into a sump and then transferred via pump and 200mm HDPE pipe column to the surface settling ponds.

4.6.8 Potable Supply

There is no potable water plant located on the mine site, and none is envisaged for the future as all clean water is and will be obtained from Ga-Nala (Kriel) Municipality, and all contaminated water is and will be contained. Potable water is currently being sourced from Ga-Nala (Kriel) Municipality to support the existing DCM Mine. This infrastructure will be extended to support the West Mine. Potable water allowance is made at 200 litres per person per day. Please refer to Table 8 for the potable water requirements. Reservoirs will be constructed at the West Mine boxcut as well as the underground site. Water will be pumped from the existing mine via a 65mm pipeline.

Since January 2018 to April 2020 the average potable water consumption per month was recorded as 4170m³. It is expected that this will be the amount that will be required per month in the future as no further changes in employee numbers and production profiles is expected. The Total Potable Water required is 1 855m³/month. The following figure illustrates the potable water reticulation system:

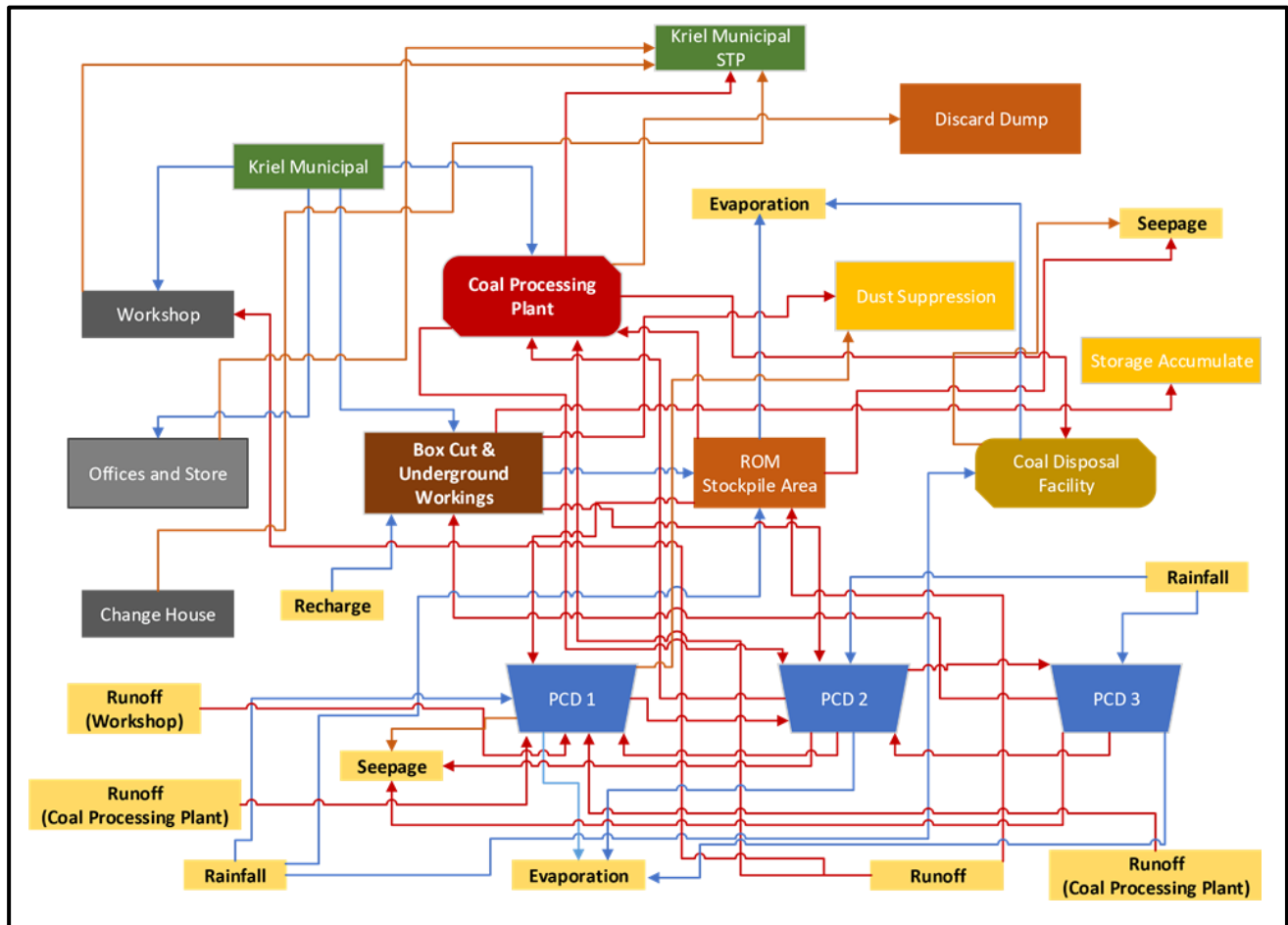


Figure 11: Potable water reticulation system

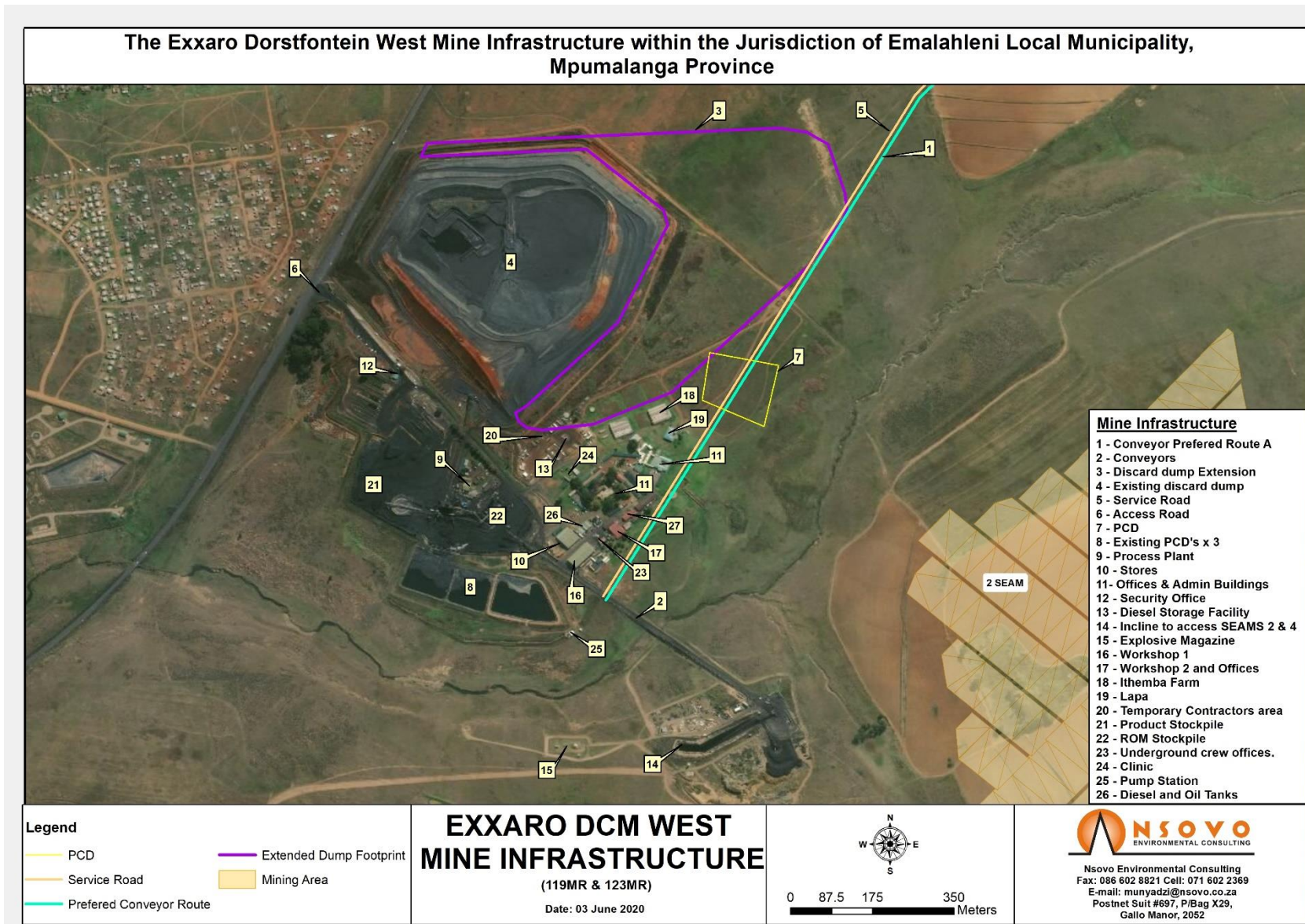


Figure 12: DCM West Site Layout

The Table 9 below specifies the listed activities that have been authorised in the previous EMPr under the 2010 EIA Regulations and includes new listed activities that are currently being applied under the 2014 EIA Regulation for and form part of the amendment.

Table 8: Listed and specified activities already authorized and those being included in the amendment

Regulation	Listed Activity	Description
Activities already authorised		
GN R 544 of 18 June 2010 Activity 1	The construction of facilities or infrastructure for the generation of electricity where: (i) The electricity output is more than 10 megawatts but less than 20 megawatts;	Possible installation of generators on site, if needed due to load shedding.
GN R 544 of 18 June 2010 Activity 9	The construction of facilities or infrastructure exceeding 1 000 metres in length for the bulk transportation of water, sewage or storm water – (i) With an internal diameter of 0,36 metres or more; or (ii) With a peak throughput of 120 litres per second or more, excluding where: (a) Such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or (b) Where such construction will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.	Transportation of water on site and underground, including to and from the pollution control dam.
GN R 544 of 18 June 2010 Activity 10	The construction of facilities or infrastructure for the transmission and distribution of electricity – Outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	Depends on the capacity of power lines used on site.
GN R 544 of 18 June 2010 Activity 11 (iii)	The construction of bridges; where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind development setback line.	Construction and development of new mining areas on DCM West. Construction of conveyor line from DCM West to East. (The route changed hence the proposed project)
GN R 545 of 18 June 2010 Activity 5	The construction of facilities or infrastructure for any purpose or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice 544 of 2010 or included in the list of waste management activities published in terms of Section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the act will apply.	Treatment of sewerage water to be pumped into pollution control dams

Regulation	Listed Activity	Description
Activities already authorised		
GN R 546 of 18 June 2010 Activity 9	The construction of above ground cableways and funiculars (a) in Mpumalanga: i) in an estuary;	Overland conveyors from underground existing conveyor. Conveyor from DCM West plant to DCM East plant. (The route changed hence the proposed project)
GN R 544 of 18 June 2010 Activity 18	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand ...or rock from (i) a water course;	Construction activities along the conveyor routes
GN R 544 of 18 June 2010 Activity 13	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.	Diesel storage and explosive magazine (depend on sizes)
GN R 545 of 18 June 2010 Activity 5	The construction of facilities or infrastructure for any purpose or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice 544 of 2010 or included in the list of waste management activities published in terms of Section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the act will apply.	Dewatering of the underground mine.
GN R 386 of 21 April 2006 Activity 14	The construction of masts of any material or type of any height, including those used for telecommunication, broadcasting and radio transmission, but excluding masts of 15m and lower, exclusively used for lighting purposes.	None of the telecommunications infrastructure constructed to date trigger this activity.
GN R 544 of 18 June 2010 Activity 22 (ii)	The construction of a road, outside urban areas, (i) with a reserve wider than 13.5m, or (ii) where no reserve exists where the road is wider than 8 meters.	New access to operations, and the construction of a service road next to the overland conveyor to DCM East. (The position of the conveyor belt has since been changed hence the new application)
GN R 544 of 18 June 2010	The expansion of existing facilities for any process or activity where such expansion will result in	Construction of new pollution control dam and the

Regulation	Listed Activity	Description
Activities already authorised		
Activity 28	the need for a new, or amendment of, an existing permit or license in terms of national or provincial legislation governing the release of emissions or pollutions, excluding where the facility, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	expansion of the co-disposal facility (Dump 2),
GN R 545 of 18 June 2010 Activity 5	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: waste Act, 2008 (Act No. 59 of 2008) in which case that act will apply	Treatment of sewerage water and the release of the treated water into the mine system for reuse and the treatment of water to decent standards to the pollution control dams.
GN R 544 of 18 June 2010 Activity 13	The construction of facilities or infrastructure for the storage, or for the storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.	Storage and off-loading of explosives at the mine before transporting explosives to underground magazine.
GN R 545 of 18 June 2010 Activity 15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more	The DCM West regarded as green field mining operation in an open area, all combined with a capacity of more than 20 hectares.
GNR 545 of 18 June 2010 Activity 20	Any activity which requires a mining right or renewal thereof as contemplated in sections 22 and 24 respectively of the Mineral and Petroleum Resource Development Act, 2002 (Act No. 28 of 2002)	New mining operations that require renewal of mining right and addition of prospecting rights.(This related to 4 seam mining)
Activities forming part of the amendment		
GN R. 327 of 7 April 2017 Activity 12:	<i>"The development of– (ii) infrastructure or structures with a physical footprint of 100 square metres or more;</i>	The proposed conveyor belt from DCM West to East will have a footprint greater than 100 square meters

Regulation	Listed Activity	Description
Activities already authorised		
	<p><i>Where such development occurs –</i></p> <p><i>(a) Within a watercourse</i></p> <p><i>(c) If no development setback exists within 32 meters of a watercourse, measured from the edge of a watercourse”.</i></p>	and this development will be within watercourses including wetlands.
GN R. 327 of 7 April 2017 Activity 19:	<p><i>Infilling or depositing of any material of more than 10 m³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic meters from: a littoral active zone, a watercourse</i></p>	The proposed discard dump facility and conveyor belt will be situated within a wetland.
GN R. 327 of 7 April 2017 Activity 28:	<p><i>Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 1 April 1998 and where such development will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.</i></p>	The proposed expansion of a discard dump will require approximately 35 hectares.
GN R. 327 of 7 April 2017 Activity 48:	<p><i>“The expansion of—</i></p> <p><i>(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or</i></p> <p><i>where such expansion occurs—</i></p> <p><i>(a) within a watercourse”</i></p>	The proposed project entails the expansion of the existing discard dump where the physical footprint will be expanded by 100 square metres or more. This expansion will be within watercourses including wetlands.
GN R. 325 of 7 April 2017 Activity 6:	<p><i>The development of facilities or infrastructure for any process or activity which requires a permit or license or an amended permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent.</i></p>	The proposed development will require Water Use and Waste Licences in terms of NWA and NEMWA.
GN R. 325 of 7 April 2017 Activity 27:	<p><i>“The development of a road wider than 4 metres with a reserve less than 13, 5 metres.</i></p>	The proposed project entails the development of an access roads wider than 4 metres with a reserve less than 13.5 meters within protected areas and Critical

Regulation	Listed Activity	Description
Activities already authorised		
		Biodiversity Areas (CBA) outside urban areas.
GN R. 324 of 7 April 2017 Activity 12:	<i>The clearance of an area of 300 square meters or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purpose undertaken in accordance with a maintenance management plan</i> F Mpumalanga <i>ii. within critical biodiversity areas identified in bioregional plans”</i>	The proposed conveyer belt route crosses a Critical Biodiversity Areas (CBA) and the project will require clearance of an area of 300 square meters or more of indigenous vegetation within CBA.
GN R921 of November 2013: Category B, Activity 7	<i>The disposal of any quantity of hazardous waste to land</i>	The proposed discard dump expansion will cater for the disposal of both discard and slurry coal.
GN R 921 of November 2013: NEM:WA Category B, Activity 10	<i>The construction of facilities for a waste management activity listed in Category B of this schedule (not in isolation to associated activity</i>	The proposed project entails the expansion of a discard dump facility that will cater for both discard and slurry coal and is expected to cater for the life of mine.
Section 21 (c)	<i>21(c) Impeding or diverting the flow of water in a watercourse; and</i>	The proposed development is within watercourses including wetlands.
Section 21 (i)	<i>21(i) Altering the Bed, Banks, Course or Characteristics of a Water Course</i>	The proposed development is within watercourses including wetlands.
Section 21 (g)	<i>Disposing of waste in a manner which may detrimentally impact on a water resource</i>	The expansion of discard dump facility is expected to have negative impacts on water resources.
Section 21 (j)	<i>Removing, discharging or disposing of water found underground.</i>	The proposed activities will require dewatering of underground mining areas. The proposed activities will require dewatering of

Regulation	Listed Activity	Description
Activities already authorised		
		underground mining areas.

5 A MAP AT AN APPROPRIATE SCALE WHICH SUPERIMPOSES THE PROPOSED ACTIVITY, ITS ASSOCIATED STRUCTURES, AND INFRASTRUCTURE ON THE ENVIRONMENTAL SENSITIVITIES OF THE PREFERRED SITE, INDICATING ANY AREAS THAT SHOULD BE AVOIDED, INCLUDING BUFFERS

Based on the baseline environment of the proposed Mining Right areas, sensitivity mapping has been undertaken to identify areas of sensitivity and create both regulated and non-regulated buffers to protect and preserve such areas. The sensitivity map below (Figure 7 and 8) and attached as **Appendix A** focuses on the proposed activities that must still be authorised. While Figure 5 provides a holistic overview of the entire mining right area and associated sensitivities and buffers. Further, Table 10 below provides a summary of Sensitive Areas within and around the mining area and Buffers Created.

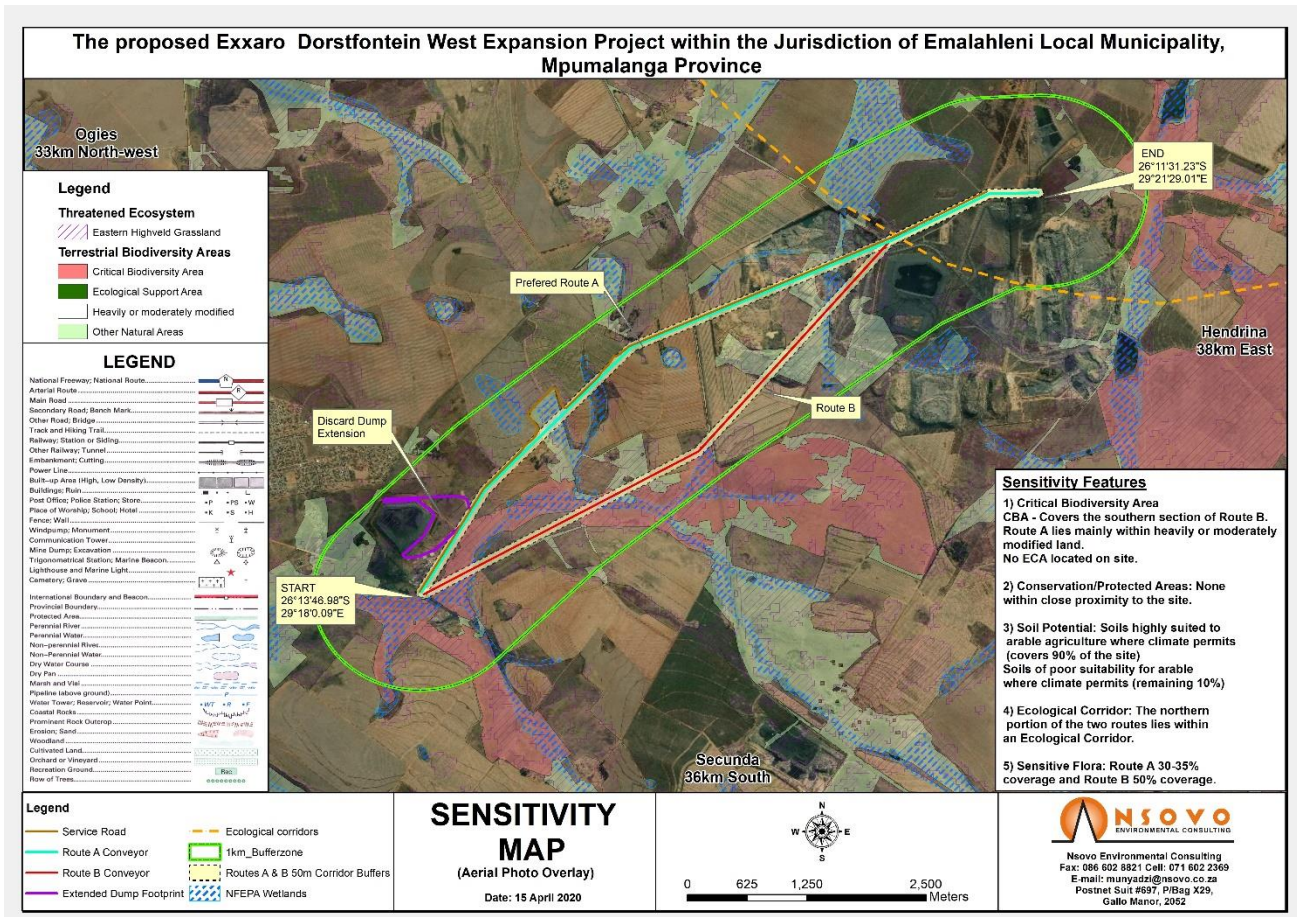


Figure 13: Sensitivity Map – Proposed Activities

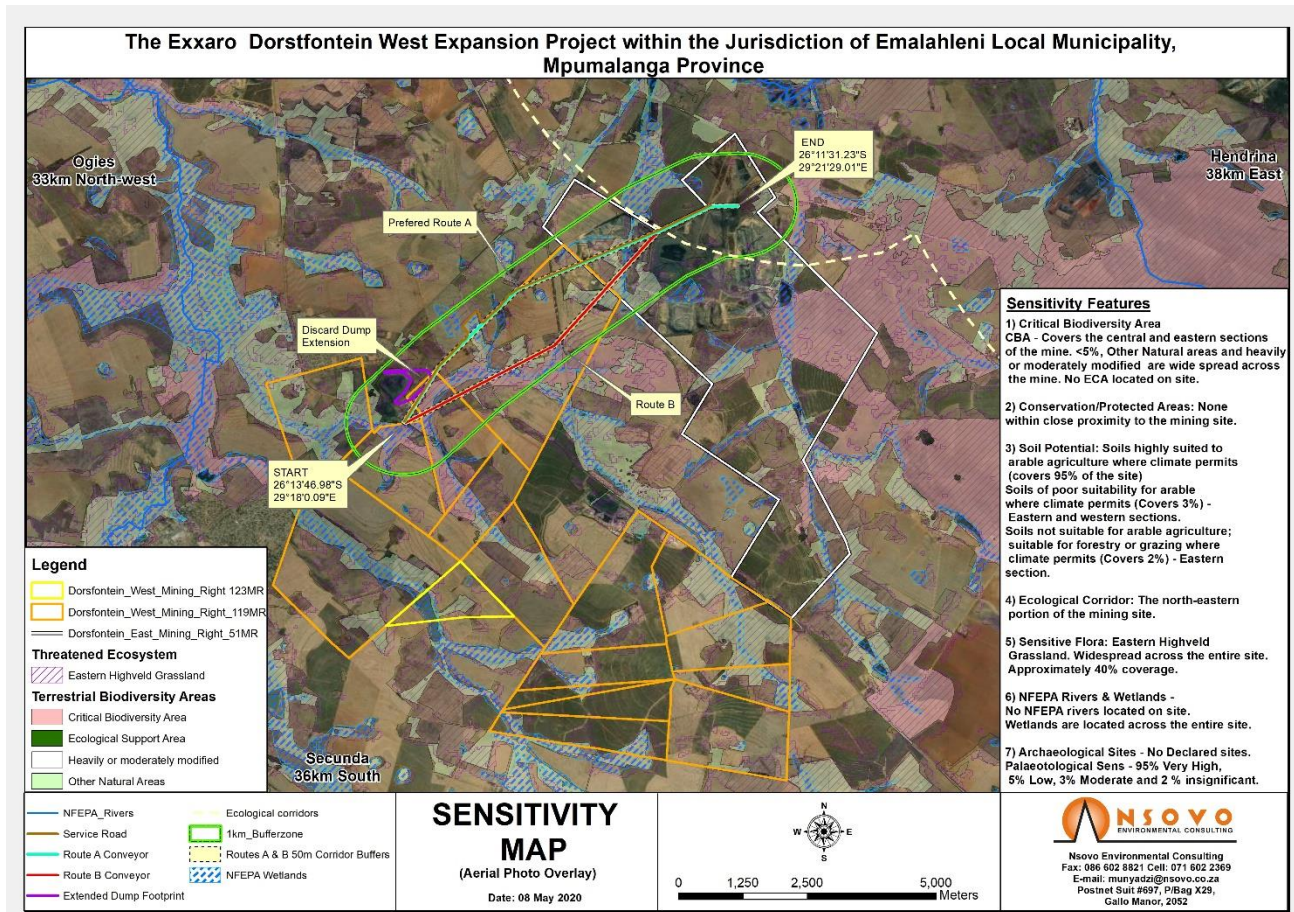


Figure 14: Sensitivity Map – DCMW Mining Rights Area

Table 9: Summary of Sensitive Areas within and around the mining area and Buffers Created

Aspect	Description	Proposed Buffers (Legislated and non-legislated)
Critical Biodiversity Area	Critical biodiversity areas covers the central and eastern portion of the mine.	None
Conservation Protected Areas	There are no conservation areas identified in close proximity to the mine.	Not applicable.
ECA	None within the mining area	Not applicable.
Ecological Corridor	There is an ecological corridor on the north eastern portion of the mine.	None
Sensitive Flora	Approximately 40% of the MR area is covered by Eastern Highveld Grassland.	None
NFEPA Rivers	None of the rivers within the mining rights area are classified as NFEPA rivers.	Not applicable

Aspect	Description	Proposed Buffers (Legislated and non-legislated)
NFEPA Wetlands	None of the delineated wetlands within the mining area are classified as NFEPA wetlands.	No buffers
Soil Potential	Approximately 95% of the soil within the mining area is highly suited for arable agriculture	No buffers
Archaeological Sites	There are no declared archaeological areas within the mining area. A grave site in proximity to the MRA.	No buffers

The information below is a sensitivity risk matrix derived from the annual Rehabilitation developed by Kimopax. The Table 12 below provides Ecological Information for the DCM West. The first column provides the type of assessment that was conducted, and the subcategory is the limitations or development parcels under the particular assessment type. The subsequent columns provide the sensitivity outcomes for the mine. The information is presented such that it can be aligned to the post-closure development objectives for the area, and the assessment gives a synopsis of what is permissible.

Table 10: Overview of sensitivity matrix (Exxaro Annual Rehabilitation Plan, 2019)

Sensitivity assessment tool	Sub Category (Development parcels)	Dorstfontein West
Aquatic Biodiversity Sub-Catchments	Assessment	Not Required
Terrestrial Biodiversity Assessment	Assessment	No Natural Habitat Remaining
	Surface Mine	Restricted
	Rural Settlement	Permitted
	Urban development	Permitted
	Major development	Permitted
	Linear structures	Permitted
	Water projects	Permitted
Vegetation map _with Threatened ecosystems		Vulnerable
Fish Support Areas		None
Mpumalanga Biodiversity Spatial Plan _Freshwater		Heavily Modified Area
Mpumalanga Biodiversity Conservation		Eastern Highveld Grassland
Vegetation map with threatened ecosystems		Vulnerable
Land Capability - Agriculture		Medium and High soil capability: Grazing

6 A DESCRIPTION OF THE IMPACT MANAGEMENT OUTCOMES, INCLUDING MANAGEMENT STATEMENTS, IDENTIFYING THE IMPACTS AND RISKS THAT NEED TO BE AVOIDED, MANAGED AND MITIGATED AS IDENTIFIED

THROUGH THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS FOR ALL PHASES IMPACT MANAGEMENT OUTCOMES

6.1 IDENTIFIED RISK THAT NEED TO BE AVOIDED

The tables (Table 13 – 15) below identified the RISK that need to be avoided throughout the project phases whereby Table 13 provides risk identified for construction phase, Table 14 for operation phase and Table 15 for decommission phase. The risk identification was also guided by the specialist studies undertaken and are summarized according to the project phases, as follows:

6.1.1 CONSTRUCTION PHASE

Table 11: Risks Identified for Construction

Hazard /Threats	Risk Identified
CONSTRUCTION ACTIVITIES	
Movement of construction personnel	<ul style="list-style-type: none"> • Impact on sensitive environments • Trespassing • Safety and security
Site preparation and excavations	<ul style="list-style-type: none"> • Loss of topsoil • Irreparable damage to plant species (biodiversity) • Possible destruction of unidentified heritage resources • Possible disturbance or destruction of sensitive environments such as wetlands • Indefinite stoppage of agricultural activities within the immediate construction footprint • Removal of wetland recharge soils • Increase in soil erosion • Contamination of Soil • Disturbance of fauna • Damage to flora • Surface Water Consumption • Groundwater Contamination <ul style="list-style-type: none"> ○ Generation of Dust ○ Generation of Smoke ○ Generation of waste ○ Destruction of Graves and archaeological sites

Hazard /Threats	Risk Identified
Vehicle movement and refueling activities	<ul style="list-style-type: none"> • Damage to protected /endangered vegetation. • Damage to sensitive areas. • Erosion and loss of topsoil. • Generation of Dust • Destruction of sites of archaeological and heritage significance. • Contamination of Soil • Could result in fuel spillages that could potentially contaminate ground and surface water resources
Change in Land Use	<ul style="list-style-type: none"> • Loss of agriculture value due to change in land use. • Alteration (both physical to hydrogeological flow paths pat, leading to degradation of wetland and chemical status) and pollution of soil forms by construction activities associated wetland recharge soils. • Loss of biodiversity puts aspects of the economy, wellbeing and quality of life at risk, and reduces socioeconomic options for future generations. • Shallow, light textured soil of low clay content, as well as soils located on higher landscape positions more prone to erosion risk.
Drainage lines	<ul style="list-style-type: none"> • Water resources contamination. • Impact on drainage lines in the vicinity of the proposed discard dump expansion. • The high negative impacts associated with the conveyor belt running along drainage lines.

6.1.2 OPERATIONAL PHASE

Table 12: Risks Identified for the Operational Phase

Hazard	Risk Identified
Climate Change	<p>Increased temperature</p> <ul style="list-style-type: none"> • Increased temperature, heatwaves and wildfires can pose a health risk to employees; can influence productivity; may present a risk of spontaneous combustion of coal stockpiles. • Wildfires may damage infrastructure and facilities.

Hazard	Risk Identified
	<p>Reduced rainfall</p> <ul style="list-style-type: none"> • Water scarcity and drought can constrain exploration, processing and site rehabilitation; can lead to water conflicts with communities; may further exacerbate water quality. • Drought may result in increased dust generation and increased water requirements for dust suppression. <p>Extreme events</p> <ul style="list-style-type: none"> • Floods, cyclones and storms may cause the following: <ul style="list-style-type: none"> ○ Damage to infrastructure and facilities; ○ Discharge of contaminated water into surrounding areas; and ○ Reduced accessibility due to flooding of roads. <p>Wind Impacts</p> <ul style="list-style-type: none"> • High wind speeds and gusts may damage infrastructure; may result in increased dust generation.
Plant operation	<ul style="list-style-type: none"> • Could result in fuel spillages that could potentially contaminate ground and surface water resources • Alteration (both physical and chemical status) and pollution of soil forms by mining operations. • Ongoing disturbances to soils, resulting in increased leaching of soil nutrients and risk of erosion, attributed to mining activities. • Increase in Soil erosion • Contamination of Soil • Loss of Soil Structure Fertility • Surface Water Contamination • Groundwater Contamination • Generation of Dust
Underground mining	<ul style="list-style-type: none"> • Health and safety risks • Noise as a result of blasting • Infiltration and seepage and therefore long-term risks and environmental liabilities (Acid Mine Drainage) • Drawdown into underground workings

Hazard	Risk Identified
Coal transfer	<ul style="list-style-type: none"> Coal dust generation
Fire	<ul style="list-style-type: none"> Safety risk
Floods	<ul style="list-style-type: none"> Safety
Gas and Dust explosions	<ul style="list-style-type: none"> Health and safety risk Can lead to fatal accidents Air pollution
Discard dump instability	<ul style="list-style-type: none"> Discard dump risk of failure Health and safety risk Can lead to fatal accidents Dirty runoff from the discard Exposure of soil surface and ineffective rehabilitation Disturbance of current discard dump could cause instability resulting in more seepage to surface water resource Surface Water pollution Groundwater pollution
Pillar Failure:	<ul style="list-style-type: none"> Safety risk Surface subsidence Underground Flooding
Toxic contaminants	<ul style="list-style-type: none"> Explosions from gasses such as methane and coal dust can pose considerable health and safety risks including loss of lives.
Blasting (underground)	<ul style="list-style-type: none"> Dispersion of dust particles Noise from blasting activities can result in hearing loss and other related health risks Safety risk as a result of flying rocks

6.1.3 DECOMMISSIONING AND REHABILITATION

A detailed risk assessment was undertaken with the ECC team to determine both financial and environmental risks during this phase. The Table below has been extracted from the annual rehabilitation report prepared by Kimopax in 2019. This is annually reviewed and updated accordingly.

Table 13: Risks Identified for the Decommissioning and Rehabilitation Phases

Hazard	Risk Identified
Co-Disposal Facilities	
Slope failure	Collapse of the slope due to the inadequate engineering designs or natural causes
Alien invasive plants	Encroachment of alien invasive plants
Erosion cover	<p>Inadequate cover material for the Co-Disposal Facility</p> <p>Ineffective rehabilitation may lead to further loosening and detachment of soil particles and risk of erosion</p>
Seepage and Leachate drainage	<p>a) Excessive water infiltration/preferential flow paths leading to excessive seepage</p> <p>b) Leachate from Co-Disposal Facility to ground and surface water sources</p>
Dust	Dispersion of dust particles from the Co-Disposal Facilities.
Spontaneous Coal Combustion	Spontaneous coal combustion as a result self-heating of coal or other carbonaceous material due to auto oxidation resulting eventually in its ignition contribution veldfires and global warming.
Building Infrastructures	
Failure to remediate contaminated soil	<p>a) Failure to remediate soil contamination and/or avoid weed infestation along the conveyors and the loading bay/siding and storage facilities for hazardous substances.</p> <p>b) Failure to remove all/some of the fuel storage and dispensing facilities</p>
Water Facilities	
Floods and earth tremors	Damage to Pollution Control Dams from floods and earth tremors.
Building fire	Destruction of building and equipment by fire.

Hazard	Risk Identified
Improper removal of the materials in Pollution Control Dams (PCDs) and silt traps	PCDs will be the last to be removed, if not removed properly there could be a possibility of soil contamination from materials in the PCD
Seepage	Leachate from PCD to ground and surface water sources
Dam wall failure or Overflow	Overflow of PCD material
Climate change	Floods, cyclones and storms that may cause damage to infrastructure and facilities and floods, cyclones and storms that may cause reduced accessibility due to flooding of roads.
Underground Mining	
Reduction of ecological support areas	Possible failure of underground workings.
Decant	Possible post-mining decant of poor quality mine affected water
Insufficient Box-Cut Material shortage	Closure material balance is not sufficient to implement closure actions and the achievement of relinquishment requirements
Groundwater and surface water contamination	Seepage from discard dump
Plant Area Including Crusher At Rom	
Alien invasive plants	Encroachment of alien invasive plants
Soil and water contamination	Failure to decontaminate materials / equipment being used elsewhere, leakage or spill of contaminated material
Leakages and spills	The leakages and spills of hazardous substance
Waste Management	Leakages and spills of hazardous substances

Hazard	Risk Identified
Visual amenity	Failure to remove all of the plant and facility structures
Soil erosion	Soil erosion where the plant was located
Stormwater Management	Stormwater runoff which erodes the ore and waste stockpiles
Legal, Financial and Reputational Risks	
Change of legislations	Exxaro incurring additional costs as a result of changing legislative requirements.
Failure to demonstrate relinquishment criteria	Exxaro failing to demonstrate that the relinquishment criteria has been achieved.
Withdrawal of planned 3rd party maintenance on infrastructure (Offices and Workshops)	The withdrawal of planned maintenance on any structures that are left for 3rd party post closure use, may result in the integrity of the structures deteriorating to the point where they represent a Health and Safety risk to users, if the 3rd party does not implement its own maintenance regime.
Omission of environmental impacts	Unidentified environmental impacts are not mitigated as a result of closure actions that are not planned
Closure delay	Closure delay once life of mine is reached with a concurrent reduction in personnel to secure the footprint
Underestimation of closure costs	Underestimation of closure quantum resulting in inadequate funds being set aside for rehabilitation
Failure to adhere to final land-use plan	Not following the final land-use plan
Insufficient baseline information	Lack of sufficient baseline information collected during operations to underpin closure-related performance;
Improper closure planning	Lack of focused, coordinated closure planning, as well as possible failure of implementation of closure and rehabilitation measures due to lack of official, dedicated closure 'champion'

Hazard	Risk Identified
Failure to consider decommissioning and closure legal requirements such as registration of contaminated land and environmental authorisations	The site that is contaminated with hazardous substances triggers registration under the National Waste Act and the decommissioning activities require environmental authorisations. Triggering legislative actions due to soil contamination which falls under S8 of Chapter 4 of NEMWA.

6.2 IMPACT MANAGEMENT OUTCOMES

Table 16 below outline the range of approaches to be undertaken to manage the potential environmental impacts / risk of the project activities throughout the project cycle.

Table 14: Approach to Impact Management

Impact Management	Description
Avoidance	Avoiding activities that could result in adverse impacts and/or resources or areas considered sensitive.
Prevention	Preventing the occurrence of negative environmental impacts and/or preventing such an occurrence having negative impacts.
Preservation	Preventing any future actions that might adversely affect an environmental resource.
Minimisation	Limiting or reducing the degree, extent, magnitude or duration of adverse impacts
Mitigation	Measures taken to minimise adverse impacts on the environment.
Enhancement	Magnifying and/or improving the positive effects or benefits of a project.
Rehabilitation	Repairing affected resources, such as natural habitats or water resources.
Restoration	Restoring affected resources to an earlier (possibly more stable and productive) state, typically 'background' or 'pristine' condition. These resources may include soils and biodiversity.
Compensation	Compensating for lost resources, and where possible, the creation, enhancement or protection of the same type of resource at another suitable and acceptable location.

Following a detailed description of the impact management approaches, this section provides a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated throughout all phases.

6.2.1 Pre-Construction Phase

Table 15: Pre-construction Objectives

Aspect	Objective
Social	<ul style="list-style-type: none"> To increase local employment. To reduce the impacts on local cultural sense of place. To minimise social pathogens and unhealthy behavior. Protection of archaeological, historical and any other site or land considered being of cultural value.
Soil	<ul style="list-style-type: none"> To prevent erosion, sedimentation, surface water contamination and reduction in water quality. To minimise land use alternation and soil erosion.
Biodiversity	<ul style="list-style-type: none"> To ensure adequate planning to prevent habitat destruction. To prevent a significant increase in alien invasive species abundance and spread and to prevent habitat fragmentation with specific reference to the proposed activities. To conserve species of conservational concern, and reduce impacts arising from insufficient rehabilitation. To minimise the impact on plants of conservation concern through implementation of Search and rescue according to the plan.
Sensitive Environments	<ul style="list-style-type: none"> To prevent the destruction of wetland habitats and conserve the biological structure of wetlands.

6.3 CONSTRUCTION PHASE

Table 16: Construction Objectives

Aspect	Objective
Social	<ul style="list-style-type: none"> To protect the social - economic environment of local land users. To improve on local economy through utilisation of local resources. To prevent destruction of graves. To conserve heritage artefacts and buildings. To minimise impacts on infrastructure and land occupiers during blasting activities.
Water	<ul style="list-style-type: none"> To prevent groundwater contamination. To protect surface water flow, water quality and associated pollution. To conserve water usage during construction. To ensure adequate clean and dirty water separation. To prevent sedimentation of local streams as a result of erosion.

Aspect	Objective
	<ul style="list-style-type: none"> To minimise loss of water to the catchment.
Air Quality	<ul style="list-style-type: none"> To minimise emissions to the atmosphere affecting employees, local land users, and climate change. To reduce greenhouse gas emissions.
Soil	<ul style="list-style-type: none"> To prevent soil contamination and ensure rehabilitation of contamination. To minimise loss of land capability and enhance rehabilitation.
Biodiversity	<ul style="list-style-type: none"> To prevent a significant increase in alien invasive species abundance and spread. To minimise the loss of floral habitat. To minimise loss of floral biodiversity. To protect floral habitats and diversity. To reduce the impacts on faunal ecological integrity through curbing erosion and poaching. To minimise cumulative loss of natural vegetation in the region.
Sensitive Environments	<ul style="list-style-type: none"> To protect of Wetland Habitat and wetland ecological structure. To protect hydrological functioning of the wetland systems.

6.4 OPERATIONAL PHASE

Table 17: Operation Objectives

Aspect	Objective
Social	<ul style="list-style-type: none"> Improve the local financial capital for local communities and landowners. Protect social – economic environment of local land users. Prevent negative social impacts on the health and safety of land users and employees. Prevent destruction of graves.
Water	<ul style="list-style-type: none"> Prevent groundwater contamination. Protect surface water flow, water quality and associated pollution. Ensure effective and reliable clean and dirty water separation. Prevent water wastage and impact on water resources. Prevent siltation of watercourses.
Air Quality	<ul style="list-style-type: none"> To minimize atmospheric pollution Reduce Greenhouse gas emissions
Soil	<ul style="list-style-type: none"> Prevent soil contamination and ensure rehabilitation of contamination. Minimise loss of soil resources. Minimise loss of agricultural land. Prevent soil sterilization and contamination.

Aspect	Objective
	<ul style="list-style-type: none"> • To reduce soil pollution and degradation. • To reduce sediment movement offsite. • To prevent compaction of soils on site.
Biodiversity	<ul style="list-style-type: none"> • To prevent a significant increase in alien invasive species abundance and spread. • To protect floral habitats and diversity.
Hydrogeology	<ul style="list-style-type: none"> • To prevent acid mine drainage generation. • To prevent deterioration of water resources due to acid mine drainage. • To avoid seepage of leachate into underlying strata.
Sensitive Environment	<ul style="list-style-type: none"> • To protect wetland habitat and wetland ecological structure. • To minimise change and effectiveness of wetland service provision. • To protect hydrological functioning of the wetland systems. • To prevent alteration of natural ecological processes and ecosystem functioning. • To prevent changing the quantity and fluctuation properties of watercourses. • To reduce the amount of sediment entering water resource and associated change in turbidity • To avoid alteration of water quality toxic contaminants including toxic metal ions and hydrocarbons. • To avoid changing the physical structure within a water resource. • To reduce ecological impacts and ecosystem functioning. • To prevent the spread of alien invasive species.
Climate Change	<ul style="list-style-type: none"> • To communicate and implement an effective nationally determined climate change response strategies. • To prevent increased temperature and wildfires due to climate change. • To avoid depletion of water resources resulting from drought. • To minimize the occurrence of floods, cyclones and storms. • To minimize damage if infrastructure cause by floods, cyclones and storms. • To minimize impact cause by high wind speeds and gusts.

6.5 REHABILITATION AND CLOSURE

Table 18: Rehabilitation and Closure Objectives

Aspect	Objective
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Aspect	Objective
Social	<ul style="list-style-type: none"> • To implement closure actions to reduce closure risks to the planned residual risk timeously. • To decommission all surface infrastructure that has no beneficial post-closure use. • To identify potential post-closure uses of the land occupied by mine infrastructure in consultation with the surrounding landowners and land users and then rehabilitate disturbed land to a state that is suitable for its post-closure uses. • To rehabilitate disturbed land to a state that facilitates compliance with applicable environmental quality objectives (air quality objectives and water quality guidelines). • To reduce the visual impact of the site through rehabilitation of all disturbed land.
Water	<ul style="list-style-type: none"> • To implement water management measures to limit the potential impact, decant has on receiving water bodies. • To promote the separation for dirty from clean water. • To avoid groundwater reduction and contamination from leachates. • To prevent water contamination and pollution.
Soil	<ul style="list-style-type: none"> • To ensure rehabilitation that results in landforms that emulate the surroundings and would facilitate drainage. • To rehabilitate all disturbed land to a state where post-closure management is minimised. • To reduce soil pollution and degradation. • To reduce sediment movement offsite. • To prevent soil contamination. • To promote revegetation on site.
Air Quality	<ul style="list-style-type: none"> • To reduce noise pollution from decommissioning activities. • To prevent windblown dust from transportation. • To reduce noise generated by decommissioning activities. • To reduce fugitive dust emissions and related impact.
Hydrogeology	<ul style="list-style-type: none"> • To prevent acid mine drainage migration. • To prevent deterioration of water resources due to acid mine drainage. • To avoid seepage of leachate into underlying strata to manage decant water.
Sensitive Environment	<ul style="list-style-type: none"> • To reduce the amount of sediment entering water resource and associated change in turbidity. • To reduce the ecological impacts and ecosystem functioning. • To prevent the spread of alien invasive species. • To prevent disturbances on wetlands.

Aspect	Objective
Climate Change	<ul style="list-style-type: none"> To implement an effective nationally determined climate change response strategy. To avoid depletion of water resources resulting from drought. To minimize damage if infrastructure cause by floods, cyclones and storms. To minimize the impact caused by high wind speeds and gusts.
Social	<ul style="list-style-type: none"> To prevent the decreasing resale value of farms. To improve the visual aesthetics. To prevent the loss of employment.
Traffic	<ul style="list-style-type: none"> To reduce traffic build up and noise generation.

7 APPLICABLE LEGISLATION

A description of applicable legislation is provided herein in accordance with the requirement of Appendix 2 Section 1(e) of the EIA Regulations. Table 21 below lists and describes the Acts and legislations applicable to the proposed project, which are pertinent to the proposed development. Municipal policies, plans, and by-laws, as well as Exxaro policies and best practices, were considered during the compilation of the EMPr. The list of legislation applicable to the project is not an exhaustive analysis; however, it provides a guideline to the relevant aspects of each Act.

Table 19 : Legislation pertaining to the proposed project

Aspect	Relevant Legislation	Brief Description
Environment	<ul style="list-style-type: none"> National Environmental Management: Act 1998, (Act No. 107 of 1998) as amended. Environmental Impact Assessment Regulations, December 2014 as amended 	<p>The overarching principles of sound environmental responsibility as reflected in the National Environmental Management Act, 1998 (Act No. 107 of 1998) apply to all listed projects. Construction and operation of activities must be conducted in line with the generally accepted principles of sustainable development, integrating social, economic and environmental factors.</p> <p>The EIA process follows the NEMA and the EIA Regulations of December 2014 as amended. The proposed development involves “listed activities”, as defined by NEMA. Listed activities are an activity which may potentially have detrimental impacts on the environment and therefore require an EA from the relevant Competent Authority, in this case DMRE.</p>
Mine Health and Safety		The Mine Health and Safety Act, 1996 (Act No. 29 of 1996) (MHSA) aims to provide for protection of the health and safety of all employees and other personnel at the mines of South

	The Mine Health and Safety Act (Act No. 29 of 1996)	<p>Africa. The main objectives of the act are:</p> <ul style="list-style-type: none"> • Protection of the health and safety of all persons at the mines; • Requires employers and employees to identify hazards and eliminate, control and minimise the risks relating to health and safety at the mines; • Gives effect to the public international law obligations of the Republic that concern health and safety at all mines; • Provides for employee participation in matters of health and safety through health and safety representatives and the health and safety committees at the mines; • Provides for effective monitoring of health and safety conditions at the mines; • Provides for enforcement of health and safety measures at the mines; • Provides for investigations and inquiries to improve health and safety at mines; and • To promote: <ul style="list-style-type: none"> ○ Culture of health and safety in the mining industry; ○ Training in health and safety in the mining industry; and ○ Co-operation and consultation on health and safety between the State, employers, employees and their representatives.
Biodiversity	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	The purpose of the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.
Protected Areas	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)	The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.
Heritage Resources	National Heritage Resources Act, 1999 (Act	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) legislates the necessity for cultural and heritage impact

	No. 25 of 1999)	assessment in areas earmarked for development, which exceed 0.5 ha. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits for this specific project would be administered by the Mpumalanga Heritage Agency or South African Heritage Resources Agency (SAHRA).
Air quality management and control	National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)	<p>The objective of the Act is to protect the environment by providing reasonable measures for the protection and enhancement of air quality and to prevent air pollution. The Act makes provision for measures to control dust, noise and offensive odours.</p> <p>Section 32 of The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) deals with dust control measures in respect of dust control. The Minister or MEC may prescribe measures for the control of dust in specified places or areas, either in general or by specified machinery or in specified instances, the steps to be taken to prevent nuisance or other measures aimed at the control of dust. The National Dust Control Regulations (2013) provides for the management and monitoring of dust.</p>
Noise Management and Control	Noise Control Regulations in terms of the Environmental Conservation, 1989 (Act 73 of 1989)	The assessment of impacts relating to noise pollution management and control, where appropriate, must form part of the EMPr. Applicable laws regarding noise management and control refer to the National Noise Control Regulations issued in terms of the Environment Conservation, 1989 (Act 73 of 1989).
Water Resources Management	National Water Act, 1998 (Act 36 of 1998)	This Act provides for fundamental reform of law relating to water resources and use. The preamble to the Act recognises that the ultimate aim of water resource management is to achieve sustainable use of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users

Agricultural Resources	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	The Act aims to provide for control over the utilization of natural agricultural resources in order to promote the conservation of the soil, water resources and vegetation and to combat weeds and invader plants. Section 6 of the Act makes provision for control measures to be applied in order to achieve the objectives of the Act.
Human	The Constitution of South Africa, 1996 (Act No. 108 of 1996)	<p>The Constitution provides for an environmental right (section 24). The State is obliged “to respect, protect, promote and fulfil the social, economic and environmental rights of everyone...”</p> <p>The environmental right states that: “Everyone has the right -</p> <ol style="list-style-type: none"> a) To an environment that is not harmful to their health or well-being; and b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that - <ul style="list-style-type: none"> • Prevent pollution and ecological degradation; • Promote conservation; and • Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”
Promotion to Access to Information	The Promotion of Access to Information Act (Act No. 2 of 2000)	The Act recognizes that everyone has a right of access to any information held by the state and by another person when that information is required to exercise or protect any right. The purpose of the Act is to promote transparency and an accountability in public and private bodies and to promote a society in which people have access to information that enables them to exercise and protect their rights.
Waste	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)	This Act provides fundamental reform of the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. This Act also ensures the provision of national norms and standards for

		<p>regulating the management of waste by all spheres of government. Further, it provides for specific waste management measures; licensing and control of waste management activities; remediation of contaminated land; compliance and enforcement; and for matters connected therewith.</p> <p>The proposed project entails the development of a discard dump which will cater for coal discards and slurry.</p>
Transport	National Road Traffic Act (Act 93 of 1996)	The transportation of Dangerous Goods Regulations as set out in the National Road Traffic Act (Act 93 of 1996) are intended to promote the safe transportation of hazardous material through the effective management of systems and processes.
	National Land Transport Act (Act 5 of 2009)	One of the purposes of the Act is to prescribe national principles, requirements, guidelines, frameworks and national norms and standards for transportation across land. The Act covers the transportation of good across land and as such, the proposed project will be regulated under the Act as goods will be transported during the construction, operation as well as decommissioning phase.
Hazardous Chemicals	Hazardous Substances Act (Act 15 of 1973)	The Hazardous Substances Act controls the production, import, use, handling and disposal of hazardous substances. Under the Act, hazardous substances are defined as substances that are toxic, corrosive, irritant, strongly sensitising, flammable and pressure-generating under certain circumstances and may injure, cause ill-health or even death in humans.
	Hazardous Substances Regulations	The Regulations provide for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances, and for the control of certain electronic products; to provide for the division of such substances or products into groups in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products.

Furthermore, in addition to the national legislative requirements, the EMPr must take equal cognisance of Exxaro's internal policies as well as best practices. The Table 22 below provides a list of policies and guidelines that must be applied to ensure effective management of the environment.

Table 20: List of Associated Policies and Guidelines

Aspect	Document	Brief Description
Environment	Exxaro SHEC Policy	<p>In support of corporate commitments and policies, Exxaro Coal Central (ECC) mine is committed to the following:</p> <p>Effective Risk Management, the organisation will strive to prevent injuries, ill-health, pollution and protection of the environment by minimizing the impact on the biodiversity and ecosystems unique to the region and sustainable use of natural resources.</p> <p>Continuously conduct responsible business practice.</p> <p>Continual measuring and evaluating the Health, Safety and Environmental performance and system performance, to determine the achievement of established objectives and the need or opportunities for improvements within the Health, Safety and Environmental management system.</p> <p>A copy of the policy is attached as Appendix B</p>
Climate Change	United Nations Framework Convention on Climate Change (UNFCCC)	The UNFCCC is an international treaty formed by the United Nations in 1992. The objective of the treaty is to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.
	Kyoto Protocol	The Kyoto Protocol is an international treaty among industrialised nations that sets mandatory limits on GHG emissions. The purpose of the Kyoto Protocol is to even out human-generated emissions at a level that will not inflict further harm on the atmosphere.
	21 st Conference of Parties (COP 21) Paris Agreement	A historic agreement to combat climate change towards a low carbon, resilient and sustainable future was agreed by 165 nation in Paris in December 2015. The 21 st COP 21 Paris

		Agreement confirms the irreversible transition to a low carbon, safer and healthier world
	South African National Climate Change Response White Paper	The South African National Climate Change Response White Paper (White Paper), published by the Department of Environmental Affairs (DEA, 2011), prioritises both climate change mitigation and adaptation in moving towards a climate-resilient and lower-carbon economy and society.
	Climate Change Bill (GG No. 41689, Notice 580)	The purpose of the Bill is to communicate and implement an effective nationally determined climate change response, including mitigation and adaptation actions, that represents South Africa's fair contribution to the global climate change response.
	National Greenhouse Gas Emission Reporting Regulations (GG No. 40762, Notice 275)	The purpose of the regulations is to introduce a single national greenhouse gas (GHG) reporting system, which will be used to inform policy formulation and help South Africa to meet its international obligations such as targets set under the United Nations Framework Convention on Climate Change.
	Draft National Climate Change Adaptation Strategy (GG No. 42446, Notice 644) (NCCAS) Ambient Air Quality Guidelines and Standards	The NCCAS serves as South Africa's National Adaptation Plan and fulfils South Africa's commitment to its international obligations as outlined in the Paris Agreement under the UNFCCC. The NCCAS will be used as the basis for meeting South Africa's obligations in terms of the adaptation commitments outlined in the National Determined Contributions. This guideline provide a basis for protecting public health from adverse effects of air pollution and for eliminating, or reducing to a minimum, those contaminants of air that are known or likely to be hazardous to human health and well-being. Once the guidelines are adopted as standards, they become legally enforceable. The South African Bureau of Standards (SABS), in collaboration with DEA (currently known as DEFF), established this ambient air quality standards for gravimetric dust fallout to manage air pollution.
	Mpumalanga Province Climate Change Adaptation Strategies	The Department of Environmental Affairs (DEA) (currently known as DEFF), in partnership with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) developed the Mpumalanga Climate Change Adaptation Strategy Report (2015). The report investigated climate change vulnerabilities within the Province, identified priority sectors and recommended

		adaptation measures that can build adaptive capacity in the relevant sectors.
Noise management	Nkangala District Municipality's Climate Change Vulnerability Assessment and Response Plan (2018) South African National Standard (SANS) 10103 of 2008	This Plan was developed in partnership with DEFF and GIZ, through the Local Government Climate Change Support Program. The plan identified key climate change vulnerabilities, as well as climate change responses to address the vulnerabilities. This standard covers methods and gives guidelines to assess working (i.e. mining area) and living environments with respect to acoustic comfort, excellence, and with respect to possible annoyance by noise (i.e. whether complaints can be expected). It also gives a method to predict speech communication efficiency.

The specialist studies undertaken in preparation of this EMPr recommended plans and programs that need to be prepared and implemented at different phases of the project, to ensure effective implementation of mitigation measures and allow for ease of monitoring. Some of the recommended may require regular updates, and this will need to be done as recommended. Table 23 provides a list of plans and programs that are either pre-requisite for construction or a requirement for the operational and decommissioning phases of the mine operations.

Table 21: Applicable Plans and Programs

Specialist	Purpose	Frequency
Groundwater Management Plan	The objective of the plan is to identify the potential direct and indirect impacts on groundwater flows and quality and develop management and monitoring measures that maximise the ongoing protection of groundwater dependent systems to be retained from disturbance by mining activities.	Prior to operation of the proposed new activities; and continuously
A GN 704 Audit	The notice was established to provide regulations on the use of water for mining and related activities aimed at the protection of water resources. To assist with compliance to the separation of clean and dirty water infrastructure,	Triennially

Specialist	Purpose	Frequency
	unless otherwise, the frequency of the audit is determined by the existing Water Use Licence;	
Water balance model	To describe the flow of water in and out of the mining operations. Account for water usage.	Prior construction and annually
Biomonitoring Plan	To create a measurable reference for mine personnel with regards to the proliferation or degradation of ecological function.	Prior construction and bi-annual thereafter
Wetland Mitigation and Rehabilitation Plan	To compensate for a minimum loss of 4, 45 healthy hectare wetland equivalents (the final multiplication factor to be determined in conjunction with DHSWS).	Continuous
Wetland Monitoring Program	A special works program must be implemented which ensures that a wetland specialist is part of the design and construction team (to minimise impacts on wetland habitat) and that the Wetland Monitoring Program makes provision for increased monitoring intensity for the conveyor route specifically.	Continuous
Wetland Rehabilitation Design	Appropriate Wetland Rehabilitation Design and Implementation must ensure that wetland functionality is restored.	Prior construction commencement
Wetland and Hillslope Monitoring Program	Wetland and Hillslope Monitoring Program must be implemented prior to the commencement of the construction phase.	Prior construction commencement

Specialist	Purpose	Frequency
Soil Management Program	Must be implemented before construction activities are initiated to secure all wetland soils in situ as these will be utilised for mitigating wetland loss through the wetland mitigation and rehabilitation plan.	Prior construction commencement
Stormwater Management Plan	The Stormwater Plan must include adequate attenuation facilities to ensure that peak flows do not cause negative impacts on wetlands.	Prior Construction commencement for the proposed new activities and it must be integrated with the existing SMP for the mining and monitored continuously.
Emergency Response Plan	To respond to any emergency situations (fires, spillages, etc.).	Continuous
Bullfrog Monitoring and Management Plan	To ensure effective relocation and preservation of bullfrogs if present.	Prior construction commencement
Open Space Management Plan	For proper management of open spaces affected by the project.	Prior construction commencement
Alien Invasive Plant Management and Control Plan	To manage and control alien invasive plants.	According to the DEA minimum requirements.
Biodiversity Action Plan	To ensure that the proposed that the proposed avoidance and mitigation measures associated with the mine construction and operation are effectively implemented.	Prior construction commencement
Plant Search and Rescue and Monitoring Plan	To identify all individual plants that need to be relocated or monitored based on their levels of conservation concern	Prior construction commencement.
Dust-fallout monitoring	To ensure dust generated does not exceed the NEMAQA allowable limits.	During operational phase

Specialist	Purpose	Frequency
Soil and Agriculture	A short-term fertilizer program	For 2 to 3 years after rehabilitation or until the area can be declared as self-sustaining by an appropriately qualified soil scientist
Climate Change Management /Adaptation Plan	Temperature and humidity levels must be monitored on site.	Daily
	A continuous monitoring station should be installed to obtain site specific wind data. Regular maintenance checks for wind-related damage should be performed.	Continuous - Daily
	Regular monitoring of fuel and energy used on site.	Daily/Weekly

7.1 METHOD STATEMENTS FOR THE ACTIVITIES TO BE CARRIED OUT

The environmental specifications are required to be underpinned by a series of Method Statements (MS), within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMPr will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to Exxaro prior to commencement of activities on site:

The Method Statements must cover applicable details with regard to:

- Site layout.
- Emergency/disaster incident and reaction procedures.
- Construction procedures;
- Delivery and storage of materials and equipment to be used;
- How the equipment/material will be moved while on-site;
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- Compliance/non-compliance with the Specifications; and
- Any other information deemed necessary by Exxaro and ECO.

Specific method statements required may include but not limited to:

- Vegetation clearing;
- Site establishment and site layout plan;
- Fauna and Flora management;
- Excavations;
- Chemical/hazardous substance storage;
- Workshop and Material Equipment Storage;
- Plant- Refuelling
- Cement/concrete use;
- Environmental awareness training;
- Fire management;
- Emergency response;
- Storm water and soil erosion management;
- Waste management;
- Servitude and Access road(s);
- Contaminated water management;
- Temporary site closure;
- Site rehabilitation;
- Blasting;
- Alien plants management and use of herbicides and pesticides;
- Dust management; and
- Noise control.

The above is not an exhaustive list of the required MS; there may be other activities/aspects that may require same prior to the commencement of the work. Additional MS may be required as the project progresses.

8 DESCRIPTION OF MITIGATION MEASURES

This section serves to prescribe mitigation measures to prevent, reduce, eliminate or compensate for impacts, to acceptable/insignificant levels.

8.1 PRE-CONSTRUCTION MANAGEMENT PROGRAMME

The pre-construction management programme is to be used as a guideline during the planning, design and detailing of the development components. This part of the programme is to be referenced by all personnel involved in decision making during the planning and design phases. The responsible agents (Table 23) are abbreviated as follows:

Table 22: Responsible agents

Title	Abbreviation
Contractor Environmental Officer	CEO
Dorstfontein Coal Mines	DCM
Environmental Control Officer	ECO
Environmental Manager	EM
Project Manager	PM
Mine Manger	MM

8.1.1 Pre-Construction Activities

Objective	Mitigation / Management Action	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Ensure that proper environmental conditions are established prior to commencement of construction activities by informing all parties of appropriate environmental protection measures. 	<ul style="list-style-type: none"> The successful tendering Contractors/third parties are made aware of the contents of this EMPr and any penalties arising from non-compliance prior to the commencement of the work. Appoint a suitably qualified environmental manager who will be responsible to monitor compliance to the EMPr. 	<ul style="list-style-type: none"> Signed Declaration by contractor. Appointment Letter. Proof of submission of ECO appointment to DMRE. 	<ul style="list-style-type: none"> Contractor. DCM. 	<ul style="list-style-type: none"> Pre-construction.

<ul style="list-style-type: none"> Record and mapping of sensitive species and environments before construction commencement. 	<ul style="list-style-type: none"> After the final layouts of new mining operation components has been approved and <i>prior to any new groundworks</i>, conduct a thorough footprint investigation (during summer) to record all Protected or Threatened plant species (population location and its size). Map (by GPS) all populations of Protected or Threatened species that must be avoided or relocated. Compile a photographic and relocation guide for the affected species. Follow up by implementing the necessary Search and Rescue actions prior to any groundworks taking place, in line with future mining plans to ensure no destruction of indigenous species of conservation concern. 	<ul style="list-style-type: none"> Records by a qualified biodiversity specialist. Maps of population of protected species. Photographic evidence of preconstruction. Search and Rescue Plan and implementation reports. 		<ul style="list-style-type: none"> Preconstruction.
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8.2 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAMME

This section relates to the construction activities at the DCM West mine expansion project and may also be implemented during any other construction activities within the mine that do not trigger listed activities.

8.2.1 Site establishment

Possible Impact	Objective	Applicable Legislation	Mitigation / Management Action	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Disturbance on the natural environment. Disturbance to soil and vegetation 	<ul style="list-style-type: none"> To ensure minimal disturbance of the environment during the construction 	<ul style="list-style-type: none"> NEMA. Construction Regulations. 	<p>Prior to establishment of the construction camp site and associated infrastructure, Dorstfontein Coal Mines (DCM) and the ECO must identify suitable areas for the establishment of site office and lay down area on the least sensitive locations preferably within already disturbed areas.</p>	<ul style="list-style-type: none"> Inspection Report. Site Plan. 	<ul style="list-style-type: none"> ECO; and CEO. 	<ul style="list-style-type: none"> Prior to site establishment.

	<p>site establishment.</p>		<p>Once these items have been addressed, site establishment shall take place in an orderly manner and all amenities shall be installed before the main workforce moves onto site. Construction camps on the site must be de-established post construction. Rehabilitation must be done in accordance with the rehabilitation plan and/or approved Method Statement.</p> <p>8.2.1.1 Site Plan Documentation for the proposed camp site must be prepared by the Contractor prior to the commencement of construction activities and must be submitted to DCM for approval. This documentation must include those listed in Section 7 above.</p> <p>8.2.1.2 Site Camps The following restrictions must be placed at the site camp for the construction workforce in general:</p> <ul style="list-style-type: none"> • The use of watercourses for domestic purposes such as washing clothes, drinking, and bathing; • The use of welding equipment, oxy-acetylene torches and other bare flames where veld fires can be a hazard; • Poaching of any form; and 			
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			<ul style="list-style-type: none"> • Use of surrounding veld as toilets. <p>8.2.1.3 Vegetation clearing:</p> <ul style="list-style-type: none"> • The natural vegetation encountered on site is to be conserved and left intact as much as possible. • Only vegetation within the approved construction footprint must be cleared and clearance must be as per the approved Method Statement in line with other requirements of this EMPr. • Search and rescue of protected flora and fauna must be done by a Specialist in consultation with the ECO. • Areas must not be stripped of vegetation before the area will be needed for construction. • Use a phased approach in clearance activities. • The Self-succession of vegetation will be encouraged after construction. • If the area is exposed for longer than 18 months and no self-succession has taken place, other options must be investigated. 			
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			<p>8.2.1.4 Water for human consumption: Potable water must always be made available.</p> <p>8.2.1.5 Sewage Treatment:</p> <ul style="list-style-type: none"> • Chemical toilets must be supplied (1 per 15 persons) and must be regularly cleaned and maintained by the Contractor. • The Contractor must arrange for regular emptying of toilets by a registered service provider and must be entirely responsible for enforcing their use and maintenance. • The ablution facilities must be at least 100m away from the watercourses and associated buffers. • All ablution facilities must be anchored to prevent them from being toppled by the wind. • Ensure site where toilets are disposed have necessary legislative approvals. 			
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8.2.2 Sensitive Ecology

Possible Impact	Objective/s	Applicable Legislation	Mitigation / Management Action	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> • Impact on sensitive 	<ul style="list-style-type: none"> • To ensure that sensitive areas are not 	<ul style="list-style-type: none"> • NEMBA 	The following plan and Method Statements must be prepared:	<ul style="list-style-type: none"> • Inspection Report; and 	<ul style="list-style-type: none"> • DCM; and • ECO; and 	<ul style="list-style-type: none"> • Prior to constructio

Possible Impact	Objective/s	Applicable Legislation	Mitigation / Management Action	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>ecology</p> <ul style="list-style-type: none"> Loss of sensitive species. Impact on the flow of the wetland due to the establishing of pillars and further construction within the drainage line. Impedance and concentration of flows along the conveyor route and crossings during construction 	<p>disturbed.</p> <ul style="list-style-type: none"> To ensure minimal or no disturbance to vegetation on and around the site. To prevent negative impact on both flora and fauna. 		<ul style="list-style-type: none"> Implement an alien invasive plant monitoring and management plan whereby the spread of alien and invasive plant species is regularly removed, and re-vegetation monitored on site. Applicable Method Statement as indicated in Section 7 must be prepared and approved by the ECO. <p>The following conditions must be adhered to:</p> <ul style="list-style-type: none"> All construction staff must undergo environmental induction before construction commences to raise awareness and reduce potential floral and faunal impacts. All construction and associated mining activities must be structured to avoid areas of high sensitivity and CBAs. Demarcate the authorised construction footprint to avoid unnecessary vegetation clearing; and clearing must be in accordance with the approved Method Statement. Ensure that 'No-Go' areas are clearly demarcated and/or fenced before construction activities commence. The access barriers must be maintained in 	<ul style="list-style-type: none"> Site plan. 	<ul style="list-style-type: none"> CEO. 	<p>n commence ment.</p>

Possible Impact	Objective/s	Applicable Legislation	Mitigation / Management Action	Monitoring Criteria	Responsible Agent	Monitoring Frequency
n.			<p>good condition throughout the course of the construction.</p> <ul style="list-style-type: none"> • Only vegetation directly affected by the works may be felled or cleared. • No open fires are permitted. • Access roads must be formalised and clearly marked as such. • The use of existing roads and tracks is promoted while creating new unauthorised routes through vegetated areas is prohibited. • No unauthorised removal of vegetation is allowed. • Only manual removal of weed will be permitted on site. Chemical and mechanical (TLB, bulldozer) control is not allowed on site. • Any fauna threatened by construction activities must be removed to safety by a suitably qualified person. • Avoid sensitive faunal habitats such as drainage lines and wetlands. • Baseline surface water monitoring and SASS5 biomonitors must begin before the construction of the river crossings. • The construction of the conveyor belt support pillars within the floodplain must 			

Possible Impact	Objective/s	Applicable Legislation	Mitigation / Management Action	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>take into account the position of machinery during construction.</p> <ul style="list-style-type: none"> • The flow of the watercourses may not be affected by construction activities. • The pillar designs must take cognisance of flood design measures as not to influence the current in a 1:100 year flood event. • The placement of a number of small diameter pipes, as opposed to single large culverts where the conveyor and associated service road cross seepage wetlands, to encourage diffuse flow and to reduce the risk of erosion and flow impedance. • A phased planned approach must be taken when construction is initiated. Areas must only be stripped directly prior to construction and only expose soils to erosion for the minimum period necessary. Where possible, re-vegetation of areas must be implemented as soon as possible. • Regularly spaced low level humps constructed across the width of the service road on the approach and departure slopes to wetland crossings, to intercept surface runoff and deflect it into the surrounding grassland. • The original wetland geometry and 			

Possible Impact	Objective/s	Applicable Legislation	Mitigation / Management Action	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>topography in both cross sectional and longitudinal profile altered during construction of a road crossing must be reinstated at closure. Care in terms of sedimentation during construction activities within the floodplain must be taken.</p> <ul style="list-style-type: none"> The conveyor must be constructed to allow space underneath to allow for free movement of faunal species such as small mammals (rodents) and herpetofauna. 			

8.2.3 Materials handling, use and storage

Possible Impact	Objective	Applicable Legislation	Mitigation / Management Action	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Impact on human health. Impact on soils and water resources. 	<ul style="list-style-type: none"> To ensure safe handling, storage, use and disposal of hazardous substances. To ensure full compliance with the requirements of the applicable legislation. 	<ul style="list-style-type: none"> OHSA. Construction Regulation (2013). 	<p>8.2.3.1 Safety:</p> <ul style="list-style-type: none"> All the necessary handling and safety equipment required for the safe use of hydrocarbons shall be provided by the Contractor to be used and/or worn by the staff. The Contractor must comply with the Occupational Health and Safety Act, 1993 (Act 85 of 1993) and Construction Regulations (2003). <p>8.2.3.2 Hazardous Material Storage:</p> <ul style="list-style-type: none"> Hydrocarbons and other hazardous 	<ul style="list-style-type: none"> Inspection Report; and Incident Report. 	<ul style="list-style-type: none"> ECO; and CEO. 	<ul style="list-style-type: none"> Continuous.

Possible Impact	Objective	Applicable Legislation	Mitigation / Management Action	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>substances will only be stored in a secured, designated area with restricted entry.</p> <ul style="list-style-type: none"> • Storage of hazardous products will only be in suitable containers. Safety Data Sheets (SDS) of the hazardous material stored must be available on site and in the safety file at all times. • All hydrocarbons, irrespective of the volumes shall be stored on a smooth, impermeable surface (concrete) with a permanent bund. The impermeable lining shall extend to the crest of the bund and the volume inside the bund, shall be 110% of the total capacity of all the storage tanks. • Gas welding cylinders and LPG cylinders must be stored in a secure, well-ventilated area. The Contractor must supply sufficient fire-fighting equipment in the event of an incident. • Strictly, no smoking will be allowed where fuel is stored and used. 			

8.2.4 Water supply

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Surface Water Consumption. 	<ul style="list-style-type: none"> To ensure availability of water for various uses as and when required. To ensure that water usage is minimized. To conserve water resources at all times. To encourage a 3R (Reduce, Reuse, Recycle). 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> The Contractor must ensure that all water uses are authorised and proof of such must be presented to the ECO. Contractor must ensure absolute conservation of water throughout construction. If possible, grey water must be used for dust suppression. Contractor must supply potable water for human consumption at all times. 	<ul style="list-style-type: none"> Water consumption records. 	<ul style="list-style-type: none"> ECO; and Contractor. 	<ul style="list-style-type: none"> On-going during the construction phase.

8.2.5 Vehicular access and movement of construction vehicles

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance indicator	Monitoring Criteria/	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Damage to protected /endangered vegetation. Damage to sensitive areas. 	<ul style="list-style-type: none"> To prevent ecological damage. Minimise damage to the identified watercourses. Minimise erosion 	<ul style="list-style-type: none"> CARA; NEMBA; and NWA. 	<ul style="list-style-type: none"> Access to the site shall be designed/mapped by the Contractor and approved by the ECO. Access roads will be maintained by the Contractor. The Contractor will erect and maintain marker pegs along the boundaries of the working 	<ul style="list-style-type: none"> Access plan approved by the ECO. No access roads through wetlands. No visible 	<ul style="list-style-type: none"> Photographic record of private roads prior to the Contractor using the roads. Site plan 	<ul style="list-style-type: none"> ECO; and CEO. 	<ul style="list-style-type: none"> Continuous during the construction phase.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance indicator	Monitoring Criteria/	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Erosion and loss of topsoil. 	<p>of embankments and subsequent siltation of watercourses.</p>		<p>areas, access roads, haul roads, or paths before commencing any work.</p> <ul style="list-style-type: none"> Ensure that access roads to the site are of a suitable quality to eliminate soil erosion and channel stormwater. No illegal use of private roads is permissible. No roads shall cut through water courses as this may lead to erosion, causing siltation of streams unless otherwise authorised. Where new routes are required, the disturbed area must be kept minimal (A two-track dirt road will be the most preferred option). Upon completion of the project, all roads shall be repaired/rehabilitated to their original state. During construction, all vehicles must adhere to demarcated tracks or roads, and the speed limit must not exceed 30km/h. Where necessary, dust suppression must be implemented to reduce dust impacts on surrounding areas. As far as possible, existing roads 	<p>erosion scars once construction is completed</p> <ul style="list-style-type: none"> No evidence of erosion on slopes. Use of designated access roads. 	<ul style="list-style-type: none"> Regular monitoring of access roads condition. Monitoring of impacts into the surrounding areas. 		

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance indicator	Monitoring Criteria/	Responsible Agent	Monitoring Frequency
			<p>and farm tracks must be used as the service road for the conveyor and to provide access during construction as this will reduce the extent of the disturbed area along the route.</p> <ul style="list-style-type: none"> • No driving is allowed in the wetland areas except along the designated construction servitude. • Employees must be educated through training and the Environmental Awareness Plan to raise awareness of the need to prevent spillages by the implementation of good housekeeping practices. • All authorisations and permits must be obtained for the transportation of abnormal loads and hazardous materials on public roads. • Measures must be taken to ensure that all health and safety requirements regarding transportation activities are complied with. This may include dust covers for hauling vehicles and dust control on all gravel roads; • Flagmen and temporary warning 				

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance indicator	Monitoring Criteria/	Responsible Agent	Monitoring Frequency
			<p>signs must be placed at all access points where heavy vehicles will access public roads during construction,</p> <ul style="list-style-type: none"> • Controls should be in place to ensure that vehicles exiting the site are not overloaded. 				

8.2.6 Movement of construction personnel and equipment

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> • Impact on sensitive environs. • Trespassing • Safety and security. 	<ul style="list-style-type: none"> • To ensure controlled and managed movement of personnel and equipment. 	<ul style="list-style-type: none"> • NEMA. 	<ul style="list-style-type: none"> • The Contractor must ensure that all construction personnel, labourers, and equipment remain within the demarcated construction sites at all times. • Where construction personnel move outside the boundaries of the site, the Contractor/ labourers must obtain permission from the EO. • All equipment moved on-site or off-site is subject to the legal requirements as well as Exxaro specifications for the transport of such equipment. The Contractor shall meet these safety 	<ul style="list-style-type: none"> • No trespassing of Contractor's workforce. • No complaints from landowners. 	<ul style="list-style-type: none"> • Inspection Report. • Security registers. • Complaints register. 	<ul style="list-style-type: none"> • ECO; and • Contractor. 	<ul style="list-style-type: none"> • Continuous throughout the construction phase.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>requirements under all circumstances.</p> <ul style="list-style-type: none"> All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be adhered to. The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken in the event of an accident and shall provide a Method statement to that effect. The Contractor shall ensure that no machinery, personnel, material, or equipment enters 'No-Go' areas. 				

8.2.7 Protection of flora and fauna

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria/	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Impacts on vegetation and listed or 	<ul style="list-style-type: none"> To conserve vegetation and listed or protected species. 	<ul style="list-style-type: none"> NEMBA. 	<p>Sensitive environment will be affected by the proposed construction activities. The following must be adhered to:</p> <ul style="list-style-type: none"> There should be a preconstruction 	<ul style="list-style-type: none"> No alien species infestation. No 	<ul style="list-style-type: none"> Inspection Report Complaints register. 	<ul style="list-style-type: none"> ECO; and CEO. 	<ul style="list-style-type: none"> Continuous during the construction phase.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria/	Responsible Agent	Monitoring Frequency
<p>protected species</p> <ul style="list-style-type: none"> • Direct faunal impacts 	<ul style="list-style-type: none"> • To ensure the control of alien invasive species and to ensure that rehabilitation is as close as possible to the original state. 		<p>walk-through of the affected sites to identify species of conservation concern (SCC) or species special concern (SSC) that must be avoided or rescued.</p> <ul style="list-style-type: none"> • Ensure that lay-down and other temporary infrastructure is within low sensitivity areas, preferably previously transformed areas if possible. • Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development. • Preconstruction environmental induction for all construction staff on-site to ensure that basic environmental principles are adhered to. This includes topics such as waste management, handling of pollution and chemical spills, fire hazards, wildlife interactions, etc. • Demarcate all areas to be cleared with construction tape or other appropriate and effective means. Caution must be 	<p>disturbance of protected flora and fauna.</p> <ul style="list-style-type: none"> • Minimal disturbance of vegetation including crops. 			

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria/	Responsible Agent	Monitoring Frequency
			<p>exercised to avoid using material that might harm fauna.</p> <ul style="list-style-type: none"> • All vehicles must stay within the demarcated tracks or roads. • All construction staff must undergo environmental induction before construction commences in order to raise awareness and reduce potential faunal impacts. • To avoid impacts on amphibians, all spills of hazardous material should be cleared according to the nature and identity of the spill and all contaminated soil removed from the site. • Avoid sensitive faunal habitats such as drainage lines and wetlands. • Weed eradication and control will be actively managed during the construction, operational, and decommissioning phases of the mine. • The mine will establish and implement a regular weed control programme to eradicate existing invader plants and to prevent new invasions during ongoing mining operation and 				

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria/	Responsible Agent	Monitoring Frequency
			<p>decommissioning.</p> <ul style="list-style-type: none"> Should protected and/or red data species be present on-site, these must be relocated in consultation with the relevant authorities, such as the MTPA and MDEDET. <p>All areas disturbed during construction must be monitored regularly to ensure the re-establishment of natural vegetation and to monitor signs of erosion (these should be restored as soon as possible).</p> <p>8.2.7.1 Avoid or minimise loss of sensitive habitats:</p> <ul style="list-style-type: none"> Avoid any disturbance to the No-Go habitats, i.e. the rocky ledges south of the current mining plant. Minimise the physical destruction of any remaining primary vegetation, especially in or near wetland areas. In general, minimise clearing and operations in habitats with a High. Sensitivity rating and clearly delineate and maintain a no-go buffer of at least 100 m around such habitats. 				

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria/	Responsible Agent	Monitoring Frequency
			<ul style="list-style-type: none"> • Use existing gravel roads and already disturbed areas to access mining operations as far as possible to avoid the creation of new roads or access routes across natural areas. • Avoid any direct impacts of mining operations on any surrounding or adjacent areas with sensitive habitats or any adjacent or nearby riparian habitats (except the clearing of alien invasive species). • Avoid blocking and/or destruction of any seasonal streams, channelled or un-channelled valley bottom wetlands or hillslope seepage areas. • Minimise channel crossings for any kind of road, if this is unavoidable, ensure channels are crossed by elevating the road surface and allowing free flow of water by the installation of culverts;. • Culverts must span the entire width of the channel, and may under no circumstance concentrate water, i.e. round pipe-culverts are not permissible; 				

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria/	Responsible Agent	Monitoring Frequency
			<ul style="list-style-type: none"> The channel area immediately downstream of the culverts must be protected from accelerated erosion by the installation of appropriate Reno mattresses. 				

8.2.8 Heritage / Archaeological sites

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Destruction of sites of archaeological and heritage significance. Loss of historic cultural landscape. Loss of heritage value due to change in land use. 	<ul style="list-style-type: none"> To preserve any heritage, cultural or archaeological sites that might be encountered during the construction phase. Protection of known sites against destruction, 	<ul style="list-style-type: none"> NHRA 	<p>Areas of heritage significance within the mining area has been assessed in terms of the National Heritage Resources Act, 1999 (No 25 of 1999); none were identified within the proposed development extent. There is however, a grave yard located to the south of the conveyor which must be monitored and maintained. The following conditions must be adhered to:</p> <ul style="list-style-type: none"> Should any archaeological materials (e.g. fossils, bones, artefacts etc.) or human burials be exposed during construction, affected families must be 	<ul style="list-style-type: none"> Detailed record of chance finds. No destruction of or damage to archaeological sites. Management of existing sites and new discoveries in 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> ECO; CEO; and Archaeologist. 	<ul style="list-style-type: none"> On-going during all excavations.

	<p>vandalism and theft.</p> <ul style="list-style-type: none"> • Preservation and appropriate management of any new archaeological sites should this be discovered during construction. 		<p>consulted, relevant rescue relocation permits must be obtained from SAHRA/MHRA before any grave relocation can take place. Furthermore, a professional archaeologist must be retained to oversee the relocation process in accordance with the National Heritage Resources Act, 1999 (25) of 1999.</p> <ul style="list-style-type: none"> • Where burial sites are accidentally disturbed during construction, the affected area must be demarcated as no go areas. • No person may, without a permit, destroy damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite. 	<p>accordance with the recommendations of the Archaeologist</p> <ul style="list-style-type: none"> • No litigation due to destruction of sites. 			
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8.2.9 Servicing and re-fuelling of construction equipment

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria/ Performance Indicator	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> • Impact on soil and water resource 	<ul style="list-style-type: none"> • To preserve soils, surface and ground water. • To prevent spillages of 	<ul style="list-style-type: none"> • NEMWA; • NWA; and • OHSA. 	<p>During the construction phase, the maintenance of construction materials and equipment may lead to environmental degradation and pollution. Therefore, the following mitigation measure must be adhered to:</p>	<ul style="list-style-type: none"> • No evidence of hazardous substances polluting the 	<ul style="list-style-type: none"> • On-going monitoring with regular inspections; and Service 	<ul style="list-style-type: none"> • ECO; and • CEO. 	<ul style="list-style-type: none"> • On-going during the construction phase.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria/ Performance Indicator	Responsible Agent	Monitoring Frequency
<p>s due to accident al spillages.</p>	<p>hazardous substances.</p>		<ul style="list-style-type: none"> • All maintenance and repair work must be carried out within an area designated for this purpose and equipped with necessary pollution containment measures. • Refuelling, greasing or oiling of vehicles and construction machinery must be done on a drip tray or bunded surface. • Effective drip trays must be placed under stationary construction vehicles and machinery at all times. • Construction vehicles are to be maintained in an acceptable state of repair. No vehicles or equipment with leaks or causing spills will be permitted on site. • Fuel required during construction must be stored at a central depot that must be located on a slab and be contained within a bund capable of containing at least 110% of the total volume in the containers. • Temporary fuel storage tanks and transfer areas also need to be located 	<p>site.</p>	<p>Records.</p>		

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria/ Performance Indicator	Responsible Agent	Monitoring Frequency
			on an adequately bunded surface to contain accidental spillages.				

8.2.10 Waste management

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> • Visual Impact • Water resources contaminati on • Land pollution 	<ul style="list-style-type: none"> • To ensure the efficient management of waste on site. • To ensure minimal waste impacts on the surrounding environment. • Minimise waste material being strewn in the environment. 	<ul style="list-style-type: none"> • NEMWA; and • NWA. 	<ul style="list-style-type: none"> • The mine’s waste management strategy must be adopted and implemented during the construction phase. • The contractor must prepare a Waste Management Method Statement for approval by the ECO. • Waste management will form part of the induction process to ensure that all workers on site have a full understanding of all practices involved with proper waste management. <p>Solid Waste Management:</p> <ul style="list-style-type: none"> • Waste must be separated at source (e.g., general, scrap metals and hazardous waste). 	<ul style="list-style-type: none"> • Presence of proper storage facilities that are properly labelled. • Post-construction work areas are clear of all waste materials. 	<ul style="list-style-type: none"> • Inspection Report • Waste Disposal Records • Water monitoring report. 	<ul style="list-style-type: none"> • ECO; and • CEO. 	<ul style="list-style-type: none"> • Daily throughout construction

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<ul style="list-style-type: none"> • An adequate number of scavenger proof refuse bins must be provided at the construction site and must be clearly labelled (general/ hazardous, etc.) according to waste streams. • All waste must be transported in an appropriate manner and disposed of at a licensed waste disposal facility. Proof of safe disposal must be kept on site. • The Contactor may not dispose of any waste and/or construction debris by burning or burying. • Waste bins must be emptied on call based on inspection such that they do not overflow. • The Contractor shall maintain 'good housekeeping' practices and ensure that all work sites and the construction camp are kept tidy and litter-free. • The co-disposal facility must be designed with the mind on closure. The co-disposal facility should be shaped to blend in with the surrounding topography as far as possible. 				

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<ul style="list-style-type: none"> Groundwater monitoring boreholes must be placed strategically around all disposal sites. <p>8.2.10.1 Liquid Waste Management:</p> <ul style="list-style-type: none"> An adequate number of suitable waste containers with lids must be provided at the construction site. The Contractor will ensure that wastewater is discharged in the drums provided. All waste must be transported in an appropriate manner and disposed of at a licensed waste disposal site. All requirements of the NEMWA, supporting policies and guidelines must be adhered. 				

8.2.11 Surface and groundwater management

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Possible contamination of water 	<ul style="list-style-type: none"> To protect and conserve water resources. 	<ul style="list-style-type: none"> NWA. 	The following mitigation measures must be implemented in relation to water resources:	<ul style="list-style-type: none"> Unpolluted watercourses. 	<ul style="list-style-type: none"> Inspection Report; and Design 	<ul style="list-style-type: none"> CEO; and ECO. 	<ul style="list-style-type: none"> Continuous through the construction

<p>resources.</p>	<ul style="list-style-type: none"> • To avoid illegal diversion and destruction of water resources. • To ensure proper management of storm water run-off that causes erosion and siltation/sedimentation. • To ensure that the rivers and streams are protected and incur minimal negative impact from the development. • To ensure compliance with the requirements of the Act. 		<ul style="list-style-type: none"> • The layout plan must be revisited and optimised to take cognisance of the potentially directly affected HGM units and avoid them as far as possible by keeping the construction footprint as small as practically possible. • Lay-out designs must incorporate wetland sensitive designs e.g. appropriate watercourse crossings that do not concentrate flows or impact on subsurface interflow. A wetland specialist must be appointed to guide engineers for the detailed designs. • The Contractor must take reasonable precautions to prevent the pollution of ground and surface water resources as a result of construction activities. • No natural watercourse is to be used for cleaning of tools, bathing, or washing of clothes etc. • No spills may be hosed / disposed into the surrounding natural environment. • All soil contaminated must be excavated to the depth of contaminant penetration, placed in 		<p>Plans.</p>		<p>phase.</p>
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			<p>suitable drums/containers and removed to a hazardous waste facility.</p> <ul style="list-style-type: none"> • No extraction of water from any natural resources without the relevant authorisation. • Erosion control measure must be put in place to control storm water runoff. • Storm water management measures must be as per approved Storm Water Management Plan. • Erosion control measures on all access roads must be implemented. • Any physical damage to any aspect of a watercourse must be prohibited. • Avoid mining activities in the wetland areas as far as possible through proper planning, demarcation and appropriate environmental training. • During construction proper compaction of the demarcated site must be conducted, implementation of stormwater management plan and infrastructure is necessary. • Groundwater quality monitoring network must be set up early in the construction phase so that any groundwater quality issues can be addressed accordingly. 				
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8.2.12 Sensitive areas (water courses and buffers)

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Changing the quantity and fluctuation properties of watercourses Changing the amount of sediment entering water resource and associated change in turbidity Alteration of water quality toxic contaminants including toxic metal ions and hydrocarbons Changing the physical 	<ul style="list-style-type: none"> To preserve and conserve the sensitive environment. 	<ul style="list-style-type: none"> NWA 	<p>The following mitigation measures must be considered during different phases of the project:</p> <ul style="list-style-type: none"> No stockpiling of any materials may take place adjacent to any of the water resources. Erosion control measures must be implemented in areas sensitive to erosion, particularly in areas prone to erosion and where erosion has already occurred. These measures include but are not limited to the use of sand bags, hessian sheets, silt fences, retention or replacement of vegetation and geotextiles such as soil cells which must be used in the protection of slopes. Prevent surface water or storm water to be concentrated, or to flow down slopes without erosion protection measures being in place. All disturbed areas must be rehabilitated as soon as construction in an area is complete or near complete and not left until 	<ul style="list-style-type: none"> Undisturbed sensitive environments and/or properly rehabilitated. Compliance with the WUL conditions. 	<ul style="list-style-type: none"> Inspection Report; and WUL. 	<ul style="list-style-type: none"> ECO; and CEO. 	<ul style="list-style-type: none"> Throughout the construction and post construction to ensure proper rehabilitation

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>structure within a water resource.</p> <ul style="list-style-type: none"> Decrease in wetland extent Alteration to Hydropedological flow paths pat, leading to degradation of wetland and associated wetland recharge soils Removal of wetland recharge soils 			<p>the end of the project to be rehabilitated.</p> <ul style="list-style-type: none"> Make use of existing access roads as much as possible and plan additional access routes to avoid vegetation communities. Minimise the extent of the work footprint as far as possible. No construction camp or any depot for any substance which causes or is likely to cause pollution within a distance of 100m of the delineated water resources. Concrete mixing areas and access roads should not be constructed within 30 m of delineated watercourses, specifically delineated natural drainage lines. All waste generated during construction shall be disposed of at an appropriate facility and no washing of construction tools in or adjacent to the watercourses is permitted. No release of any substance i.e. cement, oil, that could be toxic to fauna or faunal habitats within the watercourses. Spillages of fuels, oils and other potentially 				

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately.</p> <ul style="list-style-type: none"> • A spill management plan must be developed for the construction phase. • No construction must take place within the riparian zone of the watercourse. • Vehicles must not be permitted to be cleaned or serviced in or near aquatic ecosystems. Vehicle servicing must take place offsite. • Demarcate the watercourses and buffer zones to limit disturbance and clearly mark these areas as no-go areas. • Recommendations from the DHSWS as part of the licensing process must be taken into consideration throughout the construction phase. • All clearing activities will be limited to the construction servitude (as narrow as 				

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>possible). Prior to the commencement of construction activities that all wetland areas be fenced, where needed, so as to prevent injudicious driving within the wetland areas and unnecessary disturbance to the wetland vegetation.</p> <ul style="list-style-type: none"> • No construction waste (such as cleared vegetation) may be disposed in the wetland areas on site. • No burning of the wetland vegetation should be allowed and no dumping, littering or materials stockpiling should be allowed within the wetland areas. • Commence with the SASS5 monitoring at suggested points in the monitoring programme. • A dirty water trench must be installed downgradient of the discard facility to capture seepage which might potentially pollute the wetlands. • Stockpile all wetlands soils to be impacted separately according to various soil horizons and not higher than 2,5m. • Where the above is not possible, it is recommended that a compensation mechanism or wetland offset approach be 				

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			considered as there are many rehabilitation opportunities within the vicinity of the study area which can increase wetland functionality and support to the Olifants River downstream.				

8.2.13 Hazardous materials

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Impact on soils and water resources. 	<ul style="list-style-type: none"> To ensure safe and proper handling of hazardous material. 	<ul style="list-style-type: none"> HSA; and OHSA. 	<ul style="list-style-type: none"> The Contractor must comply with all National, Regional and Local legislations with regard to the storage, transport, use and disposal of petroleum, chemical, harmful and hazardous substances and materials. Equipped spill kits must be made available on site at all times. The Contractor EO will furthermore be responsible for the training and education of all personnel on site who will be handling the material about its proper use, handling and disposal. Storage of all hazardous material must be safe, tamper proof and under strict access 	<ul style="list-style-type: none"> No spillages and leakages. 	<ul style="list-style-type: none"> Hazardous material data sheet Incident reports. 	<ul style="list-style-type: none"> ECO; and CEO. 	<ul style="list-style-type: none"> Continuous throughout the construction phase.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>control.</p> <ul style="list-style-type: none"> • Exercise extreme care with the handling of diesel and other toxic solvents to ensure that spillage is avoided. • Any accidental chemical / fuel spills must be remediated immediately. • The management of chemicals and hydrocarbons should form part of the emergency preparedness and response programme. No activities associated with hydrocarbons and or chemicals (i.e. wash bays etc.) may be undertaken outside of an effectively designed contained area. • Regular safety checks and maintenance of the storage tanks should be undertaken by suitably qualified safety officers. • In addition, the storage tanks and any other areas where spillages and leakages could occur should be contained within a bunded area. • Any rainfall and stormwater collected within the bunded area should remain separate from other stormwater and will need to be treated to an acceptable level prior to release. • It is also recommended that the 				

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>Environmental Best Practice Specifications published by the DWAF (Integrated Environmental Management Series, Environmental Best Practice Specifications: Operations, Edition 3, DWAF 2005) be adopted for this development.</p> <ul style="list-style-type: none"> • A special works program must be implemented for the conveyor route, and this must ensure that a wetland specialist is part of the design and construction team (to minimise impacts on wetland habitat) and that the wetland monitoring program makes provision for increased monitoring intensity for the conveyor route specifically. • An emergency response plan must be implemented to clean and remediate any coal spillages as soon as they happen in order to prevent carbonaceous and harmful derivative materials from being washed into watercourses through either surface or Hydropedological pathways. Particular care must be taken within the design to ensure that watercourse (wetlands) crossings are the least 				

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>vulnerable areas for spillages and that emergency response plans rank and regard wetland areas as priority sections. Construction vehicles are to be maintained in good working order so as to reduce the probability of leakage of fuels and lubricants;</p> <ul style="list-style-type: none"> • Emergency plans and infrastructure to deal with spillages (especially hydro-carbon spillages) must be in place, this should include mobile response units to deal with spillages in the field; • A walled concrete platform, dedicated store with adequate flooring or bermed area must be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas; • Storage of potentially hazardous materials should be above any 100-year flood line, or as agreed with the Environmental Control Officer. These materials include fuel, oil, cement, bitumen etc. • Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which 				

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>will separate these chemicals and oils;</p> <ul style="list-style-type: none"> • All construction materials liable to spillage are to be stored in appropriate structures with impermeable flooring. • Portable septic toilets are to be provided and maintained for construction crews. Maintenance must include their removal without sewage spillage. • Under no circumstances may ablutions occur outside of the provided facilities. • No uncontrolled discharges from the construction crew camps to any surface water resources shall be permitted. Any discharge points need to be approved by the relevant authority. • In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water Affairs must be informed immediately; • Store all litter carefully so it cannot be washed or blown into any of the water courses within the study area. • Provide bins for construction workers and staff at appropriate locations, particularly where food is consumed. • The construction site should be cleaned 				

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			daily and litter removed.				

8.2.14 Oil Spill Management

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Soil structure contamination due to waste contamination and spillages being created during the construction activities Spillages of hydrocarbons or any other chemical 	<ul style="list-style-type: none"> To avoid ground and surface water contamination To ensure proper and safe handling of oil spillages. 	<ul style="list-style-type: none"> HSA. 	<ul style="list-style-type: none"> Waste management will form a detailed component as part of the induction process provided by the mine. There will be an incident management system including procedures and training for dealing with incidents. No activities associated with hydrocarbons and or chemicals (i.e. wash bays etc.) may be undertaken outside of an effectively designed contained area. All spills must be reported to the ECO within 24 hours of occurrence. Major spillage incidents will be reported to the DMRE, DHSWS, and MDEDET. Appropriate remedial measures will be implemented in consultation with these regulatory authorities. The Contractor must be in possession of a 	<ul style="list-style-type: none"> No incident reported Proper use of drip trays Presence of oil spill kit. 	<ul style="list-style-type: none"> Inspection Report. Incident report. 	<ul style="list-style-type: none"> ECO; and CEO. 	<ul style="list-style-type: none"> On-going during the construction phase.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
could lead to surface water pollution.			<p>mobile oil spill kit at all times.</p> <ul style="list-style-type: none"> The oil spill procedure and emergency preparedness plan must be implemented. If spills do occur and soils become contaminated, the appropriate remedial measures will be identified in consultation with an appropriate qualified specialist. Appropriate waste bins to be in place for disposal of spilled material. During induction and ongoing training all employees must be trained in how to rehabilitate contaminated spill areas. 				

8.2.15 Storm Water Management

Possible Impact	Objective	Applicable Legislation / Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Negative impact on water resources 	<ul style="list-style-type: none"> To reduce the potential impact from runoff 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> Design all structures to ensure clean and dirt water separation as stipulated in Regulation 704 of the National Water Act. Implement a management and maintenance programme for clean and dirty water systems to stay fully 	<ul style="list-style-type: none"> No evidence of erosion. No evidence 	<ul style="list-style-type: none"> Site Plan; and Inspection Report. 	<ul style="list-style-type: none"> ECO; and CEO 	<ul style="list-style-type: none"> Continuous during the construction.

Possible Impact	Objective	Applicable Legislation / Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
	sensitive areas.		<p>operational.</p> <ul style="list-style-type: none"> The Contractor must ensure that polluted rainwater does not run-off into natural areas. Storm water shall be diverted from the construction works. Implement an ecologically-sensitive stormwater management plan that includes not allowing stormwater to be discharged directly into the identified watercourse and drainage lines and seepage wetland areas. Increased runoff due to vegetation clearance and/or soil compaction must be managed and steps must be taken to ensure that storm water does not lead to excessive levels of silt entering the watercourses. The re-release of clean water from clean and dirty water separation infrastructure must be diffused and not reach wetland habitat as concentrated flows where it will have serious negative impacts on especially the valley bottom wetlands. The stormwater plan must include 	<p>of increased siltation.</p> <ul style="list-style-type: none"> No evidence of contaminated water courses. 			

Possible Impact	Objective	Applicable Legislation / Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>adequate attenuation facilities to ensure that peak flows do not cause negative impacts on wetlands. More specifically as a guideline, stormwater release structures must be designed to be released diffusely, mimicking seepage wetlands. All designs should be approved by an appropriately qualified wetland specialist.</p> <ul style="list-style-type: none"> • The design of drainage systems must ensure there is no contamination, eutrophication or increased erosion of the wetland areas. Drainage systems should be maintained regularly in order to minimise the runoff of harmful chemical substances into the wetland areas. • An adequate storm water management plan must be carefully designed and implemented in order to avoid erosion of topsoil on adjacent arable soils throughout all the mining phases. In this regard, special mention is made of: <ul style="list-style-type: none"> ○ Sheet runoff from cleared areas, paved surfaces and access roads needs to be curtailed. ○ Runoff from paved surfaces should be 				

Possible Impact	Objective	Applicable Legislation / Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>slowed down by the strategic placement of berms; and</p> <ul style="list-style-type: none"> ○ All overburden stockpiles and waste stockpiles must have berms and/catchment paddocks at their toe to contain runoff of the facilities. • Ensure that storm water leaving the construction site is not contaminated by any substance, whether solid, liquid or gas. • Clean and dirty water system must be implemented early in the construction phase, especially down-gradient of construction areas. • Linear infrastructure must follow as far as practically possible, the natural contours of the area. • Dirty water arising from any dirty area, including water seeping from the stockpiles or any activity, will be collected in the containment dams. • If possible, commencement of construction activities can be scheduled to coincide with low rainfall conditions when the erosive runoffs and wind are anticipated to be low. • Direct surface disturbance of the identified 				

Possible Impact	Objective	Applicable Legislation / Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>high clay content/wetland (i.e. Katspruit, Rensburg, etc.) soils should be limited within demarcated areas where possible to minimise the intensity of compaction due to the susceptibility of these soils to prolonged waterlogging conditions (inundation).</p> <ul style="list-style-type: none"> • Compacted soils adjacent to the mining project foot- prints and associated infrastructure footprint can be lightly ripped to at least 25 cm below ground surface to alleviate compaction prior to re-vegetation. 				

8.2.16 Fire

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> • Destruction of property • Loss of life. • Destruction 	<ul style="list-style-type: none"> • To prevent open fires. • To ensure that the workforce is aware of 	<ul style="list-style-type: none"> • NEMA; and • Occupation Health Safety 	<ul style="list-style-type: none"> • A fire management Method Statement must be put in place by the Contractor. The Method Statement must be accepted by the ECO and DCM. • Fuels or chemicals must be stored at the designated storage area. 	<ul style="list-style-type: none"> • No reported fire incident. • No traces of 	<ul style="list-style-type: none"> • Fire Management Plan. • Daily Checks. 	<ul style="list-style-type: none"> • ECO; and • CEO. 	<ul style="list-style-type: none"> • On-going during the construction phase.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
on of crops and livestock.	emergency procedures in the event of an incident.	Act.	<ul style="list-style-type: none"> Gas and liquid fuels must not be stored in the same storage area. Serviced fire-fighting equipment shall be made available and accessible at all times and routinely inspected. No open fires for heating or cooking will be permitted on site, unless approved by the ECO and DCM and only at designated areas. Designated smoking areas must be provided, with special bins for discarding of cigarette stumps. Fire incidence must be reported to the ECO immediately. Firebreaks to be put in place. 	cigarettes butts outside the designated smoking area.			

8.2.17 Air Pollution

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
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Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Dust nuisance from excavations, Site clearing, removal of topsoil and vegetation ; Exhaust fumes from construction vehicles. 	<ul style="list-style-type: none"> To ensure proper mitigation of air pollution. To avoid dust nuisance from excavation activities and vehicles on dirt roads. 	<ul style="list-style-type: none"> NEM: AQ; NEM:AQA: National Dust Control Regulations; and Ambient Air Quality Guidelines and Standards. 	<p>The following activities during the construction phase were identified as possible fugitive emission sources and may impact on the ambient air quality at the relevant environmental sensitive receivers:</p> <ul style="list-style-type: none"> Site clearing, removal of topsoil and vegetation; Construction of surface infrastructure e.g. access roads, pipes, storm water diversion berms, change houses, admin blocks, drilling blasting etc. General transportation and vehicle movement on site). <p>Therefore, the following mitigation measures and recommendations must be put in place:</p> <p>8.2.17.1 Site clearing, removal of topsoil and vegetation.</p> <ul style="list-style-type: none"> Topsoil must not be removed during high wind conditions due to associated wind erosion heightening dust levels in the atmosphere. Topsoil and subsoil must be stockpiled 	<ul style="list-style-type: none"> No complaints from surrounding land-owners recorded. No evidence of dust pollution plumes on site. 	<ul style="list-style-type: none"> Inspection Report; and Complaints register. 	<ul style="list-style-type: none"> ECO; and CEO 	<ul style="list-style-type: none"> On-going throughout the construction phase.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>separately in low heaps.</p> <ul style="list-style-type: none"> • Area of disturbance must be kept to a minimum and no unnecessary clearing of vegetation to occur. • Topsoil must be re-vegetated to reduce exposure areas. • Stockpile any topsoil or any overburden material at least 40m outside of the outer boundary of wetlands. • During the loading of topsoil onto trucks or stockpiles, the dropping heights should be minimised. • Water or binding agents such as (petroleum emulsions, polymers and adhesives) can be used for dust suppression on earth roads. • When using bulldozers and graders, minimise travel speed and distance and volume of traffic on the roads. • Stockpiles must not be left for prolonged periods as wind energy generates erosion and causes more dust. • Emissions generated by wind are dependent on the frequency of disturbance of erodible surfaces. As 				

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>such, covering the stockpiles with vegetation would reduce the negative erosion effect.</p> <ul style="list-style-type: none"> Any crusting of the surface binds the erodible material. All stockpiles to be damped down, especially during dry weather or re-vegetated (hydro seeding is a good option for slope revegetation). <p>8.2.17.2 Construction of surface infrastructure (e.g. access roads, pipes, storm water diversion berms, change houses, admin blocks, drilling blasting etc.).</p> <ul style="list-style-type: none"> Dust emitted during bulldozing activity can be reduced by increasing soil dampness by watering the material being removed thus increasing the moisture content. Timing of the blasting with wind to ensure the dust will not be blown to the sensitive receptors or especially the community. Blasting must not take place when poor 				

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>atmospheric dispersion is expected i.e. early morning and late evening.</p> <ul style="list-style-type: none"> • Material need to be removed to dedicated stockpiles to be used during rehabilitation. • This hauling of materials should take place on roads which is being watered and/or sprayed with dust suppressant. • To reduce the amount of dust being blown from the load bin in the haul roads, the material being transported can be watered or the back of the vehicles can be covered with plastic tarpaulin covers. • Constricting the areas and time of exposure of pre-strip clearing in advance of construction to limit exposed soil surfaces. <p>8.2.17.3 General transportation, hauling and vehicle movement on site.</p> <ul style="list-style-type: none"> • Hauling of materials and transportation of people must take place on roads which is being watered and/or sprayed with dust suppressant. 				

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<ul style="list-style-type: none"> • In order to mitigate the impacts of the activity, the speed limit must be kept to the low as more dust will be generated at higher wind speeds. • Speed limits need to be observed and adhered to. • Management should fit roads with speed humps to ensure adherence. • Application of wetting agents or application of dust suppressant to bind soil surfaces to avoid soil erosion. • The drop heights must be minimised when depositing materials to the ground. • Encourage car-pool and bulk delivery of materials in order to reduce the number of trips generated daily. • An operational water truck should be effective for the suppression of dust on unpaved access roads. Control techniques for fugitive dust sources generally involve watering, chemical stabilization and the reduction of surface wind speed though the use of windbreaks and source enclosures. • Further, the access roads on-site were 				

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>identified as the second most significant source of dust emissions. Therefore, three types of measures must be taken to reduce emissions from unpaved roads as follows:</p> <ul style="list-style-type: none"> ○ Measures aimed at reducing the extent of unpaved roads, e.g. paving, ○ Traffic control measures aimed at reducing the entrainment of material by restricting traffic volumes and reducing vehicle speeds, and ○ Measures aimed at binding the surface material or enhancing moisture retention, such as wet suppression and chemical stabilization. 				

8.2.18 Noise impact

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
Construction phase of the	<ul style="list-style-type: none"> • To ensure minimal 	<ul style="list-style-type: none"> • Noise Control 	The noise level at the residential areas during the construction phase of the extension of the	<ul style="list-style-type: none"> • No complaints 	<ul style="list-style-type: none"> • Noise monitoring. 	<ul style="list-style-type: none"> • CEO; and • ECO. 	<ul style="list-style-type: none"> • Quarterly basis

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>discard dump, conveyor belt and its services will generate noise from the following activities:</p> <ul style="list-style-type: none"> • Site clearing and grubbing of footprint • Earthmoving activities • Excavation /drilling of foundations and associated activities. 	<p>noise disturbance</p> <ul style="list-style-type: none"> • To ensure proper mitigation measures of noise. • To avoid noise nuisance from operating construction equipment. 	<p>Regulations (ECA); and</p> <ul style="list-style-type: none"> • SANS 10103 of 2008. 	<p>discard dump and development of the conveyor belt, as well as associated service road will be detrimental to residents and fauna around the area. Therefore, the following mitigation measures must be adhered to:</p> <ul style="list-style-type: none"> • Implementation of the noise mitigatory measures and the Noise Management Plan. • Machinery with low noise levels which complies with the manufacturer's specifications must be used. • Construction activities must take place during daytime period only. • Implement noise monitoring on a quarterly basis to ensure that construction noise is within acceptable standards • Noise associated with the construction activities can be mitigated by limiting the construction operation to business hours. • Where noise becomes a nuisance, management measures will be investigated and implemented to 	<p>from surrounding landowners recorded.</p>	<ul style="list-style-type: none"> • A register of complaints 		<p>during the construction phase.</p>

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>address these.</p> <ul style="list-style-type: none"> Offending machinery and vehicles shall be banned from use on site until they have been repaired. Use equipment with lower sound power levels. Install silencers for fans. Use mufflers on engine exhausts and compressor components. Use vibration isolation for mechanical equipment. Any complaints pertaining to noise must be recorded and reported to the ECO and addressed accordingly. Labourers must be provided with hearing protection as and when required. 				

8.2.19 Visual impact

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Loss of sense of place. The presence of 	<ul style="list-style-type: none"> To ensure proper mitigation measures of potential visual 	<ul style="list-style-type: none"> NEMA. 	<p>The proposed activities such as discard dump extension and conveyor belt as well as its associated service road will have impacts on visual of the surrounding residents, tourists and motorists. Therefore, the following mitigation measures and recommendations</p>	<ul style="list-style-type: none"> Clean and tidy site. No complaints from the landowners 	<ul style="list-style-type: none"> Inspection Report; and Complaints register. 	<ul style="list-style-type: none"> ECO; Contractor; and Exxaro. 	<ul style="list-style-type: none"> On-going during the construction phase.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>conveyor belt and discard dump sites intrudes on existing views and spoils the views of the landscape</p> <ul style="list-style-type: none"> Visual impact of new infrastructure and influence on surrounding land owners. 	<p>impacts.</p> <ul style="list-style-type: none"> To maintain the site's aesthetics. 		<p>must be implemented:</p> <ul style="list-style-type: none"> It is also recommended that trees be planted in areas where the proposed discard dump is most visible, to reduce the visual impact of viewers. It is recommended that a permeable steel structure be used for the pylons of the conveyor to create the lowest degree of visual obstruction; Rehabilitate disturbed areas around pylons as soon as practically possible after construction. This must be done to restrict extended periods of exposed soil. Plant fast-growing endemic trees along the service road and conveyor system because the trees will with time create a screen and increase the biodiversity of the area. If practically possible, locate construction camps in areas the already disturbed are or where it isn't necessary to remove established vegetation like for example naturally bare areas; Utilize existing screening features such 	<p>and affected parties.</p>			

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors;</p> <ul style="list-style-type: none"> • Keep the construction sites and camps neat, clean and organized in order to portray a tidy appearance; and • Screen the construction camp and lay-down yards by enclosing the entire area with a dark green or black shade cloth of no less than 2m height. • All temporary structures erected on site for the purposes of the project's construction phase will be removed from site upon completion of the project. • Lighting will be sufficient to ensure security but will not constitute 'light pollution' to the surrounding areas. • The site must be clean and tidy at all times. 				

8.2.20 Traffic impact

Possible	Objective	Applicable	Mitigation / Management Action	Performance	Monitoring	Responsible	Monitoring
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Impact		Legislation/Policy		Index	Criteria	Agent	Frequency
<ul style="list-style-type: none"> Possible traffic increase. Car accident. Irregular traffic impact during construction. Impact on road safety, congestion, wear and tear of the road surface. 	<ul style="list-style-type: none"> To maximise road safety and minimise congestion. To ensure that traffic impacts as a result of the construction related activities are minimized. 	<ul style="list-style-type: none"> NLTA. 	<ul style="list-style-type: none"> Effective traffic control must take place throughout the construction phase. Access roads will be maintained by the Contractor and will ensure that access roads to the site are of a suitable quality to eliminate soil erosion and channel storm water. Where possible strategic positioning of entry and exit points must be established to ensure as little impact/ effect as possible on the traffic flow. Monitor adherence to traffic regulations. Monitor drivers for use of alcohol and other substances that could impair judgment and driving. Ensure that loads on trucks are properly secured during transport. Schedule arrival and departure of heavy vehicles to avoid morning and afternoon peak hours. 	<ul style="list-style-type: none"> No increase in number of accidents; No complaints from the landowners and affected parties. 	<ul style="list-style-type: none"> Inspection Report; and Complaints report. 	<ul style="list-style-type: none"> CEO; and ECO. 	<ul style="list-style-type: none"> On-going during the construction phase.

8.2.21 Excavation and Groundworks

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
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<ul style="list-style-type: none"> • Possible erosion • Injury to humans and animals 	<ul style="list-style-type: none"> • To prevent erosion. • To ensure safety for both human and animals. 	<ul style="list-style-type: none"> • OHSA; and • NEMA. 	<p>While working at areas prone to erosion, the following must be adhered to:</p> <ul style="list-style-type: none"> • Excavations must not be left open for longer than 14 days without soil protection measures. • Excavations must be barricaded/ fenced off at all times. 	<ul style="list-style-type: none"> • No evidence of erosion • No incidence of animals trapped in trenches reported. 	<ul style="list-style-type: none"> • Inspection Report; and • Incident report. 	<ul style="list-style-type: none"> • CEO; and • ECO. 	<ul style="list-style-type: none"> • On-going excavations.
<ul style="list-style-type: none"> • Excavation activities as part of site preparation for the discard dump will result in removal of wetland recharge soils • Compaction of soil, leading to increased runoff rate. • The discard dump 	<ul style="list-style-type: none"> • To reduce the impact of the discard dump in vegetation and soils. • To prevent seepage into the ground. 	<ul style="list-style-type: none"> • MPRDA; • NEMA; and • NWA. 	<ul style="list-style-type: none"> • The construction and lining of the discard dump must be as per the DHSWS requirements to limit mobility of contaminants into the wetlands and groundwater regime. • Divert clean water away from the discard dump and other areas prone to hydrocarbon contamination or other spills • Ensure that no acid seepage percolates beyond the boundaries of the discard dumps by implementing and monitoring the effectiveness of adequate cut-off trenches and, if necessary, other sealant measures. • Preventing, monitoring and mitigating emissions from unforeseen spontaneous combustion of materials on discard dumps. • Design and create berms to stop runoff from the discard dumps during/after a periodic extreme rainfall event to enter directly into existing washes. 	<ul style="list-style-type: none"> • No seepage; • No groundwater contamination ; and • No over spilling. 	<ul style="list-style-type: none"> • Water monitoring report; • Inspection Report; and • Incident report. 	<ul style="list-style-type: none"> • Project Engineer; and • EM. 	<ul style="list-style-type: none"> • Quarterly.

<p>expansion may lead to a decrease in groundwater quality through the infiltration and seepage of contaminated water resources.</p>			<ul style="list-style-type: none"> A dirty water trench that complies with GN704 requirements must be installed downgradient of the discard facility to capture seepage which might potentially pollute the wetlands. 				
<ul style="list-style-type: none"> Loss of soil resource due to the use of soils as borrows material for construction purposes. 	<p>To reduce loss of soils due to borrow pits.</p>	<ul style="list-style-type: none"> MPRDA; and NEMA. 	<ul style="list-style-type: none"> The establishment within these areas will have minimal effect on the soil resources. Borrow pit should be constructed as far as possible outside of delineated wetland and hillslope seepage areas. 	<ul style="list-style-type: none"> No loss of valuable soils. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> PM; and EM. 	<ul style="list-style-type: none"> Construction and ongoing.

8.2.22 Soil and Agricultural Potential

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Potential loss of agricultural soil Disturbance of agricultural soil during construction Negative Impacts on agricultural activities 	<ul style="list-style-type: none"> To avoid loss of agricultural soil To reduce / prevent the disturbance of agricultural soil To limit the impact on agricultural activities To avoid undue loss of livestock and crops. 	<ul style="list-style-type: none"> CARA. 	<p>During the construction, the removal or disturbance of vegetation cover will affect the soil and agricultural potential. The following mitigation measures must be implemented:</p> <ul style="list-style-type: none"> Access roads must avoid steep slopes wherever possible. Where steep slopes are used, road stabilization measures (culverts, run-off trenches, banking of bends etc.) must be implemented. Where possible, restrict areas cleared of vegetation to road surfaces and infrastructure footprints only. Special care should be given to areas with steeper topography and areas adjacent to water courses. Consult farmers prior to any clearing activities. Avoid unnecessary destruction of crops by remaining within the working area at all times. 	<ul style="list-style-type: none"> No encroachment into agricultural crops. 	<ul style="list-style-type: none"> Inspection Report; and Complaints register. 	<ul style="list-style-type: none"> ECO; EO; and Contractor. 	<ul style="list-style-type: none"> During construction.

8.2.23 Erosion and Control

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Erosion and siltation in drainage areas. Increase the vulnerability of the disturbed areas to erosion Impact on soils and habitats and sensitive environs. Compaction of soil, leading to increase 	<ul style="list-style-type: none"> To prevent erosion and sedimentation. 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> Disturbance within or near the drainage areas must be kept to a minimum. Any roads along slopes must have water diversion structures placed at regular intervals to ensure that they do not capture overland flow and become eroded. Any erosion problems observed along the conveyor servitude should be rectified as soon as possible using the appropriate re-vegetation and erosion control works. The Contractor shall protect areas susceptible to erosion by installing necessary temporary and / or permanent drainage and by taking suitable measures to prevent surface water concentration into nearby roadways. Stripped topsoil shall be stockpiled separately from subsoil and rocky material. Soil must be stripped in a phased manner so as to retain vegetation cover for as long as possible. 	<ul style="list-style-type: none"> No visible signs of erosion. 	<ul style="list-style-type: none"> Complaints register; and Inspection Report. 	<ul style="list-style-type: none"> CEO; and ECO. 	<ul style="list-style-type: none"> On-going particularly during excavations.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>d runoff rate.</p>			<ul style="list-style-type: none"> • Stockpiled topsoil must not be compacted and must be reused as the final soil layer. • Stockpiled soil must be protected by erosion-control berms if exposed for a period of greater than 14 days during the wet/windy season. • Topsoil stockpiles must not be contaminated with oil, diesel, petrol, waste, which may inhibit the later growth of vegetation and micro-organisms in the soil. • Soil must not be stockpiled on drainage lines or near watercourses. • The timing of clearing and grubbing must be co-ordinated as much as possible to avoid prolonged exposure of soils to wind and water erosion. • If topsoil will be stockpiled for a longer period, it must be either vegetated with indigenous grasses or covered with a suitable material to prevent erosion and invasion by weeds. • To limit the introduction of alien species into the area, no soil may be imported onto site. 				

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<ul style="list-style-type: none"> • Where required, cut-off trenches can be installed to divert substantial run-off and prevent erosion as and when necessary. • Where new roads are constructed, water diversion berms must be constructed to prevent erosion. • Sensitive areas such as watercourses (wetlands, drainage lines, non-perennial rivers and riparian areas) must be cordoned off to control vehicles and construction personnel access. • Erosion Control Measures must be implemented on stockpiles where higher than 1.5m. • Regular inspections of these stockpiles should be undertaken and any erosion damage should be repaired immediately. • Topsoil and subsoil stripping will be conducted up to a suitable depth for construction purposes, at least 400mm. Different soils must be stockpiled separately in designated areas. • The topsoil and overburden that is collected will be stockpiled in such a 				

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>way that dust and water erosion is limited. Stockpiles will be constructed in such a way to ensure stability and thereby preventing the possibility of wash down. Soils which are stripped could be used in the construction of berms or other storm water management measures.</p> <ul style="list-style-type: none"> • All areas not directly within the footprint of the proposed infrastructure where the soil has been compacted will need to be ripped to break up the compacted soil surface. This will aid infiltration and decrease run-off. • All ripped areas need to be re-vegetated with a suitable mix of plant species as determined by a qualified botanist. • All re-vegetated areas should be monitored to ensure successful re-establishment of natural vegetation and to prevent invasion by alien species. • Erosion must not be allowed to develop on a large scale before effecting repairs; • A wetland monitoring program should 				

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>be initiated before the start of the construction phase. The Environmental Control Officer should be briefed by a wetland specialist on specific monitoring issues. An inspection of clean and dirty water separation infrastructure and stormwater infrastructure needs to take place after each large rain event. Appropriate mitigation needs to be implemented after consultation with relevant specialist if any problems are detected.</p> <ul style="list-style-type: none"> • Make use of existing roads and tracks where feasible rather than creating new routes through vegetated areas. • Vegetation and soil must be retained in position for as long as and wherever possible, and only removed immediately ahead of construction / earthworks in that area (DWAF, 2005). Topographical profiling and revegetation must take place as soon as a section is completed; • Runoff from roads must be managed to avoid erosion and pollution problems. • All areas susceptible to erosion must be 				

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>protected (e.g. silt screens, sandbags, swales, hay bales etc.) and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and or work areas</p> <ul style="list-style-type: none"> • Areas exposed to erosion due to construction should be vegetated with appropriate species naturally occurring in the area. • Surface water or storm water must not be allowed to concentrate, or flow down cut or fill slopes without erosion protection measures being put in place. 				

8.2.24 Use of cement and concrete

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> • Soil, surface and ground water pollution. 	<ul style="list-style-type: none"> • To conserve soils, surface and groundwater. • To minimise waste concrete from 	<ul style="list-style-type: none"> • NEMA • NEMWA • HSA 	<ul style="list-style-type: none"> • Cement and concrete are regarded as highly hazardous to the natural environment due to their high pH and the chemicals contained therein. To avoid pollution the following must be implemented: • Pre-mix concrete shall be the preferred 	<ul style="list-style-type: none"> • Areas of construction are clear of all concrete residue/waste following construction 	<ul style="list-style-type: none"> • Inspection Report; and • Site Plan. 	<ul style="list-style-type: none"> • ECO; and • CEO. 	<ul style="list-style-type: none"> • Throughout the construction phase.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
	polluting the environment.		<p>option where possible.</p> <ul style="list-style-type: none"> If concrete mixing is undertaken on site, the batching / mixing area must be properly designated, indicated on the site plan and kept neat and tidy at all times. No batching / mixing activities will be done on a permeable surface or bare ground. Unused cement bags will be stored as hazardous waste and disposed of appropriately. The visible remains of the batch plant and concrete, either solid, or from washings shall be physically removed and disposed of appropriately at a licensed landfill site if not reused. 	.			

8.2.25 Social Impact

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Influx of jobseekers to the area 	<ul style="list-style-type: none"> Promote local employment. 	<ul style="list-style-type: none"> Basic Conditions of 	<ul style="list-style-type: none"> It is not possible to restrict people's movements. This impact will be more prevalent during the 	<ul style="list-style-type: none"> No community riots. 	<ul style="list-style-type: none"> HR Record; and 	<ul style="list-style-type: none"> PM. 	<ul style="list-style-type: none"> Ongoing

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>where they see construction activities starting</p> <ul style="list-style-type: none"> Inflow of Temporary workers. 		<p>Employment Act; and</p> <ul style="list-style-type: none"> Exxaro External Communication Policy. 	<p>construction phase.</p> <ul style="list-style-type: none"> All employment opportunities should be advertised, and interviews conducted off the mine or by appointment only. <p>Where opportunities for local employment arise the proper measures must be put in place to advertise and determine if the services can be supplied by local providers</p> <ul style="list-style-type: none"> Control the inflow of workers onto the construction sites. The movement of construction workers should be confined to the work site. Specify the conduct of contract workers in worker related management plans and employment contracts. Develop a strategy to minimise the influx of outsiders to the area. 		<ul style="list-style-type: none"> SLP. 		

8.2.26 Construction Site clean-up and rehabilitation

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Erosion. Spread of alien invasive plant species. Visual impact. 	<ul style="list-style-type: none"> Minimise damage to topsoil and environment at tower positions. Successful rehabilitation of all damaged areas. Prevention of erosion. To ensure that the site is fully rehabilitated to its original state. To ensure that the site is clean and neat. Minimize claims and 	<ul style="list-style-type: none"> NEMBA NEMA 	<ul style="list-style-type: none"> The Contractor must ensure that all temporary structures, materials, waste and facilities used for construction activities are removed upon completion of the project. Fully rehabilitate all disturbed areas according to an approved rehabilitation plan. All replaced equipment and excess gravel, stone, concrete, bricks, temporary fencing and the like shall be removed from the site upon completion of the work. No waste materials of any nature shall be buried on the site or on any other land within the site. Re-seeding shall be done on disturbed areas as per the Rehabilitation Plan and as directed by the Exxaro EO and ECO. Slopes in excess of 2% must be contoured and slopes in excess of 12% must be terraced. The Contractor shall dispose of all excess material from site at a registered disposal facility. 	<ul style="list-style-type: none"> No loss of topsoil due to construction activities All disturbed areas successfully rehabilitated within three months of completion of the contract No visible erosion scars three months after completion of the contract. No evidence of rubble or 	<ul style="list-style-type: none"> Rehabilitation Plan; and Inspection Report. 	<ul style="list-style-type: none"> ECO; and CEO. 	On completion of construction.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
	litigation from landowners.		<ul style="list-style-type: none"> Reusable material will be taken off site and reused elsewhere. 	litter left on site.			

8.2.27 Monitoring of EMPr and compliance

Objective	Mitigation / Management Action	Monitoring Criteria	Responsible Agent	Monitoring Frequency
To implement an on-going monitoring and performance audit programme.	<ul style="list-style-type: none"> The correct and successful implementation of impact mitigation measures in order to reduce adverse impacts on environmental aspects needs to be ensured by a proper monitoring program. Monitoring of the general implementation of/adherence to the EMPr shall be the responsibility of the ECO. Reporting on adherence/compliance to stipulations as communicated to Contractors, shall take place during scheduled site meetings. Regular site meetings by the project team must be held. Continuous induction of staff and visitors on the EMPr conditions and requirements. Put in place non-conformance, prevention and corrective procedures. 	<ul style="list-style-type: none"> Checklist; Daily Register; Attendance Registers Photographic evidence; Audit and Monitoring Reports; and Inspection Report. 	<ul style="list-style-type: none"> ECO; and CEO. 	On-going post rehabilitation.

8.3 OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME

8.3.1 Mining of Coal

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Removal of geological coal and associated resources will permanently alter the geology of the area. 	<ul style="list-style-type: none"> Conserve geological strata. 	<ul style="list-style-type: none"> MPRDA 	<ul style="list-style-type: none"> No mitigation measures are possible, as mining permanently destroys the geological strata. The mine will make optimal use of the coal resources which forms part of the mining rights. The mining operations will remain within the limits of the designated mining rights area. 	<ul style="list-style-type: none"> Mining within the designated rights. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> MM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> The potential sterilisation of coal resources due to the establishment of infrastructure on potential coal resources. 	<ul style="list-style-type: none"> To utilise all available coal resources optimally. 	<ul style="list-style-type: none"> MPRDA 	<ul style="list-style-type: none"> The mine must reviews where applicable existing geological investigations to determine the extent of the resources and ensure that no mining infrastructure is located on areas of potential coal resources. The mine must ensure to optimally utilise all available coal resources. Should additional coal resources be identified outside the boundaries as stipulated within this report, the necessary applications must be made to the relevant authorities, who will include, but are not limited to the DMRE (for mining), 	<ul style="list-style-type: none"> Application for authorisation. 	<ul style="list-style-type: none"> Inspection Report; and Licences/ Permits. 	<ul style="list-style-type: none"> MM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			MDARDLEA (for listed activities); DHSWS (for water related issues), National Department of Agriculture (for potential impacts on land use and capability), SAHRA (for potential impact on unidentified graves or culturally important sites).				
<ul style="list-style-type: none"> Potential subsidence due to operations. 	<ul style="list-style-type: none"> Avoid ground subsidence 	<ul style="list-style-type: none"> MPRDA MHSA 	<ul style="list-style-type: none"> Ongoing monitoring must be undertaken of the surface area to determine whether any subsidence is taking place. The underground mining operations must be undertaken by means of stabilizing infrastructure (pillars) to reduce the potential of subsidence. Should subsidence be detected, it must be made safe and rehabilitated as soon as possible. 	No subsidence.	<ul style="list-style-type: none"> Rock Engineering recommendation; Inspection Report; Licence conditions; and Permit conditions. 	<ul style="list-style-type: none"> MM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Possibility for deterioration of water quality due to acid mine drainage. 	<ul style="list-style-type: none"> To prevent deterioration of water resources. 	<ul style="list-style-type: none"> NWA; and NEMA. 	<ul style="list-style-type: none"> The timing, location, quality and volume of decant that is expected to occur post mining should be determined to allow more detailed decisions to be made regarding possible mitigation and management measures to be implemented. The necessity and feasibility of treating the decanting water should also be investigated and treatment implemented if necessary. 	<ul style="list-style-type: none"> No deterioration of wetlands. 	<ul style="list-style-type: none"> Inspection Report; and Sampling. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			Refer to Hydrogeology Report.				
<ul style="list-style-type: none"> Peripheral impact relating to human presence and mining related activity will lead to changes in vegetation dynamics and alternation of natural ecological processes and ecosystem functioning. 	<ul style="list-style-type: none"> Prevent alteration of natural ecological processes and ecosystem functioning. 	<ul style="list-style-type: none"> NEMBA 	<ul style="list-style-type: none"> The mining operations will remain strictly within the limits of the designated mining rights area. Implement a weed and alien invasive species eradication programme during the life of the mine all areas. 	<ul style="list-style-type: none"> No ecological damage. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> Environmental Manager. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Contamination of clean water catchment 	<ul style="list-style-type: none"> Avoid clean water contamination 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> Construction of pollution control dams, berms and trenches and correct operation of the water balance will assist in the proper water management measures to be 	<ul style="list-style-type: none"> No contamination of storm water. 	<ul style="list-style-type: none"> Incident report; and Sampling. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
at Shaft Area	ation.		implemented.				
<ul style="list-style-type: none"> Quantity: Dewatering will result in some inflow of groundwater into the mine which could reduce groundwater availability to users. The aquifers surrounding the mining area will be dewatered due to the mine dewatering. This will lead to a lowering of 	<ul style="list-style-type: none"> Avoid groundwater reduction 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> Some farm boreholes will be impacted on during the operational phase. No management measures can be implemented since dewatering is consequential, but ongoing monitoring of the farm boreholes yearly will determine if any problems occur. If problems are identified, then an independent groundwater specialist must be appointed for a detailed study and should it be proven that the mine is responsible for these impacts the compensation of farmers should be negotiated. Groundwater levels will recover once mine dewatering stops. Modelling simulations indicate that the groundwater levels will stabilise approximately 50 years after mining stops. 	<ul style="list-style-type: none"> No complaints from landowners regarding water shortage. 	<ul style="list-style-type: none"> Complaints register; Volume measurement; Water Balance update; Water levels measurement; and Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>the groundwater levels surrounding the mining area and the groundwater flow directions and gradients being directed towards the mining area, thereby containing pollution to the immediate vicinity of the mining activities. The groundwater levels will be</p>							

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
lowered by a maximum of 105m within the mining area and 1 m up to 3600m							
<ul style="list-style-type: none"> Quality: ABA analyses showed that acid mine drainage (AMD) formation is expected and poor-quality leachate can occur based on the leach potential of the material. This can influence the water quality in the 	<ul style="list-style-type: none"> Prevent groundwater contamination from leachate. 	<ul style="list-style-type: none"> NWA; NEMA; and MPRDA 	<ul style="list-style-type: none"> Limited measures can be applied to the possible leachate of sulphate and AMD development. The coal stockpile footprints can be minimised and the underlying material compacted to reduce the seepage rates into the underlying material. Implement groundwater monitoring network to assess and document the influence the mining operations might have on groundwater resource and quality of groundwater for surrounding landowners. 	<ul style="list-style-type: none"> No contamination of water resources from AMD. 	<ul style="list-style-type: none"> Complaints register; Inspection Report; and Sampling. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>surrounding aquifers. However, groundwater flow directions will be directed towards the mining area and contaminant migration away from the mining area will be limited during active mining.</p>							
<ul style="list-style-type: none"> Activities related to mining and operation of conveyor belt and vehicles to 	<ul style="list-style-type: none"> Reduce noise pollution from mining activities. 	<ul style="list-style-type: none"> MHS. NEMA. Noise Control regulations. SANS 	<ul style="list-style-type: none"> Noise monitoring to be done regularly at the abutting residential areas in the vicinity of the proposed discard expansion, overland conveyor/service road and entrance to the S4L reserve. Actively manage the proposed mining extension activities and the noise 	<ul style="list-style-type: none"> No noise pollution. No complaints from landowners with regards 	<ul style="list-style-type: none"> Complaints register; and Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> When appropriate.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
discard dump will cause noise pollution to the surrounding		10103 of 2008.	<p>management plan must be used to ensure compliance to the noise regulations and/or standards.</p> <ul style="list-style-type: none"> Implementation of the noise mitigatory measures and the noise management plan; Selecting equipment with lower sound power levels; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Implement regular noise monitoring to be done to ensure that operation noise is within acceptable standards. 	to noise from mining activities.			
<ul style="list-style-type: none"> Possibility of decreasing water quality. 	<ul style="list-style-type: none"> To prevent water quality deteriora 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> Water resources must be monitored on a regular basis. No dirty water must be allowed to leave the mine. Any detected deterioration of water quality must be immediately investigated, and action 	<ul style="list-style-type: none"> No water quality deterioration. 	<ul style="list-style-type: none"> Inspection Report; and Water Quality sampling/Tests. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
	tion.		<p>measures introduced to prevent water contamination.</p> <ul style="list-style-type: none"> Implement and maintain surface water and groundwater monitoring network. 				
<ul style="list-style-type: none"> Increase potential of fires. 	<ul style="list-style-type: none"> Prevent fires. 	<ul style="list-style-type: none"> NEMA. 	<ul style="list-style-type: none"> Control of contraband going underground. Fire detection and gas detection systems underground must be in place. Access of workers onto mine property to be controlled, access to underground workings should be under strict supervision. 	<ul style="list-style-type: none"> No veld fires. 	<ul style="list-style-type: none"> Incident report; and Inspection Report. 	<ul style="list-style-type: none"> PM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Increase in increased sexual transmitted diseases 	<ul style="list-style-type: none"> To reduce the spread of sexually transmitted diseases 	<ul style="list-style-type: none"> OHSA. 	<ul style="list-style-type: none"> HIV awareness campaigns must continue. Education Programmes and Health Education programmes must be held regularly and during induction. 	<ul style="list-style-type: none"> Reduction in the spread of sexually transmitted diseases. 	<ul style="list-style-type: none"> Inspection Report; and Incident. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Increased temperature, heatwaves and wildfires. 	<ul style="list-style-type: none"> To prevent increased temperature and 	<ul style="list-style-type: none"> NEMA QA; and Climate Change Bill. 	<ul style="list-style-type: none"> The risk and management of heat related illnesses should be integrated in the Occupational Health and Safety Plans. Measures may include monitoring of temperature and humidity levels, providing of adequate cooling and ventilation, 	<ul style="list-style-type: none"> No wildfires; and No records of extreme temperatures. 	<ul style="list-style-type: none"> Inspection Report; and Incident report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
	wildfires due to climate change.		introducing systems to limit exposure to heat and educating staff to recognise early symptoms of heat stress. <ul style="list-style-type: none"> Adequate monitoring, fire detection and suppression systems for the spontaneous combustion of coal stockpiles should be implemented. The risk of wildfires in relation to infrastructure and facilities should be assessed. Adequate monitoring, fire detection and suppression systems should be implemented. 				
<ul style="list-style-type: none"> Water scarcity and drought. 	<ul style="list-style-type: none"> To avoid depletion of water resource. 	<ul style="list-style-type: none"> NWA. Climate Change Bill. 	<ul style="list-style-type: none"> Regular monitoring of operational water requirements and available resources should be conducted. A contingency response plan should be developed in the event of short, medium or long-term water shortages. A Water Management Strategy should be developed as to manage and minimise water usage, setting clear objectives and targets to improve efficiency. A contingency response plan should be developed in the event that water quality deteriorates. Measure may include additional water treatment infrastructure 	<ul style="list-style-type: none"> No lack of water. 	<ul style="list-style-type: none"> Water monitoring report; and Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			development. <ul style="list-style-type: none"> A contingency response plan should be developed for dust suppression in the event of dry spells and periods of elevated dust generation. Community participation should be considered with regards to water infrastructure and management. 				
<ul style="list-style-type: none"> Floods, cyclones and storms. 	<ul style="list-style-type: none"> To minimize the occurrence of floods, cyclones and storms. Minimize damage cause by floods, cyclones and storms. 	<ul style="list-style-type: none"> Climate Change Bill NWA 	<ul style="list-style-type: none"> A site-specific flood risk assessment should be conducted to identify areas vulnerable to flooding. A risk assessment should be conducted to assess the flood risk in relation to key access roads. A contingency response plan should be developed should operations become inaccessibility due to floods. 	<ul style="list-style-type: none"> No damage caused by floods. 	<ul style="list-style-type: none"> Flood risk assessment; and Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> High wind 	<ul style="list-style-type: none"> To 	<ul style="list-style-type: none"> NEMA 	<ul style="list-style-type: none"> A continuous monitoring station should be 	<ul style="list-style-type: none"> No damage 	<ul style="list-style-type: none"> Weather 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action	Performance Index	Monitoring Criteria	Responsible Agent	Monitoring Frequency
speeds and gusts.	minimize impact cause by high wind speeds and gusts.	QA • Climate Change Bill.	installed to obtain site specific wind data. • Regular maintenance checks for wind-related damage should be performed.	to infrastructure.	station.		

8.3.2 Stockpiling and Transportation System

The following EMPr table with Management Measures and Action Plans relates to the following activities associated with coal stockpiling and transportation system:

- Operation and maintenance of the RoM stockpile and push-off area;
- Operation and maintenance of the conveyor route, power lines and service road;
- Maintenance of the structures over and along the conveyor crossings (i.e. culverts, drains and covers);
- Pollution of watercourses as a result of spills;
- Fugitive dust generation along conveyor or from stockpiles and mining; and
- Continuation to limit the impact of visual and noise disturbance.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
• The stockpiling of material	• Reduce visual impact	• NEMA.	• Stockpile heights will be restricted as far as practically possible. • The visual management measures as	• Low visual intrusion.	• Inspection Report.	• EM.	• Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
will impact on the micro and macro topography due to the establishment of the RoM Stockpiles.	due to stockpiling .		incorporated during the construction phase will be maintained during the operational phase.				
<ul style="list-style-type: none"> Spillages along the conveyors could lead to the contamination of the soil resources and may impact on the land capability. 	<ul style="list-style-type: none"> To reduce spillages. 	<ul style="list-style-type: none"> CARA. NEMA. 	<ul style="list-style-type: none"> Ongoing monitoring along the conveyor will be undertaken to detect areas of spillage. Where spillages have been detected these areas will be cleaned immediately. Spillage control measures will be implemented at areas of material transfer. Management measures will be implemented over the river crossings and wetland soils to contain any potential for spillages. Surface Water monitoring upstream and downstream of crossing will be implemented. Implement recommendations if any contamination of water courses takes place 	<ul style="list-style-type: none"> No spillages. 	<ul style="list-style-type: none"> Incident report; and Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Soil 	<ul style="list-style-type: none"> To reduce 	<ul style="list-style-type: none"> NEMA. 	<ul style="list-style-type: none"> Employees will be educated by means of 	<ul style="list-style-type: none"> No soil 	<ul style="list-style-type: none"> Incident 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
pollution due to the spillages of hydrocarbons along the access, construction and service routes	soil pollution.	<ul style="list-style-type: none"> CARA. 	<p>training and the Environmental Awareness Plan to make them conscious of the necessity to prevent spillages by the implementation of good housekeeping practices and how to manage these in the event of a major spill.</p> <ul style="list-style-type: none"> Make sure all employees are aware of the contents of Environmental Awareness Plan and implement good housekeeping practices. The management of chemicals and hydrocarbons should form part of the emergency preparedness and response programme. No activities associated with hydrocarbons and or chemicals (i.e. wash bays etc.) may be undertaken outside of an effectively designed contained area. A detailed waste management strategy will be established during construction and implemented and will be maintained during operational phase. Proper establishment and maintenance practices must be implemented for bunded areas. 	pollution.	<p>report; and</p> <ul style="list-style-type: none"> Inspection Report. 		
<ul style="list-style-type: none"> Seepages from the overburden 	<ul style="list-style-type: none"> To prevent seepages and 	<ul style="list-style-type: none"> MPRDA ;and NEMA. 	<ul style="list-style-type: none"> Move coal stockpiles on a first-in-first-out basis to reduce extent of coal stockpile areas. Coal stockpile and handling must be 	<ul style="list-style-type: none"> No contamination of 	<ul style="list-style-type: none"> Visual inspections. Groundwater 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Quarterly and Annual.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
and RoM stockpiles could be highly mineralised with mostly sulphate.	groundwater contamination		<p>in the designated areas only.</p> <ul style="list-style-type: none"> Intercept seepage from stockpiles and maintain in the affected water circuit. PCD to be managed with the sufficient freeboard. Should environmentally unacceptable concentrations of constituents of concern be identified during monitoring of the seepage plume, hydraulic plume containment should be initiated. Do not discharge water that does not comply to release standards. 	groundwater.	<p>Monitoring.</p> <ul style="list-style-type: none"> Annual IWUL Compliance Audit to include compliance against GN704. 		
<ul style="list-style-type: none"> Soil physical and chemical degradation as result of RoM stockpiles and spillages during operations. 	<ul style="list-style-type: none"> To prevent soil degradation. 	<ul style="list-style-type: none"> CARA. NEMA. 	<ul style="list-style-type: none"> There will be an incident management system including procedures and training for dealing with incidents. Major spillage incidents will be reported to the DMRE, DHSWS, MDARDLEA and the Department of Agriculture. Appropriate remedial measures will be implemented in consultation with these regulatory authorities. If spills do occur and soils become contaminated, the appropriate remedial measures will be identified in consultation with an appropriate qualified specialist. If necessary, the polluted soils will be classified as waste and will be discarded at 	<ul style="list-style-type: none"> No visible soil degradation. 	<ul style="list-style-type: none"> Incident report; and Inspection Report. 	<ul style="list-style-type: none"> PM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>an appropriate permitted waste site. After the removal of the contaminated soils, the affected areas will be landscaped and rehabilitated.</p> <ul style="list-style-type: none"> • Use of heavy machinery such as bulldozers should be avoided as far as possible. • Soil stripping should be done with oversight by a soil specialist and careful consultation of the pre-mining soil survey is essential. This will ensure optimal soil availability and avoid excessive mixing of undesirable soil due to over-stripping, as well as loss of available cover soil due to under-stripping and as such ensure that as much topsoil as possible is available for rehabilitation during closure. • Separate stockpiling of different soil to obtain the highest post-mining land capability; The A and B-horizons should be stripped separately and replaced in the same sequence on top of the spoil material. • Stockpile height should be restricted to that which can deposited without additional traversing by machinery. A Maximum height of 2-3 m is therefore proposed, and the stockpile should be treated with temporary 				

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>soil stabilisation methods; such as the application of organic matter to promote soil aggregate formation, leading to increased infiltration rate, thereby reducing soil erosion. Also, the use of lime to stabilise soil pH levels.</p> <ul style="list-style-type: none"> • Soil erosion should be controlled on stockpiles by having control measures to reduce erosion risk such as erosion control blankets, soil binders, revegetation, contours, diversion banks and spillways. 				
<ul style="list-style-type: none"> • Increased sediment load in wetlands may occur as a result of mining activities. Increased sediment movement off the site. 	<ul style="list-style-type: none"> • Reduced wetland contamination 	<ul style="list-style-type: none"> • NWA; and • NEMA. 	<ul style="list-style-type: none"> • The height of the stockpiles should also be limited to minimise compaction (consult a soil specialist in this regard). • Regular inspections of these stockpiles should be undertaken, and any erosion damage should be repaired immediately. • This will serve to minimise the increased sediment loads in the surrounding wetlands. Clean and dirty water systems (berms and trenches) should be implemented downstream of the RoM product stockpiles. • To assist with baseline information and monitoring, SASS5 monitoring must be implemented in areas where identified by 	<ul style="list-style-type: none"> • No sediments into wetlands. 	<ul style="list-style-type: none"> • Inspection Report. 	<ul style="list-style-type: none"> • EM. 	<ul style="list-style-type: none"> • Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
			specialist. • Management measures should be implemented to catch and contain any spillages into wetland soils and over the crossings.				
<ul style="list-style-type: none"> Possibility of generation of acid mine drainage or contamination of wetland areas from spillages. 	<ul style="list-style-type: none"> To prevent AMD generation 	<ul style="list-style-type: none"> MPRDA; NEMA; and NWA. 	<ul style="list-style-type: none"> The dirty water management system should have a capacity to cope with flood events up to a minimum of the 1:50 year return events. All dirty water should then be stored within surface pollution control dams, from where the water should be re-used, for example for dust suppression. The surface pollution control dams should collect all run-off and seepage from the coal handling areas. No direct discharge of this dirty water into any wetland area should be allowed. 	<ul style="list-style-type: none"> No contamination of wetlands by AMD. 	<ul style="list-style-type: none"> Inspection Report; and Sampling. 	<ul style="list-style-type: none"> Environmental Manager. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Impedance and concentration of flows increased sediment movement off the site. 	<ul style="list-style-type: none"> Reduce sediment movement offsite. 	<ul style="list-style-type: none"> CARA; and NEMA. 	<ul style="list-style-type: none"> Clean and dirty water systems need to be maintained (i.e. the clean of culverts and pipes where siltation is evident). Re-vegetated areas should be monitored to ensure successful establishment of natural vegetation, and all alien vegetation should be removed from these areas, with long-term follow up. 	<ul style="list-style-type: none"> No visible movement of sediments (erosion). 	<ul style="list-style-type: none"> Inspection Report 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Deteriorating water quality due to coal spillages. 	<ul style="list-style-type: none"> To prevent contamination of water resources. 	<ul style="list-style-type: none"> NWA; and NEMA. 	<ul style="list-style-type: none"> The conveyor should incorporate turnovers to minimise spillage during normal operation. Should larger spillages occur due to malfunctioning of the conveyor or for any other reason, clean-up of the spillages should be undertaken as soon as possible following the event. In this regard regular inspection of the entire conveyor route should be undertaken. No belt transfers are to be located within the wetland areas on site. Where belt transfers are located in close proximity to wetland areas a small, shallow berm should be constructed between the belt transfer site and the wetland area to prevent direct run-off of storm water from the belt transfer site into the valley bottom wetland. Where indicated by specialists SASS5 monitoring of conveyor crossings should be undertaken. 	<ul style="list-style-type: none"> No deterioration of water quality. 	<ul style="list-style-type: none"> Inspection Report; and Incident report. Water Sampling. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Windblown dust from the conveyor transportation, facility 	<ul style="list-style-type: none"> To prevent windblown dust from transportation. 	<ul style="list-style-type: none"> NEMA. 	<ul style="list-style-type: none"> The dust monitoring programme implemented during construction will be maintained though the operation of the mine. Dust must be suppressed by using a dust suppression method, especially in areas of 	<ul style="list-style-type: none"> No visible dust generation. No complaints from 	<ul style="list-style-type: none"> Inspection Report. Complaints. Dust Sampling. 	<ul style="list-style-type: none"> Environmental Manager. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
could prohibit the photosynthesis process in plants. This could cause reduced growth rates and plant vigour.			material transfer.	landowners			
<ul style="list-style-type: none"> The presence of disturbed land could allow the establishment of alien invasive vegetation. 	<ul style="list-style-type: none"> To prevent establishment of alien invasive species. 	<ul style="list-style-type: none"> NEMBA. 	<ul style="list-style-type: none"> The mine will establish and implement a regular weed-control programme to eradicate existing invader plants and to prevent new invasions during ongoing mining operation and decommissioning. 	<ul style="list-style-type: none"> No alien invasive species. 	<ul style="list-style-type: none"> Inspection Report Vegetation Assessment. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Increased vehicular activity 	<ul style="list-style-type: none"> Reduce animal fatalities 	<ul style="list-style-type: none"> RTA. 	<ul style="list-style-type: none"> Operators will receive induction and awareness training informing them of the rules related to travelling in designated 	<ul style="list-style-type: none"> No animal fatalities; 	<ul style="list-style-type: none"> Inspection Report; and 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>could result in an increase in animal fatalities due to collisions.</p>	<p>due to vehicular activities.</p>		<p>areas and the importance of conserving the local fauna and flora.</p> <ul style="list-style-type: none"> Speed limits will be maintained. Speed limit signs will be visible and legible on site. Off-limit areas will be fenced off. 	<ul style="list-style-type: none"> No complaints from landowners ; and No damage to ecology. 	<ul style="list-style-type: none"> Incident report. 		
<ul style="list-style-type: none"> Peripheral impact relating to human presence and mining related activity will lead to changes in vegetation dynamics and alternation of natural ecological processes and ecosystem 	<ul style="list-style-type: none"> To reduce ecological impacts and ecosystem functioning . 	<ul style="list-style-type: none"> NEMBA. 	<ul style="list-style-type: none"> The mining operations will remain strictly within the limits of the designated mining rights area. No poaching, hunting, killing or trapping of any animals in the area will be allowed. 		<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
functioning.							
<ul style="list-style-type: none"> Erosion of River Banks at conveyor crossing. 	<ul style="list-style-type: none"> To prevent erosion. 	<ul style="list-style-type: none"> CARA. NWA. 	<ul style="list-style-type: none"> After construction the river banks within the 15m servitude along the conveyor route must be equipped with erosion control measures to ensure that erosion does not cause any detrimental environmental impacts during rain events. 	<ul style="list-style-type: none"> No visible erosion to river banks. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> The presence of linear infrastructure could lead to an increase in volume and speed of surface water run-off should management measures not be implemented which will 	<ul style="list-style-type: none"> Reduce soil erosion. 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> Clean and dirty water systems will be maintained throughout the life of mine. Vegetation must be replaced after construction to ensure no bare soil surfaces are left. 	<ul style="list-style-type: none"> No visible soil erosion; and No water contamination 	<ul style="list-style-type: none"> Inspection Report; and Incident report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
increase the erosive capacity of the water.							
<ul style="list-style-type: none"> Deterioration in water quality can be expected due to spills from the conveyor. 	<ul style="list-style-type: none"> To reduce deterioration of water quality 	<ul style="list-style-type: none"> NWA 	<ul style="list-style-type: none"> The conveyor must incorporate belt cleaning device to minimise spillages. Belt transfers should take place outside wetland areas, preferably within the pollution control area of the mine. Regular inspection of the conveyor route to check for spillages and the removal of spillages should be undertaken. The conveyor must be covered where watercourses and wetlands are crossed. 	<ul style="list-style-type: none"> No contamination of water resources from spills. 	<ul style="list-style-type: none"> Inspection Report; Incident report; and Sampling. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Runoff from stockpiles and berms may flow into watercourses especially during intensive 	<ul style="list-style-type: none"> Reduce water resources contamination. 	<ul style="list-style-type: none"> NEMA. NWA. 	<ul style="list-style-type: none"> The stockpiles and berms will be constructed in such a way that dust and water erosion during operation is limited and to ensure stability and thereby preventing the possibility of wash down. Clean and dirty water systems to contain all dirty water within the mine site will be contained and maintained during operations. The pollution control dams and silt traps will require periodic cleaning of sediment. This 	<ul style="list-style-type: none"> No contamination of water resources from stockpile runoff. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>rainstorms. This results in siltation, which adversely affects the water quality as well as the habitat of the living organisms.</p>			<p>should form part of normal operation and maintenance.</p>				
<ul style="list-style-type: none"> The stockpiling of material may lead to a decrease in groundwater quality through the infiltration and seepage of contaminated water 	<ul style="list-style-type: none"> To reduce groundwater contamination. 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> The clean and dirty water separation structures will be adequately maintained. All dirty water will be maintained in the fit for purpose designed facilities, which will limit infiltration of contaminated water to the groundwater. Groundwater monitoring must be implemented and maintained during operation. Boreholes will be monitored for groundwater level and quality which will indicate possible anomalies. The coal stockpiles should be kept as small as possible. This will reduce the volume of 	<ul style="list-style-type: none"> No groundwater contamination from stockpile runoff. No complaints from landowners. 	<ul style="list-style-type: none"> Inspection Report Complaints register Sampling. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
resources			potentially poor-quality leachate infiltrating the aquifers. The base of the coal stockpile should be compacted to reduce the permeability and therefore the infiltration.				
<ul style="list-style-type: none"> The removal, transportation and stockpiling of material will have a visual impact. 	<ul style="list-style-type: none"> To reduce visual impact from transportation. 	<ul style="list-style-type: none"> NEMA. 	<ul style="list-style-type: none"> The visual management measures as incorporated during the construction phase will be maintained during the operational phase. Dust management and monitoring programme should be maintained during operation. 	<ul style="list-style-type: none"> No visual intrusion. 	<ul style="list-style-type: none"> Inspection Report; and Complaints register. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Visual disturbance will be caused by presence of conveyor belt and increased by the extension of discard dump on surrounding 	<ul style="list-style-type: none"> Reduce visual intrusion from lighting. 	<ul style="list-style-type: none"> NEMA. 	<ul style="list-style-type: none"> During operation avoid crossing over or through ridges, rivers, pans or any natural features that have visual value. This also includes centres of floral endemism and areas where vegetation is not resilient and takes extended periods to recover; Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance; and Lighting will be sufficient to ensure security but will not constitute 'light pollution' to the surrounding areas. 	<ul style="list-style-type: none"> No visual intrusion. 	<ul style="list-style-type: none"> Inspection Report; and Complaints register. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
g land users and motorist.							
<ul style="list-style-type: none"> Noise will be generated by the conveyor system. 	<ul style="list-style-type: none"> To reduce noise generated by the conveyor system. 	<ul style="list-style-type: none"> NEMA. 	<ul style="list-style-type: none"> All workers will have access to and wear noise reduction personal protection equipment (PPE) appropriate to their working conditions. An open channel of communication will be maintained to ensure that surrounding farmers can lodge concerns should the need arise. Noise monitoring will be undertaken throughout the life of the mining activities to ensure noise levels comply with Safety and Health Standards. 	<ul style="list-style-type: none"> No complaints from landowners 	<ul style="list-style-type: none"> Complaints register; Inspection Report; and Noise Sampling. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Traffic to and from the mine during trucking operation while conveyor belt is being 	<ul style="list-style-type: none"> Reduce traffic build up and noise generation 	<ul style="list-style-type: none"> RTA. 	<ul style="list-style-type: none"> Speed control measures to be implemented and enforced; Road surface to be maintained on a weekly basis. 	<ul style="list-style-type: none"> No traffic build-up. Reduced noise levels. 	<ul style="list-style-type: none"> Inspection Report; Complaints; and Noise Sampling. 	<ul style="list-style-type: none"> EM 	<ul style="list-style-type: none"> Ongoing until conveyor construction is completed.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
constructed will cause additional noise disturbance . These will be for a limited time.							
<ul style="list-style-type: none"> Noise will be generated by the ventilation shaft. 	<ul style="list-style-type: none"> To reduce noise from the shaft. 	<ul style="list-style-type: none"> NEMA. 	<ul style="list-style-type: none"> Opening of the ventilation duct to face away from the noise sensitive residential area. 	<ul style="list-style-type: none"> No noise coming from the ventilation shaft. 	<ul style="list-style-type: none"> Complaints register Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> When appropriate.
<ul style="list-style-type: none"> Ambient Air quality impacts due to Increase in dust 	<ul style="list-style-type: none"> Reduce dust generation 	<ul style="list-style-type: none"> NEM: AQ; NEM:A QA: Nation al Dust Contro l Regula tions; 	<ul style="list-style-type: none"> An operational water truck should be effective for the suppression of dust on unpaved access roads. Three different mitigation levels for conveyor belts systems adopted from the Australian NPI must be implemented as follows: <ul style="list-style-type: none"> Enclosing the conveyor belt which leads to 70% reduction of fugitive dust. 	<ul style="list-style-type: none"> No complaints from the landowners 	<ul style="list-style-type: none"> Inspection Report. Complaints register. Dust Sampling. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
		<ul style="list-style-type: none"> Ambient Air Quality Guidelines and Standards 	<ul style="list-style-type: none"> Use of water sprays to suppress dust. 99% reduction in fugitive emissions can be achieved when the conveyor system is enclosed and fabric filter system installed. Dust impacts will be considered as more of a nuisance than a health impact. Dust suppression methods must be implemented around the boxcut, stockpiling areas and transfer stations and it is recommended that a dust monitoring network be established to monitor levels of dust dispersion. 				
<ul style="list-style-type: none"> Trucking of ROM material to DCM East Plant will not be a regular occurrence, only when necessary, but will have a minimal 	<ul style="list-style-type: none"> To reduce the traffic impact by trucking of ROM. 	<ul style="list-style-type: none"> RTA. NEMA. 	<ul style="list-style-type: none"> Management measures must be in place to prevent unauthorised access to the conveyor belt. 	<ul style="list-style-type: none"> No unauthorised access to conveyor belt. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> On going.

Possible Impact	Objective	Applicable Legislation /Policy	Mitigation / Management Action		Monitoring Criteria	Responsible Agent	Monitoring Frequency
impact.							
<ul style="list-style-type: none"> Fugitive dust emissions from the operation of the conveyor system will negatively affect the air quality. 	<ul style="list-style-type: none"> Reduce fugitive dust impact. 	<ul style="list-style-type: none"> Dust Regulations NEMA QA. 	<ul style="list-style-type: none"> Dust suppression methods must be implemented around the boxcut, stockpiling areas and transfer stations and it is recommended that a dust monitoring network be established to monitor levels of dust dispersion. The drop height at the off-load point will be limited or it will be closed off in order to reduce the amount of fugitive dust emissions. 	<ul style="list-style-type: none"> No fugitive dust generation. 	<ul style="list-style-type: none"> Complaint register. Inspection Report. Dust monitoring report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Fugitive dust emissions from the stockpiles will have a negative visual impact 	<ul style="list-style-type: none"> Reduce fugitive dust impact 	<ul style="list-style-type: none"> Dust Regulations NEMA QA 	<ul style="list-style-type: none"> Dust suppression methods must be implemented around the boxcut, stockpiling areas and transfer stations and it is recommended that a dust monitoring network be established to monitor levels of dust dispersion. Should it be found that the stockpiles create excessive dust, measures must be implemented to reduce this impact. 	<ul style="list-style-type: none"> No fugitive dust generation 	<ul style="list-style-type: none"> Complaint register Inspection Report Dust monitoring report 	<ul style="list-style-type: none"> EM 	<ul style="list-style-type: none"> Ongoing

8.3.3 Control of Clean and Dirty Water Systems

The following Management Measures and Action Plans relates to the following activities associated with:

- Operation and maintenance of pollution control structures;

- Operation and maintenance of the stormwater management system; and
- Operation of monitoring systems.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> • Concentration of flows along the conveyor route, close to wetlands and around the surface infrastructure and crossings will have an impact on environment 	<ul style="list-style-type: none"> • To reduce impact on the environment 	<ul style="list-style-type: none"> • NEMA • NWA 	<ul style="list-style-type: none"> • Discharge points for clean stormwater and treated effluent should include erosion protection measures as well as energy dissipaters and should release flows in a diffuse manner to encourage dispersion across the full extent of the wetland. • The construction of surface stormwater drainage systems during the operational phase must be done in a manner that would protect the quality and quantity of the downstream system. • Ensure building materials are not dumped or stored within the proximity of the delineated wetlands. • Discharge points should regularly undergo maintenance checks and any erosion damage repaired as well as accumulated debris removed. Maintenance plan of the pollution dam structures shall be compiled. 	<ul style="list-style-type: none"> • No impact on the environment • No visible erosion 	<ul style="list-style-type: none"> • Inspection Report 	<ul style="list-style-type: none"> • EM 	<ul style="list-style-type: none"> • Ongoing

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Deterioration in water quality. 	<ul style="list-style-type: none"> To reduce impact on water quality. 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> Clean and dirty water should at all times be kept separate. No dirty water may be discharge into any wetland area on site. Regular maintenance and inspection of the water infrastructure will need to be undertaken. Treated water on site should meet the applicable DWA standards (minimum standard for aquatic ecosystems and livestock watering) prior to release into any natural water body or wetland on site. Surface water quality and SASS5 monitoring must be conducted regularly. 	<ul style="list-style-type: none"> No deterioration of water quality. 	<ul style="list-style-type: none"> Inspection Report. Water monitoring reports. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Decrease in flows. 	<ul style="list-style-type: none"> To minimise impact on water flows. 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> Discharge points should regularly undergo maintenance checks and any erosion damage repaired as well as accumulated debris removed. Clean water should be released so as to spread across the full wetland front of downstream wetlands. 	<ul style="list-style-type: none"> No reduction in flows. 	<ul style="list-style-type: none"> Inspection Report. Water monitoring reports. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Discharge of stormwater 	<ul style="list-style-type: none"> To reduce impact on 	<ul style="list-style-type: none"> NWA. NEMA 	<ul style="list-style-type: none"> All areas likely to cause pollution should be located within the dirty 	<ul style="list-style-type: none"> No negative impacts on 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>into wetlands along the conveyor route and at river crossings.</p>	<p>wetlands.</p>		<p>water area.</p> <ul style="list-style-type: none"> • Dirty water should not be allowed to discharge into any wetland area; Stormwater discharge points should be protected against erosion and should include energy dissipaters and be maintained to ensure the optimal function. • Flow velocity at point of discharge should not exceed 0.05m/s. • An appropriate wetland and hillslope monitoring program must be implemented prior to the start of the construction phase. • Appropriate wetland rehabilitation design and implementation must ensure that wetland functionality is restored. The re-release of clean water from clean and dirty water separation infrastructure must be diffused and not reach the wetland as concentrated flows where it will have serious negative impacts on the valley-bottom wetland soils. The stormwater plan must include adequate attenuation facilities to 	<p>wetlands.</p>			

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			ensure that peak flows do not cause negative impacts on wetlands.				
<ul style="list-style-type: none"> Peripheral impact relating to human presence and mining related activity will lead to changes in vegetation dynamics and alternation of natural ecological processes and ecosystem functioning. 	<ul style="list-style-type: none"> To reduce ecological impacts and ecosystem functioning. 	<ul style="list-style-type: none"> NEMBA. 	<ul style="list-style-type: none"> The mining operations will remain strictly within the limits of the designated mining rights area. 	<ul style="list-style-type: none"> No damage to ecology. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Leaking storage facilities will result in a loss of water and will impact the 	<ul style="list-style-type: none"> To prevent water loss. 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> The water storage facilities will be regularly monitored for leaks and siltation and will be adequately maintained. A detailed surface water monitoring 	<ul style="list-style-type: none"> No reduction in water availability. 	<ul style="list-style-type: none"> Water monitoring report; and Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
water availability of the mine.			<p>programme will be implemented.</p> <ul style="list-style-type: none"> Dirty water dams are HDPE-lined to limit the potential for leakage. Maintenance plan of the pollution dam structures shall be compiled 				
<ul style="list-style-type: none"> Stream flow reduction will be caused by separating the clean and dirty water through berms and trenches. 	<ul style="list-style-type: none"> To prevent reduction of streamflow. 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> Ensure the dirty water catchment area is as small as possible to avoid unnecessary losses to the streamflow. 	<ul style="list-style-type: none"> No reduction in streamflow. 	<ul style="list-style-type: none"> Inspection Report Water monitoring report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Poor quality seepage may occur into the underlying strata if the dams are situated on permeable soil formation or on a groundwater flow path like 	<ul style="list-style-type: none"> To avoid seepage of leachate into underlying strata. 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> Lining of all pollution control dams should be regularly monitored and checked to mitigate the possibility of seepage. Dam levels will be kept at the required levels (refer to GN 704). Surface water monitoring and groundwater monitoring programme must be maintained during operation. 	<ul style="list-style-type: none"> No water contamination. 	<ul style="list-style-type: none"> Inspection Report. Complaints register. Water monitoring report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>dykes and/or faults systems. Overflow of dams can also result in down-stream contamination of surface water bodies and seepage into groundwater.</p>							
<ul style="list-style-type: none"> • Possibility of decreasing water quality. 	<ul style="list-style-type: none"> • To prevent water contamination. 	<ul style="list-style-type: none"> • NWA. 	<ul style="list-style-type: none"> • Water resources must be monitored on a regular basis. • No dirty water must be allowed to leave the mine. • Any detected deterioration of water quality must be immediately investigated, and action measures introduced to prevent water contamination. • All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimized, and be surrounded by bunds. It should also 	<ul style="list-style-type: none"> • No water contamination. 	<ul style="list-style-type: none"> • Water monitoring reports • Inspection Report. 	<ul style="list-style-type: none"> • EM. 	<ul style="list-style-type: none"> • Ongoing.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>only be stored for the minimum amount of time necessary.</p> <ul style="list-style-type: none"> Erosion control of all banks must take place so as to reduce erosion and sedimentation into wetland areas. 				

8.3.4 Waste Generation and Handling

The following table indicate Management Measures and Action Plans associated with:

- Operation and maintenance of waste management systems (domestic);
- Operation and maintenance of the extended co-disposal facility (mine waste),
- Collection and handling of waste from workshops (domestic and hydrocarbons);
- Collection and handling of waste from the offices and change houses (domestic);
- Operation and maintenance of diesel storage areas; and
- Collection, handling and storage of other domestic and hazardous waste identified.

8.3.4.1 Mine Waste (Co-Disposal/Discard Dump Facility)

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> The stockpiling, dumping and pumping of material as result of operational 	<ul style="list-style-type: none"> To prevent impact on the environment. 	<ul style="list-style-type: none"> NEMA. 	<ul style="list-style-type: none"> The co-disposal facility must be designed with the mind on closure. The co-disposal facility should be shaped to blend in with the surrounding topography as far as possible. 	<ul style="list-style-type: none"> No negative impact on the environment. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
activities will impact on the micro and macro topography due to the construction of the co-disposal facility.							
<ul style="list-style-type: none"> Erosion with regards to the co-disposal facility. 	<ul style="list-style-type: none"> To prevent erosion. 	<ul style="list-style-type: none"> CARA; and NEMA. 	<ul style="list-style-type: none"> Vegetation establishment in disturbed areas will be undertaken as soon as practically possible. Where disturbed areas cannot be revegetated during the life of operations, appropriate erosion control measures (i.e. dust allaying agent, terraces, rock cladding, etc.) must be implemented. Erosion control measures are required on all slopes exceeding 2% and engineering erosion control measures are required on all slopes exceeding 15%. The mine will ensure that all erosion controls are included in the designs of all linear infrastructure (power lines, conveyors, pipelines etc.) and points of 	<ul style="list-style-type: none"> No visible erosion. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>water discharge.</p> <ul style="list-style-type: none"> • Areas where erosion control measures have been implemented must be inspected on a weekly basis to determine the effectiveness. 				
<ul style="list-style-type: none"> • Soil physical and chemical degradation as result of the co-disposal facility and possible spillages that might occur during operations. 	<ul style="list-style-type: none"> • To prevent soil contamination. 	<ul style="list-style-type: none"> • CARA. • NEMA. 	<ul style="list-style-type: none"> • There will be an incident management system including procedures and training for dealing with incidents. • Major spillage incidents will be reported to the DMRE, DHSWS, MDARDLEA and the Department of Agriculture. • Appropriate remedial measures will be implemented in consultation with these regulatory authorities. • If spills do occur and soils become contaminated, the appropriate remedial measures will be identified in consultation with an appropriate qualified specialist. If necessary, the polluted soils will be classified as waste and will be discarded at an appropriate permitted waste site. • After the removal of the contaminated soils, the affected areas will be landscaped and rehabilitated. • A detailed waste management strategy will be established and implemented. 	<ul style="list-style-type: none"> • No soil contamination. 	<ul style="list-style-type: none"> • Incident report; and • Inspection Report. 	<ul style="list-style-type: none"> • EM. 	<ul style="list-style-type: none"> • Ongoing.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<ul style="list-style-type: none"> Best waste management practices should be emphasized during the induction phase and on ongoing basis. Waste should be removed by licensed waste disposal companies. Once the designated areas for waste skips and the planned amounts have been finalised the mine has to obtain a Section 19 Application from the MDARDLEA in terms of the National Environment Management: Waste Act. 2008 (Act No. 59 of 2008). 				
<ul style="list-style-type: none"> Deterioration of water quality due to oxidation and leaching of pyretic material during storage on site, releasing low pH, high metal and sulphate rich discharges 	<ul style="list-style-type: none"> To prevent pollution of water resources. 	<ul style="list-style-type: none"> NWA. NEMWA. 	<ul style="list-style-type: none"> A waste characterization test should be undertaken prior to the disposal of any coal material. The surface of the disposal area should be compacted to reduce the potential of infiltration. Berms/drainage channels and cut off trenches should be constructed both below and above stockpiles to enable the separation of clean and dirty water. Contaminated water (if of acceptable quality) may be utilised for dust suppression. Should a pollution plume be detected an 	<ul style="list-style-type: none"> No pollution of water resources 	<ul style="list-style-type: none"> Inspection Report Water monitoring report. Waste characterisation report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
into the surface water wetlands.			<p>action plan should be enforced immediately to pump and treat the polluted water.</p> <ul style="list-style-type: none"> • Groundwater monitoring boreholes must be placed strategically around all disposal sites. • The surface water quality of surrounding streams must be monitored continuously. • Should the contamination of the wetland and surrounding water resources be detected an action plan should be enforced immediately to rehabilitate the situation. 				
<ul style="list-style-type: none"> • Increase in alien invasive species. Due to the disturbance of the mining activities, and all other infrastructure, the potential for the spreading of invasive alien 	<ul style="list-style-type: none"> • To prevent the spread of alien invasive species. 	<ul style="list-style-type: none"> • NEMBA. 	<ul style="list-style-type: none"> • A plan to eradicate all invasive alien species must be established on site. The plan will be implemented in a phased approach. 	<ul style="list-style-type: none"> • No alien invasive species. 	<ul style="list-style-type: none"> • Alien invasive monitoring plan. • Inspection Report. 	<ul style="list-style-type: none"> • EM. 	<ul style="list-style-type: none"> • Ongoing

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
plant species increase.							
<ul style="list-style-type: none"> The fine material from the coal stockpiles can be transported to watercourses and lead to the contamination thereof. 	<ul style="list-style-type: none"> To prevent contamination of water resources. 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> Ongoing rehabilitation must be undertaken to ensure that no erosion of the side slopes take place as practical as possible. Polluted water at the bottom of the dumps must be captured and pumped or gravitated to the pollution control dams through dirty water drains. 	<ul style="list-style-type: none"> No contamination of water resources 	<ul style="list-style-type: none"> Water monitoring report. Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing
<ul style="list-style-type: none"> Contamination of surrounding groundwater from the co-disposal facility. 	<ul style="list-style-type: none"> To prevent contamination of groundwater. 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> Management measures must be put in place to reduce seepage through the base of the co-disposal facility, also under the coal-product stockpile and the RoM stockpiles. The ongoing monitoring and reporting programme must be followed. The ongoing reporting on groundwater levels must be undertaken throughout all stages of the project. If water quality or quantity is impacted on by the mine, water must be supplied to 	<ul style="list-style-type: none"> No contamination of groundwater. 	<ul style="list-style-type: none"> Groundwater monitoring report. Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>water users, if the groundwater study proves that the mine is impacting on the groundwater. Water must be of similar quality used prior to the mining activities.</p> <ul style="list-style-type: none"> • Clean and dirty water systems must be maintained to ensure that it remains effective. • The clean and dirty water systems must be kept in good conditions to ensure that aquifers will not be polluted by dirty water, and that there will be no further negative effects on the groundwater aquifers. 				
<ul style="list-style-type: none"> • The increase in dust dispersion around the co-disposal facility and associated activities. 	<ul style="list-style-type: none"> • To reduce dust generation. 	<ul style="list-style-type: none"> • Dust regulations. • NEMAQA. 	<ul style="list-style-type: none"> • A dust management plan that includes some of the following mitigation measures must be implemented on the mine: Where vehicles are used the limited of vehicle speeds, especially during high risk periods of high winds, high temperature and low humidity should be enforced. • Water sprays must be used in the loading of stockpiles (50% reduction). • Should emissions continue to exceed the guidelines the enclosure to the loading stockpiles should be investigated. • Erosion control measures should be 	<ul style="list-style-type: none"> • No dust generation. 	<ul style="list-style-type: none"> • Dust Management Plan. • Dust monitoring report. • Inspection Report. 	<ul style="list-style-type: none"> • EM. 	<ul style="list-style-type: none"> • Ongoing.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>employed and maintained at all dumps and stockpiles.</p> <ul style="list-style-type: none"> Ongoing ambient and PM10 monitoring must be implemented with dust monitors concentrated to the west of the site. 				
<ul style="list-style-type: none"> Visual impact of mining activities and the Co disposal facility. 	<ul style="list-style-type: none"> To reduce visual intrusion. 	<ul style="list-style-type: none"> NEMA. 	<ul style="list-style-type: none"> Very little mitigation is possible during operational phase, but several management measures can be put in place to minimise the overall effect, and to make rehabilitation easier. To restore the visual quality of the landscape, it is suggested that a comprehensive rehabilitation plan be developed, based on the principles of ecological restoration. Shaping of dump and stockpiles will be implemented such that the sides of the dumps are articulated in a fashion that create areas of light and shadow interplay. Shaping of the discard dump will be implemented such it is in line with the Closure requirements. Harsh, steep engineered slopes will be avoided as these could impose an additional impact on the landscape by contrasting with existing natural 	<ul style="list-style-type: none"> No visual intrusion. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> PM. 	<ul style="list-style-type: none"> Ongoing

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>topographic forms and because it is difficult to sustain vegetation on steep slopes in the long term.</p> <ul style="list-style-type: none"> • Visual barriers (i.e. indigenous trees) could be planted to reduce the visual impact on surrounding areas. • Avoid construction material with bright colours with high reflection values. Grey to olive green colours in a matt finish contribute to the assimilation of features with natural backgrounds. 				
<ul style="list-style-type: none"> • The possible impact on site of historical and cultural significance. 	<ul style="list-style-type: none"> • To prevent negative impact on cultural sites. 	<ul style="list-style-type: none"> • NHRA; • NEMWA; and • NEMA. 	<ul style="list-style-type: none"> • Should any graves or other sites with potential historical and/or cultural importance be identified, all activities in that vicinity must cease immediately. • The mine environmental and safety and health office must be informed. The area must be cordoned off. An archaeologist should be informed immediately to investigate and inspect the site to determine the importance. Should a grave be found, the Mpumalanga Heritage Resource Authority (MPHRA) officer should be contacted immediately. 	<ul style="list-style-type: none"> • No impact on sites of historical and cultural significance 	<ul style="list-style-type: none"> • Complaints register • Inspection Report. 	<ul style="list-style-type: none"> • EM. 	<ul style="list-style-type: none"> • Ongoing

8.3.4.2 Waste Generation

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> The use of diesel, oil and other hazardous chemical substances may lead to the contamination of soils. 	<ul style="list-style-type: none"> To prevent contamination of soil. 	<ul style="list-style-type: none"> CARA. NEMA. NEMWA. HSA. 	<ul style="list-style-type: none"> All hydrocarbons should be stored in designated, bunded areas with a capacity of at least 110% of the volume stored. Spill kits should be readily available, and all employees must be trained in the utilisation thereof. Should a spill take place the area should be cleaned immediately, and the contaminated area will be rehabilitated as appropriate. In the event of a major spill that could result in major soil and water contamination the DHSWS should be informed immediately and a remediation strategy should be enforced. Employees will be educated by means of training and the Environmental Awareness Plan to make them aware of the necessity to prevent spillages by the implementation of good housekeeping practices. The management of chemicals and hydrocarbons should form part of the emergency preparedness and 	<ul style="list-style-type: none"> No spillages of hazardous chemicals. 	<ul style="list-style-type: none"> Incident report. Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>response programme.</p> <ul style="list-style-type: none"> The management of chemicals and hydrocarbons should form part of the emergency preparedness and response programme. No activities associated with hydrocarbons and or chemicals (i.e. wash bays etc.) may be undertaken outside of an effectively designed contained area. Where impacts could not effectively be mitigated or in instances where mitigation measures failed, a wetland off-set mitigation approach should be followed as a last resort. Appropriate wetlands studies should be conducted in order to facilitate such a process. Should there be a need for mobile toilets, they must be provided at a ratio 1:15 and serviced according to the waste management method statement. 				
<ul style="list-style-type: none"> The generation of waste may lead to soil 	<ul style="list-style-type: none"> To prevent contamination of 	<ul style="list-style-type: none"> HSA. NEMWA. 	<ul style="list-style-type: none"> A detailed waste management strategy will be established and implemented, which will clearly demarcate the containments for 	<ul style="list-style-type: none"> No spillages of hazardous 	<ul style="list-style-type: none"> Incident report. Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
contamination	soil.		<p>different waste types. These containments will be colour coded.</p> <ul style="list-style-type: none"> Waste management will form a detailed component as part of the induction process provided by the mine. The mine will adopt a cradle-to-grave approach to ensure that the waste is removed and disposed of in a prescribed and correct manner. Littering and contamination of water sources during mining activities must be mitigated by effective camp management. Regular safety checks and maintenance of the storage tanks should be undertaken by suitably qualified safety officers. In addition, the storage tanks and any other areas where spillages and leakages could occur, should be contained within a bunded area. Any rainfall and stormwater collected within the bunded area should remain separate from other stormwater and will need to be treated to an 	chemicals.			

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>acceptable level prior to release.</p> <ul style="list-style-type: none"> It is also recommended that the Environmental Best Practice Specifications published by the DWAF (Integrated Environmental Management Series, Environmental Best Practice Specifications: Operations, Edition 3, DWAF 2005) be adopted for this development. 				
<ul style="list-style-type: none"> The improper storage procedures of diesel, oil and other hazardous chemical substances may lead to the contamination and of destruction of flora and fauna. 	<ul style="list-style-type: none"> To prevent destruction of flora and fauna by hazardous chemicals. 	<ul style="list-style-type: none"> HSA; NEMBA; NEMA; and NEMWA. 	<ul style="list-style-type: none"> Areas used for storage and handling of waste must be properly fenced and kept safe to limit the accessibility of the area for any fauna. All hydrocarbons should be stored in designated, bunded areas with a capacity of at least 110% of the volume stored. Spill kits should be readily available, and all employees must be trained in the utilisation thereof. Should a spill take place the area should be cleaned immediately, and the contaminated area will be rehabilitated as appropriate. Employees will be educated by means of training and the Environmental 	<ul style="list-style-type: none"> No damage to flora and fauna due to chemicals. 	<ul style="list-style-type: none"> Incident report. Inspection Report. Toolbox talk. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>Awareness Plan to make them aware of the necessity to prevent spillages by the implementation of good housekeeping practices. The management of chemicals and hydrocarbons should form part of the emergency preparedness and response programme.</p> <ul style="list-style-type: none"> The management of chemicals and hydrocarbons should form part of the emergency preparedness and response programme. In the event of a major spill that could result in major soil and water contamination the DHSWS should be informed immediately and a remediation strategy should be enforced. No activities associated with hydrocarbons and or chemicals (i.e. wash bays etc.) may be undertaken outside of an effectively designed contained area. 				
<ul style="list-style-type: none"> The handling and storage of fuel creates a 	<ul style="list-style-type: none"> To prevent uncontrol 	<ul style="list-style-type: none"> NEMWA; HSA; and NEMBA. 	<ul style="list-style-type: none"> There shall be an emergency preparedness plan is in place in order to fight accidental fires should they 	<ul style="list-style-type: none"> No fires. 	<ul style="list-style-type: none"> Incident report. Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
fire risk. This could negatively impact the local fauna.	ed fires.		<p>occur. The induction and awareness programmes will address fire-related issues.</p> <ul style="list-style-type: none"> The adjacent landowners/ users/ managers should also be informed and/or involved. There must be sufficient fire-fighting equipment. This equipment must fulfil the South African Occupation Health and Safety requirements. All vegetation adjacent to the fuel storage tanks will be continually removed. All provisions relating to fire safety will be related during the induction and awareness training programme. 				
<ul style="list-style-type: none"> Peripheral impact relating to human presence and mining related activity will lead to changes in vegetation dynamics and 	<ul style="list-style-type: none"> To reduce ecological impacts and ecosystem functionin g. 	<ul style="list-style-type: none"> NEMBA. 	<ul style="list-style-type: none"> A detailed waste management strategy will be established and implemented, which will clearly demarcate the containments for different waste types. These containments will be colour coded. Waste management will form a detailed component as part of the induction process provided by the mine. The mine will adopt a cradle-to-grave 	<ul style="list-style-type: none"> No damage to ecology. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
alternation of natural ecological processes and ecosystem functioning.			approach to ensure that the waste is removed and disposed of in a prescribed and correct manner.				
<ul style="list-style-type: none"> The generation of waste may lead to surface water contamination. 	<ul style="list-style-type: none"> Prevent surface water contamination by waste. 	<ul style="list-style-type: none"> NEMWA. NWA. 	<ul style="list-style-type: none"> A surface water monitoring programme will be developed and implemented The mine will adopt a cradle-to-grave approach to ensure that the waste is removed and disposed of in a prescribed and correct manner. 	<ul style="list-style-type: none"> No surface water contamination. 	<ul style="list-style-type: none"> Inspection Report. Water monitoring report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> The use of diesel, oil and other hazardous chemical substances may lead to the contamination of surface water. 	<ul style="list-style-type: none"> Prevent surface water contamination by waste. 	<ul style="list-style-type: none"> NEMWA. NWA. HSA. 	<ul style="list-style-type: none"> A surface water monitoring programme will be developed and implemented. All hydrocarbons should be stored in designated, bunded areas with a capacity of at least 110% of the volume stored. 	<ul style="list-style-type: none"> No surface water contamination. 	<ul style="list-style-type: none"> Inspection Report Water monitoring report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Hazardous chemical spills as well as seepage from the workshop and wash bay may reach groundwater, thereby impacting its quality. 	<ul style="list-style-type: none"> To prevent groundwater contamination from hazardous chemicals. 	<ul style="list-style-type: none"> HSA. NWA. NEMA. 	<ul style="list-style-type: none"> Maintenance features should be designed properly. Good housekeeping practices will be in place in order to prevent accidental spillage. 	<ul style="list-style-type: none"> No contamination of groundwater. 	<ul style="list-style-type: none"> Water monitoring report. Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.
<ul style="list-style-type: none"> Waste accumulation may have a negative visual impact. 	<ul style="list-style-type: none"> Prevent visual intrusion. 	<ul style="list-style-type: none"> NEMWA. 	<ul style="list-style-type: none"> A detailed waste management strategy will be established and implemented, which will clearly demarcate the containments for different waste types. These containments will be colour coded. Waste management will form a detailed component as part of the induction process provided by the mine. The mine will adopt a cradle-to-grave approach to ensure that the waste is removed and disposed of in a prescribed and correct manner, and must be stored in a designated area 	<ul style="list-style-type: none"> No visual impact resulting from waste. 	<ul style="list-style-type: none"> Inspection Report. Waste characterisation report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Ongoing.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			as part of the waste management strategy.				

8.4 DECOMMISSIONING PHASE

The mine and equipment associated infrastructure would be decommissioned once it has reached the end of its economic life. The decommissioning activities would need to comply with the legislation relevant at the time.

8.4.1 Removal of Infrastructure

The table below indicate the Management Measures and Action Plans relates to activities associated with Removal of Infrastructure. Following cessation of mining and processing, it is planned that all infrastructures will be decommissioned and removed from site in a systematic and regulated manner. The following activities will be conducted during the decommissioning and closure phase of the project:

8.4.1.1 Buildings

- All infrastructure will be removed and the area rehabilitated, should no alternative use be found for the structures.
- Foundations will be removed to a depth of 1m below surface.
- An alternative use for the brick structures will first be sought i.e. they can either be sold/donated to the post-mining landowner on sale of the land. If an alternative use cannot be found, the buildings will be demolished.
- All material recovered from the demolition of buildings and/or structures will either be transported to a permitted disposal site, sold as scrap or made available to the local community as building materials (provided they are in a satisfactory condition following demolition).

8.4.1.2 Linear infrastructure

- Linear infrastructure constructed by the mine (i.e. roads, conveyors and power lines) will be removed if it proves to inhibit land use at decommissioning. Where possible infrastructure will remain for future mining operations as determined by DCM or for social investment opportunities, this will be decided in conjunction with Integrated Development Plan (IDP) of the area and the local authorities (i.e. municipality). The soils and land capability will be rehabilitated to near pre-mining conditions.
- All roads will be rehabilitated by ripping these structures to a depth of 500mm.
- All fences erected around the mine and linear infrastructure will be dismantled and either disposed of at a permitted disposal site or sold as scrap (provided these structures will no longer be required by the post-mining land owner). Fences erected to cordon-off dangerous excavations will remain in place and will be maintained as and when required.
- The overland conveyors, if not used as transportation system by another operation or as a community initiative, will be disassembled and the components removed from the site. The material can either be sold (as a unit) or the components sold as scrap.

8.4.1.3 Dams

- All pollution control dams will be maintained to ensure that no leakages occur.
- Overflow pipes will be kept clean.
- Sumps will be kept clean and all pumps will be maintained.
- The pollution control dams will only be demolished should the area prove to be free draining with no pollution potential after rehabilitation.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> The removal of all infrastructures and the conveyor will produce waste, which may lead to soil contamination. 	<ul style="list-style-type: none"> To prevent soil contamination. 	<ul style="list-style-type: none"> NEMWA. 	<ul style="list-style-type: none"> The detailed waste management strategy implemented during construction and operation must be continuously implemented. Use plan that will clearly demarcate the containments for different waste streams. These containments will be colour coded. The mine will adopt a cradle-to-grave approach to ensure that the waste is removed and disposed of in a prescribed and correct manner. 	<ul style="list-style-type: none"> No soil contamination from waste. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During decommissioning.
<ul style="list-style-type: none"> The utilisation of hydrocarbons and other chemicals during the removal of infrastructure and conveyor may lead to the contamination of soils. 	<ul style="list-style-type: none"> To prevent soil contamination. 	<ul style="list-style-type: none"> NEMWA. HSA. 	<ul style="list-style-type: none"> The detailed waste management strategy implemented during construction and operation must be continuously implemented. All hydrocarbons should be stored in designated, bunded areas with a capacity of at least 110% of the volume stored. Spill kits should be readily available and all employees must be trained in the utilisation thereof. Should a spill take place the area should be cleaned immediately and the contaminated area will be rehabilitated as appropriate. Employees will be trained on the 	<ul style="list-style-type: none"> No soil contamination from hydrocarbons. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During decommissioning.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>Environmental Awareness Plan to make them aware of the necessity to prevent spillages by the implementation of good housekeeping practices. The management of chemicals and hydrocarbons should form part of the emergency preparedness and response programme.</p> <ul style="list-style-type: none"> The management of chemicals and hydrocarbons forms part of the emergency preparedness and response programme. In the event of a major spill that could result in major soil and water contamination the DHSWS should be informed immediately and a remediation strategy should be enforced. No activities associated with hydrocarbons and or chemicals (i.e. wash bays etc.) may be undertaken outside of an effectively designed contained area. 				
<ul style="list-style-type: none"> The decommissioning activities may lead to increased sediment movement off 	<ul style="list-style-type: none"> To reduce sediment movement due to decommissioning activities. 	<ul style="list-style-type: none"> CAR A. NEM A. 	<ul style="list-style-type: none"> Decommissioning activities should as far as possible take place in winter. Limit decommissioning activities to the designated infrastructure areas and the 15m conveyor servitude as far as possible. Clean and dirty water systems should be maintained until closure or when the area is 	<ul style="list-style-type: none"> No movement of sediments off site. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During decommissioning.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
the site.			self-draining.				
<ul style="list-style-type: none"> Removal of infrastructure may lead to the destruction and disturbance of wetland vegetation. 	<ul style="list-style-type: none"> To prevent disturbances to wetlands. 	<ul style="list-style-type: none"> NWA. NEM BA. 	<ul style="list-style-type: none"> Limit decommissioning activities to the 15m conveyor servitude as far possible. Clearly delineate the remaining wetlands that must not be disturbed during decommissioning. No stockpiling of materials in the wetland along the route. Using existing tar and service roads as much as possible for decommissioning activities. Decommissioning activities should preferably take place in winter. Remove alien vegetation post decommissioning, with long term follow-up afterwards. 	<ul style="list-style-type: none"> No destruction to wetland vegetation. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During decommissioning.
<ul style="list-style-type: none"> Increase in alien invasive species. Due to the removal of infrastructure activities, the potential for the spreading of invasive 	<ul style="list-style-type: none"> To prevent distribution of alien invasive species. 	<ul style="list-style-type: none"> NEM BA. 	<ul style="list-style-type: none"> The mine will maintain the regular weed-control programme to eradicate existing invader plants and to prevent new invasions during ongoing mining operation and decommissioning. 	<ul style="list-style-type: none"> No increase in alien invasive species. 	<ul style="list-style-type: none"> Alien Invasive Management Plan. Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During decommissioning.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
alien plant species increase.							
<ul style="list-style-type: none"> The removal of linear infrastructure could lead to an increase in volume and speed of surface water run-off should management measures not be maintained which will increase the erosive capacity of the water and lead to additional siltation. 	<ul style="list-style-type: none"> Reduce water velocity and erosion. To avoid groundwater seepage and contamination. 	<ul style="list-style-type: none"> CAR A. NEM A. 	<ul style="list-style-type: none"> Clean and dirty water systems will be maintained throughout the life of mine and continue to operate during decommissioning activities. Vegetation must be replaced during decommissioning to ensure no bare soil surfaces are left that will increase possibility of siltation. 	<ul style="list-style-type: none"> No visible erosion. No complaints from landowners. 	<ul style="list-style-type: none"> Inspection Report. Water monitoring report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During decommissioning.
<ul style="list-style-type: none"> Possible contamination 	<ul style="list-style-type: none"> To avoid surface 	<ul style="list-style-type: none"> NEMWA. 	<ul style="list-style-type: none"> The detailed waste management strategy implemented during construction and 	<ul style="list-style-type: none"> No contamination 	<ul style="list-style-type: none"> Water monitoring 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During decom

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
of surface water due to the generation of waste during removal of infrastructure and the use of hydrocarbons.	water contamination.	<ul style="list-style-type: none"> NWA. 	<p>operation must be continuously implemented. All hydrocarbons should be stored in designated, bunded areas with a capacity of at least 110% of the volume stored.</p> <ul style="list-style-type: none"> Spill kits should be readily available, and all employees must be trained in the utilisation thereof. Should a spill take place the area should be cleaned immediately, and the contaminated area will be rehabilitated as appropriate. Employees will be trained on the Environmental Awareness Plan to make them aware of the necessity to prevent spillages by the implementation of good housekeeping practices. The management of chemicals and hydrocarbons should form part of the emergency preparedness and response programme. No activities associated with hydrocarbons and or chemicals (i.e. wash bays etc.) may be undertaken outside of an effectively designed contained area. The management of chemicals and hydrocarbons forms part of the emergency preparedness and response programme. 	of water resources.	<p>report.</p> <ul style="list-style-type: none"> Inspection Report. Incident report. 		missioning.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<ul style="list-style-type: none"> In the event of a major spill that could result in major soil and water contamination the DHSWS should be informed immediately and a remediation strategy should be enforced. 				
<ul style="list-style-type: none"> The removal of infrastructure such as the conveyor belt will improve the visual quality of the site by removing the visual incongruity. (Positive). 	<ul style="list-style-type: none"> To improve visual aesthetics. 	<ul style="list-style-type: none"> NEMA. 	<ul style="list-style-type: none"> Plant fast-growing endemic trees along the service road and conveyor system. The trees will with time create a screen and increase the biodiversity of the area. The mine will investigate an appropriate seed mix for the rehabilitation purposes should self-succession not establish on rehabilitated sites. An ecological approach to rehabilitation and screening measures, as opposed to a horticultural approach to landscaping, will be adopted. For example, communities of indigenous plants enhance biodiversity and blend well with existing vegetation. Attempts will be made to restore the natural character of the landscape. 	<ul style="list-style-type: none"> Improved visual impact. No visible waste. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During decommissioning.
<ul style="list-style-type: none"> Decommissioning activities will cause further noise 	<ul style="list-style-type: none"> To reduce noise impact. 	<ul style="list-style-type: none"> Noise Regulations NEM 	<ul style="list-style-type: none"> Implementation of the noise mitigatory measures and the noise management plan; Selecting equipment with lower sound power levels; Installing suitable mufflers on engine 	<ul style="list-style-type: none"> No complaints from landowners. 	<ul style="list-style-type: none"> Complaints register. Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During decommissioning.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>pollution to the surrounding residents and environment. However, this activity is temporary.</p>		A.	<p>exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.</p> <ul style="list-style-type: none"> Activities must take place during daytime period only. Vehicles to comply with manufacturers' specifications and any activity which will exceed 85.0dBA to be done during daytime only. 				
<ul style="list-style-type: none"> Possibility of decrease in resale value of Farm. 	<ul style="list-style-type: none"> To prevent decreasing resale value of farms. 	<ul style="list-style-type: none"> Land Act. NEMA. 	<ul style="list-style-type: none"> Ongoing consultation should be conducted with farmers on a regular basis. Should any developments deemed to decrease the value of the farm, compensation negotiations between the Farmer and Exxaro should be entered into. If required independent assessors should be utilised and the potential losses calculated. 	<ul style="list-style-type: none"> No decrease in resale value of farm. 	<ul style="list-style-type: none"> Negotiations. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During decommissioning.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>Air quality impact as the results of the following activities.</p> <ul style="list-style-type: none"> Demolition and Removal of all infrastructure (incl. transportation off site). Rehabilitation (spreading of soil, revegetation and profiling/contouring). 	<ul style="list-style-type: none"> To reduce the impact on ambient air quality. 	<ul style="list-style-type: none"> NEM: AQ; NEM: AQA: National Dust Control Regulations ; Ambient Air Quality Guidelines and Standards 	<p>The following activities: Demolition and Removal of all infrastructure (incl. transportation off site) and Rehabilitation (spreading of soil, revegetation & profiling/contouring), during the Decommissioning and Closure phase are identified as possible air impacting sources and may impact on the ambient air quality at the relevant sensitive receivers. Therefore, the following mitigation measures must be implemented:</p> <p><u>Demolition and Removal of all infrastructure (incl. transportation off site)</u></p> <ul style="list-style-type: none"> Demolition must not be performed during windy periods, where possible, as dust levels and the area affected by dust fallout will increase. . <ul style="list-style-type: none"> The area of disturbance must be kept to a minimum, as demolition should be done judiciously avoid the exposure of larger areas to wind erosion. Speed restrictions must be 	<ul style="list-style-type: none"> No complaints from landowners. 	<ul style="list-style-type: none"> Dust monitoring; Complaints register; and Inspection Report 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During decommissioning.

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>imposed and enforced.</p> <ul style="list-style-type: none"> • Cabs of machines must be swept or vacuumed regularly to remove accumulated dust. • Exhaust pipes of vehicles must be directed so that they do not raise dust. • Engine cooling fans of vehicles must be shrouded so that they do not raise dust. • Hard surfaced haul roads or standing areas must be washed down and swept to remove accumulated dust. • Dust suppression of roads being used during rehabilitation should be enforced. <p><u>Rehabilitation (spreading of soil, revegetation & profiling/contouring),</u></p> <ul style="list-style-type: none"> • Revegetation of exposed areas for long-term dust and water erosion control is commonly used and is the most cost-effective option. 				

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<ul style="list-style-type: none"> • Plants with roots that bind the soil, and vegetation cover should be used that breaks the impact of falling raindrops, thus preventing wind and water erosion. • Plants used for revegetation must be indigenous to the area, hardy, fast-growing, nitrogen-fixing, provide high plant cover, be adapted to growing on exposed and disturbed soil (pioneer plants) and should easily be propagated by seed or cuttings. • The area of disturbance must be kept to a minimum, as demolition should be done judiciously avoid the exposure of larger areas to wind erosion. • Spreading of soil must be performed on less windy days. • The bare soil will be prone to erosion and therefore there is need to reduce the velocity near the surface of the soil by re-vegetation. • Leaving the surface of soil in a coarse condition reduces wind erosion and ultimately reduces dust levels. • Additional mitigation measures include keeping soil moist using sprays or water 				

Possible Impact	Objective	Applicable Legislation/Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>tanks, using wind breaks.</p> <ul style="list-style-type: none"> • The best time to re-vegetate the area must be linked to the distribution and reliability of rainfall. • Speed restrictions must be imposed and enforced. • Cabs of machines must be swept or vacuumed regularly to remove accumulated dust. • Exhaust pipes of vehicles must be directed so that they do not raise dust. • Engine cooling fans of vehicles must be shrouded so that they do not raise dust. • Hard surfaced haul roads or standing areas to be washed down and swept to remove accumulated dust. • Dust suppression of roads being used during rehabilitation must be enforced. • The rehabilitation by vegetating must begin during the operational phase already as the objective is to minimise the erosion. • These measures must be aimed to reduce the potential for fugitive dust generation and render the impacts on ambient air quality negligible. 				

8.4.2 Landscaping and Rehabilitation

The following Management Measures and Action Plans relates to activities associated with:

- Recovery of all saleable infrastructure, including the conveyor system;
- Sealing of the underground access / boxcut area and ventilation shafts;
- Demolition and removal of all buildings and structures;
- Ripping of all compacted areas, which will be followed with amelioration and vegetation;
- Ensure that all remaining piles and slopes are sufficiently shaped to blend in with the surrounding environment;
- Amelioration and vegetation of all disturbed areas;
- Maintenance of all re-vegetated areas up until such areas initiate succession and create a sustainable cover;
- Monitoring of key environmental variables (i.e. soils, vegetation, groundwater and surface water) in order to demonstrate stability during decommissioning of rehabilitated areas; and
- Weed management after closure, limited to areas disturbed by mining or included as infrastructure related to the mine.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> • Ripping and topsoil replacement will restore the soil physical characteristics prior to re-vegetation. This is a positive impact to the environment. With the 	<ul style="list-style-type: none"> • To promote revegetation on site. 	<ul style="list-style-type: none"> • NEMBA 	<ul style="list-style-type: none"> • Compacted soils will be ripped and topsoil will be replaced. After the topsoil has been replaced the area should be ameliorated and seeded, should self-succession of vegetation not take place. Only species indigenous to the area will be included. • The recovered soils should be re-used to rehabilitate the mine footprint following mine closure. • During rehabilitation replace soil to appropriate soil depths in the correct order, and cover areas to achieve an appropriate topographic aspect and attitude so as to 	<ul style="list-style-type: none"> • Ripped topsoil. • Improved revegetation. 	<ul style="list-style-type: none"> • Inspection Report. 	<ul style="list-style-type: none"> • EM. 	<ul style="list-style-type: none"> • During rehabilitation.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
completion of the rehabilitation, wetland function will slowly improve as the disturbances will be reduced.			<p>achieve a free draining landscape that is as close as possible the pre-mining land capability rating as possible.</p> <ul style="list-style-type: none"> A short-term fertilizer programs should be based on the soil chemical status after levelling and should consists of a pre-seeding lime and fertilizer application, an application with the seeding process as well as a maintenance application for 2 to 3 years after rehabilitation or until the area can be declared as self-sustaining by an appropriately qualified soil scientist. 				
<ul style="list-style-type: none"> Increased sediment movement off the site. 	<ul style="list-style-type: none"> To prevent sediment movement off site. 	<ul style="list-style-type: none"> CARA NEMA 	<ul style="list-style-type: none"> All decommissioning activities should be undertaken towards the end of winter and before the onset of the first summer rains as this would markedly reduce the likelihood of erosion caused by surface runoff and rainfall. Decommissioning activities should also be limited to the 15m wide servitude as far as practically possible. In addition, all bare soil areas should be ripped and revegetated as soon as possible following completion of decommissioning activities. Re-vegetated areas should be monitored to ensure successful establishment of natural 	<ul style="list-style-type: none"> No visible erosion. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During rehabilitation.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			vegetation, and all alien vegetation should be removed from these areas, with long-term follow up.				
<ul style="list-style-type: none"> Site compaction. 	<ul style="list-style-type: none"> To prevent compaction of soils on site. 	<ul style="list-style-type: none"> CARA. 	<ul style="list-style-type: none"> All areas not directly within the footprint of the proposed infrastructure where the soil has been compacted will need to be ripped to break up the compacted soil surface. This will aid infiltration and decrease run-off. All ripped areas need to be revegetated with a suitable mix of plant species as determined by a qualified botanist. All revegetated areas should be monitored to ensure successful re-establishment of natural vegetation and to prevent invasion by alien species. 	<ul style="list-style-type: none"> No compaction. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During rehabilitation.
<ul style="list-style-type: none"> Re-vegetation will be undertaken on the decommissioned and rehabilitated areas before mine closure. This will be a positive 	<ul style="list-style-type: none"> Improve revegetation during decommissioning. 	<ul style="list-style-type: none"> NEMBA 	<ul style="list-style-type: none"> Compacted soils will be ripped and topsoil will be replaced. After the topsoil has been replaced the area should be ameliorated and seeded, should self-succession of vegetation not take place. Only species indigenous to the area will be included. Remove alien vegetation post decommissioning, with long term follow-up afterwards. 	<ul style="list-style-type: none"> Revegetation on site. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During rehabilitation.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
impact to the flora and fauna of the area.							
<ul style="list-style-type: none"> Runoff from rehabilitated areas will impact on watercourses especially during intensive rainstorms especially if the area is not free draining. 	<ul style="list-style-type: none"> To reduce runoff from rehabilitated areas. 	<ul style="list-style-type: none"> CARA. NEMA. 	<ul style="list-style-type: none"> Berms, should they be necessary, must remain upstream and downstream of the dumps and stockpiles to ensure that clean water is kept separate from dirty water until the area is free draining and re-vegetation has occurred. 	<ul style="list-style-type: none"> No visible erosion. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During rehabilitation.
<ul style="list-style-type: none"> Groundwater quantity: Groundwater levels in the mining area will start to recover when the mine dewatering stops. This 	<ul style="list-style-type: none"> To prevent groundwater reduction. 	<ul style="list-style-type: none"> NWA. 	<ul style="list-style-type: none"> Farm boreholes will be impacted on during operational phase. This will continue for another 10 years until groundwater levels will recover to pre-mining conditions. Impact on regional stream flow will be minimal and will return to conditions approximately 20 years after closure. Boreholes that will not be used by any farming activities after the mine closed will be plugged to ensure the safety thereof and 	<ul style="list-style-type: none"> No reduction in groundwater quantity. No complaints from landowners. 	<ul style="list-style-type: none"> Water monitoring report. Inspection Report. Complaints register. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During rehabilitation.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<p>will lead to the re-establishment of the groundwater levels, flow directions and flow gradients to near pre-mining levels. This will re-establish the base flow rates within the zone of influence.</p> <p>Negative: contaminants might lead to decant and migrate away from the area.</p> <p>Will take approximately 20-25 years to recover.</p>			<p>that no unauthorised use of the water will occur.</p>				

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> Quality: Mining occurs in deep elevations, especially toward the south west and seepage from underground workings will be limited by low permeability of sandstone layers. Impact on surrounding aquifer will be small. Decant of poor quality water into the stream/river system will be highly unlikely. 	<ul style="list-style-type: none"> To prevent groundwater contamination from decant. 	<ul style="list-style-type: none"> MPRDA. NEMA. NWA. 	<ul style="list-style-type: none"> The mined out areas should be allowed to be submerged as soon as practically possible, this will displace oxygen and stop oxidation of the minerals. The impact is difficult to effectively mitigate and is dependent on the natural rock characteristics. Ideally a sufficient barrier should be left along the outside ridge of the pre body to stop seepage along the coal / sediment contact to daylight. All infrastructure, product stockpile areas and the remaining footprint will be cleared. 	<ul style="list-style-type: none"> No groundwater contamination. Co complaints from water users. 	<ul style="list-style-type: none"> Water monitoring report. Complaint register. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During rehabilitation.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> The rehabilitation (ripping, topsoil replacement and landscaping) will remove the visual incongruity. An overall visual improvement will be noticed once all mining related infrastructure has been demolished and the area has been landscaped and revegetated. In general the removal of 	<ul style="list-style-type: none"> To promote visual aesthetics . 	<ul style="list-style-type: none"> NEMA. 	<ul style="list-style-type: none"> Limit the decommissioning activities to the 15m conveyor servitude as far as possible. Final shaping will be implemented, such that, the final profile of the rehabilitated mining areas are formed to emulate natural contours of the area. All infrastructures will be removed, and the area rehabilitated. Foundations will be removed to a depth of 1m below the surface. All material recovered from the demolition of buildings and/or structures will either be transported to a permitted disposal site, or made available to the local community as building materials (provided they are in a satisfactory condition following demolition). Linear infrastructure constructed by the mine (i.e. roads, conveyors and power lines) will be removed if it proves to inhibit land use at decommissioning. All fences erected around the mine will be dismantled and either disposed of at a permitted disposal site. 	<ul style="list-style-type: none"> Improved visual appearance. 	<ul style="list-style-type: none"> Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During rehabilitation.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
infrastructure is seen as a positive impact to the environment.							
<ul style="list-style-type: none"> Traffic to and from the mine during the decommissioning and rehabilitation phase will cause noise disturbance until the area is cleared. 	<ul style="list-style-type: none"> To reduce noise induced by traffic. 	<ul style="list-style-type: none"> Noise Regulations NEMA. 	<ul style="list-style-type: none"> Speed control measures to be implemented and enforced; Road surface to be maintained on a weekly basis. 	<ul style="list-style-type: none"> No noise. 	<ul style="list-style-type: none"> Complaints register. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During rehabilitation.
<ul style="list-style-type: none"> Possibility of the loss of employment opportunities for current employees after the mine has close. 	<ul style="list-style-type: none"> To prevent loss of employment. 	<ul style="list-style-type: none"> Basic Conditions of Employment Act. Unemployment Insurance 	<ul style="list-style-type: none"> The mine will plan for closure in terms of the closure objectives as they are set out in the Social and Labour Plan requirements for the DCM Mine Complex. The mine will continue with the skills development programme to empower the workforce to undertake other activities after the closure of the mine, at other operations. 	<ul style="list-style-type: none"> No loss of employment opportunities 	<ul style="list-style-type: none"> Inspection Report. HR Records. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During rehabilitation.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
		ce Fund.					
<ul style="list-style-type: none"> Fugitive dust emissions from the rehabilitation activities will negatively affect the air quality. 	<ul style="list-style-type: none"> To prevent dust generation. 	<ul style="list-style-type: none"> Dust Regulations NEMA. 	<ul style="list-style-type: none"> A dust management programme must be continuously implemented. Dust suppression techniques will be implemented. 	<ul style="list-style-type: none"> No visible dust from site activities. Complaints from landowners. 	<ul style="list-style-type: none"> Complaints register. Inspection Report. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> During rehabilitation.
<ul style="list-style-type: none"> Loss of agricultural land. 	<ul style="list-style-type: none"> To prevent loss of agricultural land. 	<ul style="list-style-type: none"> CARA 	<ul style="list-style-type: none"> The footprint should be ripped at 25 cm to alleviate compaction as part of rehabilitation. Stored topsoil should be replaced (if any) and the footprint graded to a smooth surface. The landscape should be backfilled and re-profiled to mimic the natural topography for potential agricultural activities and grazing opportunities post mining. If possible, ensure a continuation of the pre-mining surface drainage pattern. The soil layers should be put back in the reverse order of stripping (e.g. subsoil first then followed by topsoil). 	<ul style="list-style-type: none"> No loss in soil fertility. 	<ul style="list-style-type: none"> Inspection Report. Soil analysis. 	<ul style="list-style-type: none"> EM. 	<ul style="list-style-type: none"> Rehabilitation.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<ul style="list-style-type: none"> It is recommended that soil quality assessments (through laboratory analysis) be conducted prior to establishing vegetation on the rehabilitated. The analytical data should be evaluated by a suitably qualified expert, and soil fertility or soil acidity problems should be corrected prior to vegetation establishment. Slopes of the backfilled surfaces should change gradually since abrupt changes in slope gradient increase the susceptibility for erosion initiation. 				

8.4.3 Closure and Residual Impact Phase

The following Management Measures and Action Plans relates to activities associated with the Closure and Residual Impacts remaining after closure. The main environmental closure objectives, in addition to the objectives presented can be summarized as follows:

- Mitigation of all environmental impacts and addressing all environmental aspects on the basis of the EMP;
- To ensure an effective surface runoff control system in order to deal with the separation of clean and dirty water;
- Rehabilitate areas as soon as possible;
- The sustainable and safe rehabilitation of all activities, in order to address all environmental impacts as far as practical according to the EMP;
- The sustainable rehabilitation of all activities and the mining area as a whole in order to ensure a sustainable endues for the majority of the activity sites/areas;
- Return of land to its pre-mining state where possible (i.e. agriculture/grazing for the majority of the mine's lease area);
- Make all areas safe for both humans and animals;
- Ensure that all areas remaining upon closure are stable, which will prevent dust and water erosion;
- Minimise the impact on the local community;

- Minimise the impact on the surrounding economic environmental and other mining activities;
- Maintenance requirements for rehabilitated activity areas/sites need to be established and documented within the capability of the subsequent land user;
- Financial provision for post closure maintenance cost of rehabilitation activity area/sites will at all times be appropriate to provide for premature closure in terms of the MPRDA;
- No rehabilitation work, demolition of buildings shall take place without the approval of the Business Unit Manager in consultation with the Manager (Group Environmental Manager); and
- Final rehabilitation of all infrastructures shall be completed within a period as specified in the appropriate closure document and rehabilitation activities will comply with the specifications as per the appropriate closure document. Should the mine, due to unforeseen circumstances, need to deviate from the closure plan, approval from the DMRE and relevant State Departments will be obtained.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
<ul style="list-style-type: none"> • Decant of acid mine drainage: With rising groundwater levels the risk of decant from the mining area increase. Any seepage into the mining area will find its way towards the lowest point in the mine where it 	<ul style="list-style-type: none"> • To manage decant water. 	<ul style="list-style-type: none"> • MPRDA • NEMA. 	<ul style="list-style-type: none"> • It is very difficult to mitigate against AMD, as is evidenced by the water quality concerns within the Upper Olifants catchment. • In order to manage AMD, it is important that a detailed water balance be calculated for the mine and that the expected decant points and decant qualities are determined. Water influx into the mine should also be kept to the absolute minimum possible. In this regard the fracturing of the overlying strata due to blasting or surface subsidence should be avoided at all cost, so as to prevent increased infiltration of surface water into the mine workings. Treating of decanting mine water to acceptable water quality levels can be 	<ul style="list-style-type: none"> • No decant visible. 	<ul style="list-style-type: none"> • Inspection Report. • Water monitoring report. 	<ul style="list-style-type: none"> • EM. 	<ul style="list-style-type: none"> • Decommissioning.

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
will accumulate, and the mine void area will start to fill. Decant at the topographical lowest point is likely.			<p>achieved by the installation of a treatment plant. DCM must continue with the investigations to the most effective way to possibly treat water on site if needed at the end of LoM. The level to which the water is treated depends on the use of the water after treatment but should be determined in consultation with the DWA. As a minimum, treated water should meet the standards for use for livestock watering and irrigation. Water treatment plants are however very energy intensive, raising questions about the long term viability of treatment plants as a solution to AMD, especially given the energy crisis in South Africa and South Africa's dependence on coal as a source of electricity. The installation of a Reverse Osmosis plant should be seen as a last option. Hodgson <i>et al.</i> (WRC Report 1263/1/07; 2007) recommend the following measures for management of mine water: The feasibility and effectiveness of employing these measures at Dorstfontein should be investigated.</p> <p>1) Select the mining method based on environmental considerations (deep</p>				

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
			<p>bord-and-pillar mining generates the smallest water volumes, opencast mining the highest. Underground mining is preferred to opencast);</p> <p>2) Mine from deep to shallow;</p> <p>3) Flood the mine workings;</p> <ul style="list-style-type: none"> • Flush the mines after being flooded. • Surface water monitoring of the streams will be essential. Quarterly groundwater sampling should be done to establish a database of plume movement trends, to aid eventual mine closure. • The drilling of boreholes into mining areas is recommended so that recovery of water in mining areas can be monitored. Intercepting decant by a downstream trench or subsurface drains is an option to investigate. • The impacts of the mitigation measures should be assessed by water and wetland specialists. If a risk of impact on the surface water bodies is established, a remediation action plan should be developed to negate the potential impact. 				
<ul style="list-style-type: none"> • Deterioration in water 	<ul style="list-style-type: none"> • To avoid contamina 	<ul style="list-style-type: none"> • NWA. • NEMW 	<ul style="list-style-type: none"> • The same mitigation measures as mentioned during the operational phase 	<ul style="list-style-type: none"> • No deterioratio 	<ul style="list-style-type: none"> • Water monitoring 	<ul style="list-style-type: none"> • EM. 	<ul style="list-style-type: none"> • During operati

Possible Impact	Objective	Applicable Legislation/ Policy	Mitigation / Management Action	Performance Indicator	Monitoring Criteria	Responsible Agent	Monitoring Frequency
quality to the co-disposal facility (discard dump) and the PCDs.	tion of water due to the co-disposal facility.	A. • MPRDA	<p>will apply and should be maintained until such a time as seepage water out of the mine dump conforms to the relevant standards for aquatic ecosystems. Rehabilitation of the mine dump should also be undertaken in such a way as to limit infiltration of rainwater into the mine dump. The use of a clay layer under the topsoil should be investigated and implemented if feasible.</p> <ul style="list-style-type: none"> • The DCM's current closure financial provision accounts for the capping of the discard dump with a 300 mm thick engineered soil cover. This will reduce the amount of seepage coming from the facility and will reduce oxygen influx. • Mitigation measures should be maintained until such a time as seepage water from the discard dump facility conforms to the relevant standards for aquatic ecosystems. • If a risk of impact on the surface water bodies is established, a remediation action plan should be developed to negate the potential impact. 	<p>n in water quality.</p> <ul style="list-style-type: none"> • No complaints from landowners 	<p>report.</p> <ul style="list-style-type: none"> • Complaints register. 		<p>onal and decommissioning phase. Implement throughout LoM.</p>

9 MONITORING MANAGEMENT PROGRAMME

9.1 HYDROLOGICAL AND HYDROGEOLOGICAL MONITORING REQUIREMENTS

9.1.1 APPLICABLE LICENCES

Competent Authority	Authorised Activities	Licence No	Issue Date	File Number
Department of Human Settlement Water and Sanitation.	<p>Section 21(a) – Taking of water from a water resource;</p> <p>Section 21(c) – Impeding or diverting the flow of water in a water course;</p> <p>Section 21(i) – Altering the bed, banks, course or characteristics in a watercourse;</p> <p>Section 21(g) – Disposing of waste in a manner which may detrimentally impact on a water resource; and</p> <p>Section 21(j) – Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.</p>	04/B11B/ACGIJ/506.	21st November 2011 amended on the 5 th June 2017.	16/2/7/B100/C60.

9.1.2 Reporting

Reporting on surface and groundwater quality and quantity conditions will be included in the quarterly reports for the mine, an annual report will be submitted to the relevant authorities i.e., Department of Human Settlement Water and Sanitation.

The quarterly report will be an update of the database with time-series graphs, statistical analysis (average, maximum, minimum, 5, 50 and 95 percentile values as well as linear performance). Laboratory results will be analysed against the target water quality guidelines for domestic use, livestock watering and irrigation (according to the South African Water Quality Guidelines, 1996: DWAF). The strictest value between the target water quality objectives or objectives through a reserve determination will be used.

In terms of flow, all water uses and discharges will be measured on an ongoing basis. The flows include:

- Make-up water;
- Volumes of groundwater pumped out for mine dewatering purposes;
- Volumes of water pumped from the plant as part of slimes;
- Volumes of contaminated water that is recovered and used in the plant or for dust suppression; and
- Volumes of water in terms of the internal water flow processes.

An annual detailed water quality audit report on the surface and groundwater quality will be prepared that will analyse the water quality situation in detail to investigate trends and non-compliance. The report will be submitted to the relevant authorities as required by license conditions. Should the monitoring data indicate that the groundwater conditions are adversely affected, additional studies will be undertaken if it is deemed necessary.

9.1.2.1 Data Management

Monitoring results would be entered into an electronic database as soon as results are available, and at no less than one monthly interval, allowing:

- Data presentation in tabular format;
- Time-series graphs with comparison abilities;
- Statistical analysis (minimum, maximum, average, percentile values) in tabular format;
- Graphical presentation of statistics;
- Linear trend determination;
- Performance analysis in tabular format;
- Presentation of data, statistics and performance on diagrams and maps; and
- Comparison and compliance to South African Water Quality Guidelines and any other given objectives.

As far as possible, the same monitoring points will be used from the construction phase through the operational and decommissioning phases to after mine closure to develop a long term data record and enable trend analysis and recognition of progressive impacts with time.

9.2 HYDROLOGICAL MONITORING (SURFACE WATER)

Various perennial and not-perennial rivers characterize the area of the DCM. The mine has, however adopted a no-discharge policy, which will ensure that all dirty water on the mine property will remain within the mining area. Due to the mines commitment on not polluting the surrounding water in the area, the mine will reuse dirty water contained within the dirty water systems (i.e. pollution control dams).

Water monitoring points will be surveyed and indicated on a map with every monitoring report. Table 24, 25 and 26 indicates the recommended positions and parameters to be monitored. The surface water locations are included in Figures 9 below.

Table 23: Current Surface Water Monitoring Points

Dorstfontein Seam 2 Mine				
Point	Latitude	Longitude	Surface Water Locations	Monitoring Frequency
DFSW1	-26.22981	29.30299	Small stream passing through the mine. Steenskoolspruit tributary	Monthly
DFSW3	-26.2263	29.30459	Upstream in the tributary to the passing through the mine. Upstream of DFW1	
DFSW4	-26.22918	29.29163	Above the bridge. Downstream of DFW1	
DFSW5	-26.22753	29.29844	Seepage from the discard dump	
DFSW6	-26.23135	29.29768	Downstream of DFW1 on Steenskoolspruit tributary	
DFSW7	-26.22968	29.30319	Small stream entering tributary to Steenskoolspruit at DFW1	
DFSW2	-26.22879	29.2959	Pollution dam no.1	
DFSW8	-26.22932	29.2972	Pollution dam no. 2	
DFSW9	-26.22955	29.29826	Pollution dam no. 3	

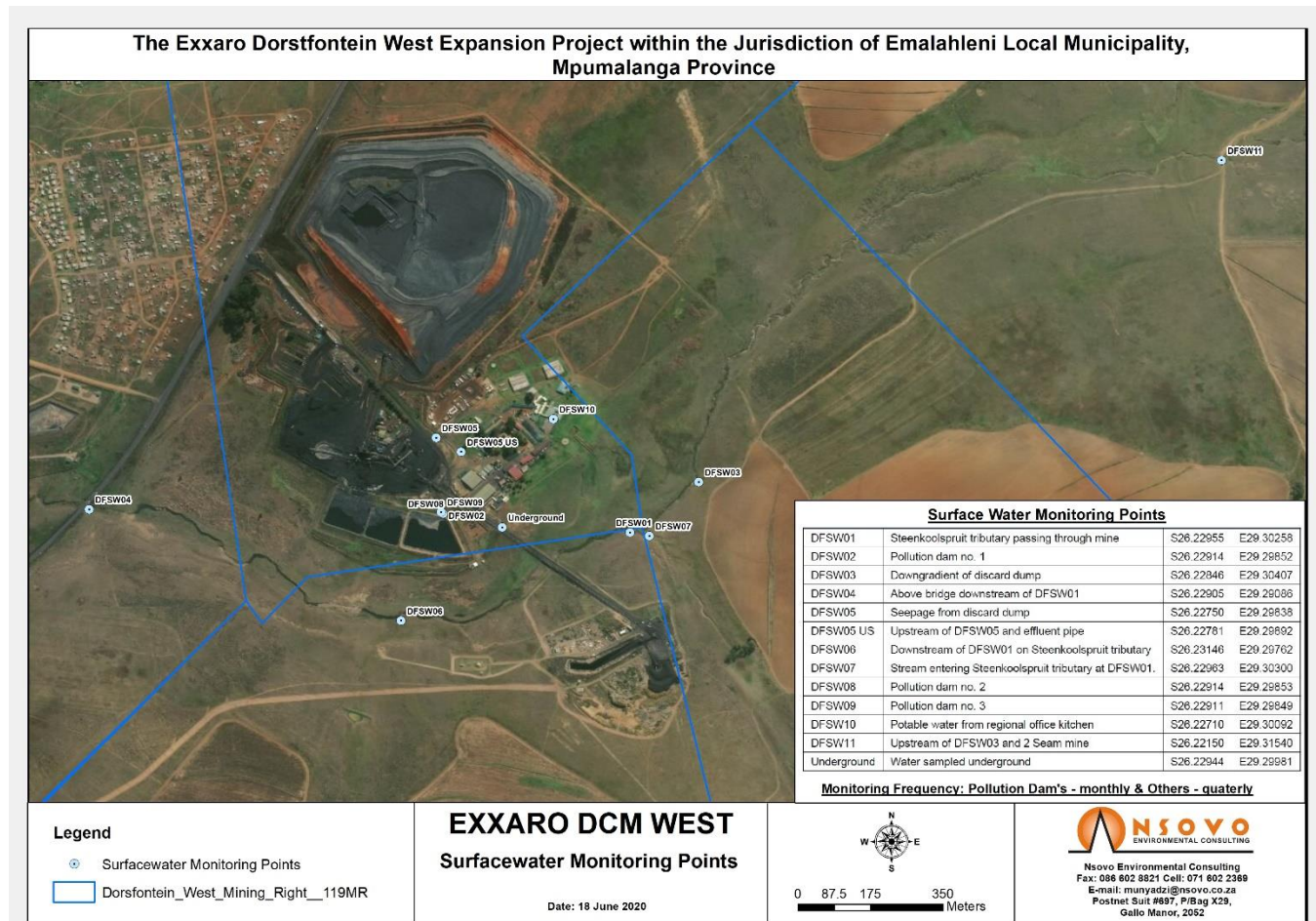


Figure 15: DCM West Surface water monitoring points

Table 24: Surface Water Monitoring Parameters

Constituent	Class 0 (Ideal)	Class 1 (Acceptable)	Class II (Max. Allowable)	Class III (Exceeding)
pH Value @20°C	6.0-9.0	5-6 or 9.0-9.5	4-5 or 9.5-10	<4 or >10
Conductivity mS/m@25°C	<70	70-150	>150-370	>370
Total Dissolved Solids	<450	450-1000	1000-2400	>2400
Calcium, Ca	<80	80-150	>150-300	>300
Calcium Hardness as CaCO ₃	N/S	N/S	N/S	N/S
Magnesium, Mg	<30	30-70	>70-100	>100
Magnesium Hardness as CaCO ₃	N/S	N/S	N/S	N/S
Total Hardness as CaCO ₃		100-200 (Fairly Hard)	200-300 (Hard)	>300 (Very Hard)
Sodium, Na	<100	100-200	200-400	>400
Potassium, K	<25	25-50	50-100	>100

Free and Saline Ammonia as NH ₄	N/S	N/S	N/S	N/S
Total Alkalinity as CaCO ₃	N/S	N/S	N/S	N/S
Bicarbonate, HCO ₃	N/S	N/S	N/S	N/S
Carbonate, CO ₃	N/S	N/S	N/S	N/S
Chloride, Cl	<100	100-200	>200-600	>600
Sulphate, SO ₄	<200	200-400	>400-600	>600
Nitrate, NO ₃	N/S	N/S	N/S	N/S
Nitrate as N	<6.0	6.0-10	>10-20	>20
Fluoride, F	<0.5	0.5-1	1-1.5	>1.5
Total Suspended Solids	N/S	N/S	N/S	N/S
Langier Saturation Index (pH-pHs)	N/S	N/S	N/S	N/S
Sodium Absorption Ration (SAR)	N/S	N/S	N/S	N/S
Aluminium, Al	<0.15	0.15-0.3	>0.3-0.58	>0.58
Manganese, Mn	<0.05	0.05-0.1	>0.1-1	>1
Iron, Fe	<0.01	0.01-0.2	>0.2-2	>2
Chromium, Cr	<0.01	0.01-0.1	0.1-0.5	>0.5
Phosphorus as P	N/S	N/S	N/S	N/S

9.3 HYDROGEOLOGICAL MONITORING (GROUNDWATER)

A detailed groundwater monitoring programme will be implemented. Samples will be analysed for chemical and physical constituents normally associated with coal mining and expected impacts at specific areas as determined during risk assessments. Water samples will be taken around the mining area as well as at the co-disposal facility, coal stockpile areas and other pollution control facilities on a quarterly basis.

The monitoring program should continue with current monitoring points and should be expanded to incorporate the proposed monitoring boreholes as identified on the Monitoring Map. The monitoring program will be conducted according to the recommendations as set out in the approved license. The boreholes that have been included in the monitoring program (Table 27 and 28) are monitoring boreholes and fall within the proposed mining area. The borehole locations are included in Figures 10 below.

Table 25: Current DCM West Groundwater Monitoring Points

Dorstfontein West Mine					
Point	Latitude	Longitude	Groundwater Monitoring Points	Monitoring Frequency	
				Levels	Sampling
DFGW8-08	26 15' 42.05"	29 18' 48.095	Far south of Dorstfontein Seam 2	Monthly	Quarterly
DFGW9-08	26 13' 37.97"	29 19' 35.735"	East of Dorstfontein Seam 2, next to R544		
DFGW10-08	26 13' 58.07"	29 18' 44.975"	South-east of Dorstfontein Seam 2		
DFGW11-08	26 13' 20.09"	29 19' 6.875"	Further upstream of DFGW12-08		
DFGW12-08	26 13' 33.11"	29 18' 21.935"	Upstream of DFSW3		
DFGW14-08	26 13' 23.45"	29 18' 9.635"	Next to DFGW7		
DFGW15-08	26 13' 31.37"	29 18' 8.675"	South of DFGW14-08 and northeast of DFGW5		
DFGW16-08	26 15' 15.71"	29 19' 30.815"	North-east of DFGW8-08		
DFGW1	-26.23121	29.30131	Close to boxcut. South of Steenskoolspruit tributary	Monthly	Quarterly
DFGW2	-26.23123	29.30127	Adjacent to DFGW1		
DFGW3	-26.23009	29.29725	Below pollution dam no. 2		
DFGW4	-26.22629	29.29944	. Downstream of discard dump.		
DFGW5	-26.21934	29.29695	Along R544, adjacent to the cemetery. Up gradient of discard dump		
DFGW6	-26.22945	29.29554	Adjacent of Pollution dam 1.		
DFGW7	-26.22318	29.30266	Below the dump. Downstream of discard dump.		

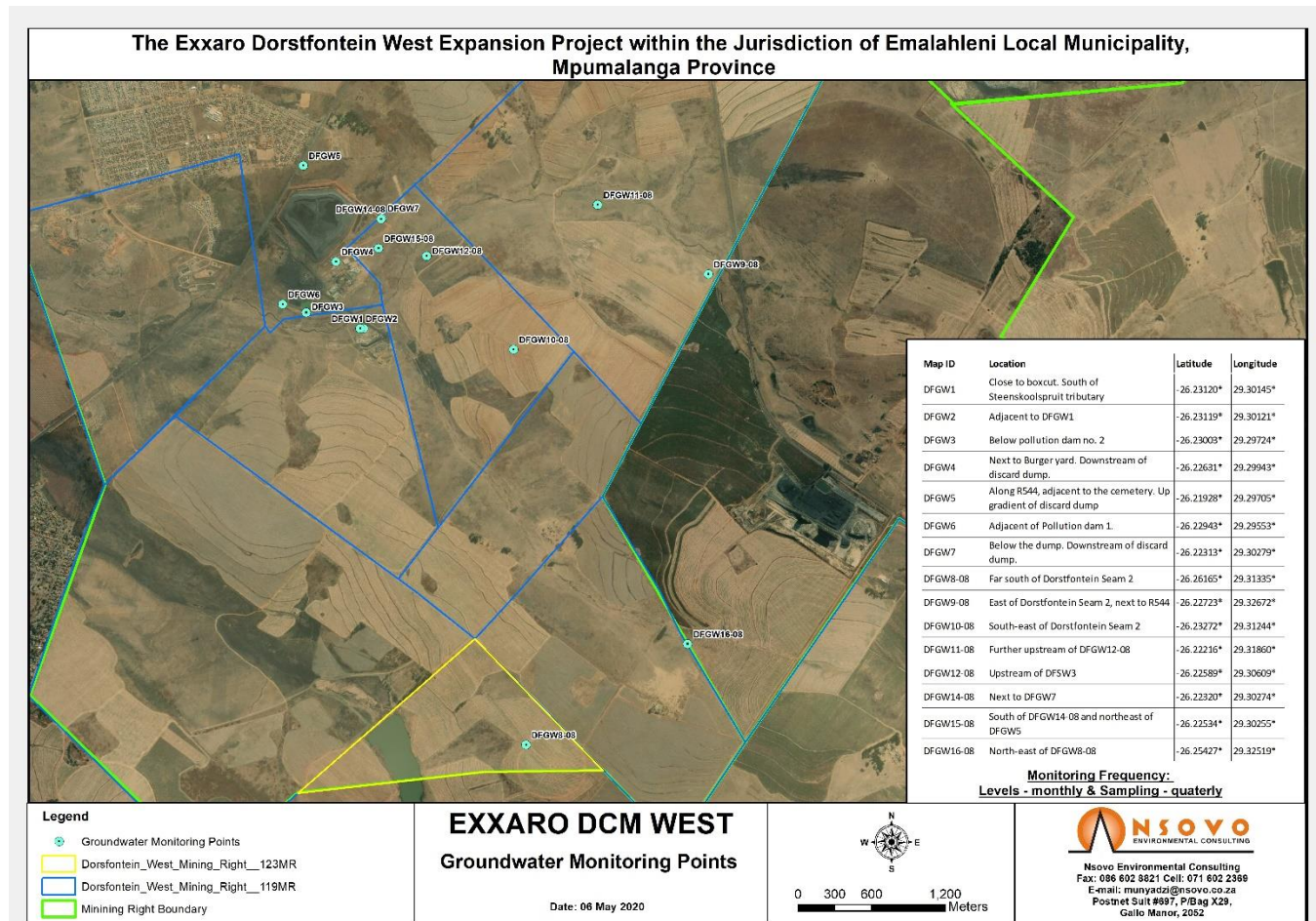


Figure 16: DCM West Ground water monitoring points

Table 26: Proposed Groundwater Monitoring Points

Point	South	East	Latitude	Longitude
G1	26°-13'-40.5"S	29°16'43.8"E	-26.2279	29.27884
G2	26°-14'-33.1"S	29°16'50.7"E	-26.2425	29.28077
G3	26°-14'-50.2"S	29°17'19.1"E	-26.2473	29.28866
G4	26°-16'-59.5"S	29°19'7.2"E	-26.2832	29.31869
G5	26°-16'-20.6"S	29°19'42"E	-26.2724	29.32835
G6	26°-17'-14.3"S	29°19'57.4"E	-26.2873	29.33262
G7	26°-16'-17"S	29°20'55.8"E	-26.2714	29.34884
G8	26°-17'-35.7"S	29°21'58.9"E	-26.2933	29.36636
G9	26°-16'-38.3"S	29°22'8.1"E	-26.2773	29.36892
G10	26°-14'-56.6"S	29°20'55.9"E	-26.2491	29.34887

9.3.1 Post-Closure Phase Monitoring

Regarding post-closure monitoring points in the underground voids, exact locations can be targeted towards the end of life of mine based on the following criteria:

- The monitoring points can only be installed after mining activities have been completed.
- For DCMW the following number of monitoring points are proposed:
 - Three (3) borehole for No. 2 Seam; and
 - Three (3) borehole for No. 4 Seam.
- As the aim is to measure recovering groundwater levels these points should be installed at the deepest points for each seam.

Installation and exact location of the monitoring points needs to be done accurately in order to prevent groundwater flow from the one seam into the other; if underground voids for No. 2 Seam and No. 4 Seam overlap at the monitoring location, the monitoring point for No. 2 Seam must be drilled through a pillar, not a void, in No. 4 Seam.

A closure water management plan should be developed. This should assess the management of decant via channelled decant or the management of a critical water level to minimise contamination of the shallow weathered aquifer.

The numerical model should be updated once every three years or after significant changes in mine schedules or plans by using the measured water ingress and water levels to re-calibrate and refine the impact predictive scenario.

9.4 DUST MONITORING

9.4.1 Applicable Licences

An air quality network will be established for the mine. The dust fallout network will be based on all the potential air pollutants inherent to a coal mining operation and associated processing plant. A single bucket non directional and monitoring is being undertaken. The sampling methodology and analysis for the dust fall must be according to the ASTM D 1739 method.

Dispersion modelling will be also used to estimate the level of air pollution that can be expected at DCM West, as well as to provide information to inform the air quality network to be established.

The proposed dust fallout network can be used to meet various objectives, such as:

- Compliance monitoring;
- Validate dispersion model results;
- Use as input for health risk assessment;
- Assist in source apportionment;
- Temporal trend analysis;
- Spatial trend analysis;
- Source quantification; and
- Tracking progress made by control measures.

The prominent air pollution parameters to be measured on site include particulate matter, dust, wind speed and emissions inherent to the coal processing plant, mining areas and the co-disposal facility. A monthly report must be compiled detailing the outcomes of the dust monitoring programme. This report must be kept on the mine and must be available for the surrounding public and/or government agencies on request. Table 30 below provides the current DCM dust monitoring points and Figure 11 illustrates the location of the points.

Table 27: Current DCM Dust Monitoring Points

Point	Latitude	Longitude	Monitoring Frequency
Dorstfontein T1	26°14'6,21"	29°18'13,27"	Monthly within 30 days (+-3 days)
Dorstfontein T2	26°13'40,9"	29°18'03,1"	
Dorstfontein T4	26°13'09,5"	29°17'42,2"	
Dorstfontein T10	26°13'42,80"	29°17'33,38"	
Dorstfontein New 1	26°13'13,60"	29°18'16,14"	
Dorstfontein New 2	26°14'45,0"	29°18'36,9"	
Dorstfontein New 3	26°14'40,5"	29°18'52,5"	

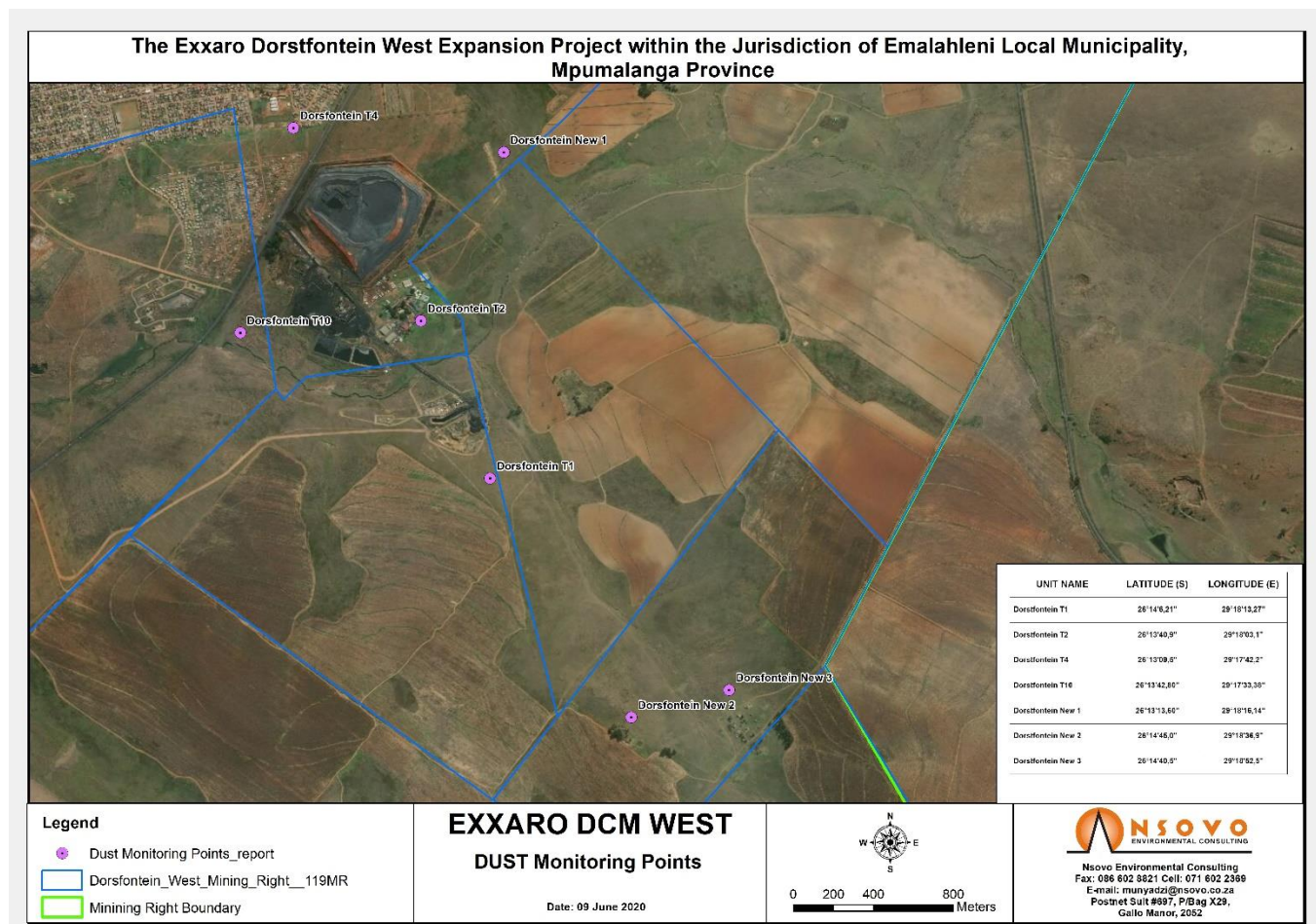


Figure 17: Dust monitoring points

9.5 BIOMONITORING PROGRAMME (SASS5 AND TOXICITY TESTING)

The biomonitoring programme will include the following River Health Indices: Invertebrate Habitat Assessment System (IHAS) and the latest SASS (South African Scoring System). The biomonitoring investigations will be undertaken bi-annually to establish the current status of the rivers and surrounding tributaries that transects the mining area.

In terms of site selection for biomonitoring, the following river biotopes need to be present within a perennial river in order to be suitable for biomonitoring:

- Stones biotope;
- Vegetation biotope; and
- Gravel, Sand and Mud (GSM) biotope.

The baseline information of the aquatic health of the rivers will be used for comparison during the investigation and future biomonitoring studies/surveys. The biomonitoring investigation will fulfil several roles including:

1. Determine the Present Ecological State of the various affected river system/s;
2. Define areas of aquatic ecological sensitivity; and
3. Provide recommendations for the maintenance/improvement of the present ecological state of the river system.

9.6 METHODOLOGY

9.6.1 Fieldwork Phase

The fieldwork will be based on the following indices:

- Monitoring and assessing of freshwater macro-invertebrate communities, both diversity and abundance. Assessment will be based on the SASS5 index according to the protocol of Dickens & Graham (2001);
- Assessing the condition and availability of invertebrate habitats of the site being sampled according to the protocol of Kleynhans (1999). This assessment is referred to as the Invertebrate Habitat Assessment System (IHAS).
- In situ water quality parameters will be measured, i.e. pH, electrical conductivity, dissolved oxygen and temperature.
- Raw water will be collected from the monitoring sampling sites for WET testing.
- Grab water samples of 2 litres will be collected at each sampling site. A grab sample represents a “snap shot view” of the effluent present at the sampling sites.
- The assessment of fish assemblage’s integrity based on the FRAI index at identified sites.

9.6.2 Lab Analysis

Concomitant laboratory Screening Toxicity tests will be conducted to determine any possible problems with the water samples. With the screening test the organisms are directly exposed to the effluent (100%) and to one dilution of the effluent (50%). At various times during the exposure period the response of the organisms in each test concentration will be observed and recorded and the number of responses in relation to the test concentrations analysed.

9.6.3 Bi-annual Biomonitoring Report

GCS will provide the client with two bi-annual biomonitoring reports (one winter biomonitoring survey report and one summer biomonitoring survey report) once the fieldwork has been undertaken and all fieldwork findings interpreted.

The bi-annual biomonitoring reports will cover the following aspects:

- Baseline information;
- Fieldwork data analysis and interpretation;
- Comparative analysis of previous biomonitoring data (if available);
- Data interpretation of Toxicity Test analysis; and
- Data interpretation of FRAL.

9.7 NOISE

The following three (3) primary variables should be considered when designing acoustic screening measures for the control of sound and/or noise:

- The source - Reduction of noise at the source;
- The transmission path - Reduction of noise between the source and the receiver; and
- The receiver - Reduction of the noise at the receiver.

9.8 MONITORING PLAN IN TERMS OF CLIMATE CHANGE

The following monitoring must be implemented with respect to Climate Change Impacts

- Temperature and humidity levels must be monitored on site.
- A continuous monitoring station should be installed to obtain site specific wind data. Regular maintenance checks for wind-related damage should be performed.
- Regular monitoring of fuel and energy used on site.

9.9 MONITORING PLANS IN TERMS OF SOIL AND AGRICULTURE

A short-term fertilizer program should be based on the soil chemical status after levelling and should consist of a pre-seeding lime and fertilizer application, an application with the seeding process as well as a maintenance application for 2 to 3 years after rehabilitation or until the area can be declared as self-sustaining by an appropriately qualified soil scientist.

9.10 MINE ENVIRONMENTAL AUDITS

A register of environmental monitoring and auditing results will be available for inspection. This will also include compliance with environmental legislation. In order to ensure compliance with the environmental management programme and to assess the continued appropriateness and adequacy of the environmental management programme, the DCM commits to:

- Conduct the monitoring on an ongoing basis;
- Conduct the performance assessments of the environmental management programme every two years or as agreed by the Minister in writing;
- Compile and submit a performance assessment report to the Director: Mineral Development of the environmental management programme; and
- The above will be undertaken according to the Regulations (No.26275) of the Minerals and Petroleum Resources Development Act of 2002.

The mine further undertakes to:

- Appoint a responsible person(s), in writing, who will monitor all environmental aspects of the site on a regular basis. A copy of this letter of appointment including the relevant emergency numbers will be supplied to the Director: Mineral Development of the DMRE; and
- The appointed person will communicate, on a regular basis, with the local interested and affected parties identified with regards to the project and will report on the progress made with regards to implementation of the mitigation measures. Any complaints, with regards to the mining activity, will be reported to the appointed person and be recorded in the complaint register;

Compile a report with regards to the following issues, which will be submitted to the DMRE on a yearly basis:

- Quantities processed to be recorded on a monthly basis,
- Percentage of disturbed area rehabilitated (rehabilitation figures) – recorded on a three-monthly basis. A six-monthly report to be compiled,
- Water quality results,
- Water levels of identified boreholes, and
- A copy of the complaints registers.

10 ENVIRONMENTAL AWARENESS PLAN AND ENVIRONMENTAL EMERGENCY RESPONSE PLAN

Environmental Awareness Plan and Environmental Emergency Response Plan are available for use as separate document.

10.1 EMERGENCY RESPONSE PLAN

10.1.1 Defining an Environmental Response Plan

Environmental emergencies occur over the short term and require an immediate response. A mine, as part of its management tools, especially ISO 14001 and ISO 45001 compliant, should have an Emergency Response Plan. If one does not exist then one should be compiled and disseminated to all employees and contractors and in the event of an emergency, the emergency response plan should be consulted.

This plan should be placed around the mine where it will be easily viewed. The plan should contain a list of procedures, evacuation routes and a list of emergency contact numbers. It is advisable that the mine tests the emergency response plan in order to identify any areas for improvement.

If the emergency has the potential to affect surrounding communities, they should be alerted via alarm signals or contacted in person. The surrounding community will be informed, prior to mining taking place, of the potential dangers and emergencies that exist, and the actions to be taken in such emergencies.

Communication is vital in an emergency and thus communication devices, such as mobile phones, two-way radios, pagers or telephones, must be placed around the mine. A checklist of emergency response units must be consulted, and the relevant units notified.

The checklist includes:

- Fire department;
- Police;
- Emergency health services such as ambulances, paramedic teams, poisons centres;
- Hospitals, both local and further afield, for specialist care;
- Public health authorities;
- Environmental agencies, especially those responsible for air, water and waste issues;
- Other industrial facilities in the vicinity with emergency response facilities;
- Public works and highways departments, port and airport authorities; and
- Public information authorities and media organisations.

10.1.2 Emergency Procedures

10.1.2.1 The Event of an Injury to any person

In the Event of an Injury to any person the following Procedure should be followed.

1. Take down details from the person reporting the incident including the following:
 - telephone number of the person reporting the incident;
 - nature of injuries to accident victim;
 - if assistance is required from the paramedic;
 - where the accident victim is located;
 - if transport is required to case vac patient; and
 - Instruct the person reporting the incident to leave a messenger by the phone.
2. If the injuries are serious contact the following numbers:
 - Ambulance – 072 344 2344 (Speed Dial **999) Paramedics on the same number; or
 - Life Cosmos Hospital in Witbank at 013 653 800 Emergency Casualties
3. Await paramedics and instruct them to proceed to the accident site.
4. Notify security and inform them of ambulance arrangements and where the said vehicle must go to.
5. Inform the paramedic called out of the following:
 - telephone number of the person reporting the incident;
 - nature of injuries to accident victim or victims;
 - location of injury on body (arm, leg, head, etc.);
 - where the accident victim is presently;
 - what is the condition of victim (breathing, stable, etc.); and
 - if an ambulance is required to case vac victim from surface location to hospital.
6. If necessary, provide a guide, at security gate, to escort the ambulance or paramedics to the required location.
7. Inform your manager or the next senior manager of the accident.

NOTE:

The procedure does not change because there is more than one accident victim. One victim or 20 victims must be handled in the same manner.

10.1.3 Emergency Procedure for Duty Officials

In the event of an explosion or fire occurring in the underground environment, the following actions and phases must be taken by the duty official:

First Phase:

1. The following details of the incident from the reportee must be noted :
 - Nature of the incident, explosion, fire etc.;
 - Location of the incident, explosion, fire etc.;
 - If there are casualties and the nature and extent of their injuries;
 - Ask if the reportee requires assistance (rescue team, doctor, paramedic, transport etc.);
 - If the reportee and his team are going to or are in the rescue chamber;
 - The phone number of the reportee; and
 - Name of person reporting the incident.

2. Based on the above-mentioned information, the official on duty will take a decision whether to evacuate any or all other work areas of the mine, making use of the current escape plan for the section or area.
3. Report the incident to the mine manager and the Subordinate Manager.
4. If the mine manager is unobtainable then report the incident to the next lowest level of official (engineer, mine overseer, etc.).
5. Contact and call out the following personnel:
 - o The mine doctor and paramedics;
 - o Occupational hygienist (Ventilation Officer)
 - o The mine overseer for the incident area;
 - o The mine engineer; and
 - o The safety manager.
6. Begin a logbook or record of events putting in detail of times and who said what, where and when, going back to the original reportee.

NOTE:

- (i) The official will assume the position of the incident controller until relieved of that position by the newly appointed incident controller, i.e. (mine manager, engineer, etc.).
- (ii) It is important to ensure that all phone messages are kept to a minimum duration throughout the incident period.

Second Phase:

1. Appoint lamp room attendant as required in terms of this emergency standard procedure to conduct shaft clearance of evacuates.
2. If necessary, send for ER 24, fire brigade, police, etc.
3. Give feedback to newly appointed incident coordinator once he is present on the mine and hand over role to new incident coordinator.
4. Follow instructions of Mine Manager.
5. Refer all media enquiries to head office legal department.
6. Remain in position at control room until relieved.
7. Brief official on current situation.

NOTE:

Remember to maintain the logbook at all times and throughout the duration of the incident.

10.1.4 Process for Identifying Emergency Procedures

The process of identifying emergency situations at Dorstfontein Coal Mines is conducted in terms of the Aspects Registers and may include the following emergencies:

- Discard dump burning;
- Discard Dump Failure with Breach of Slurry Pond;
- Stockpile Burning;

- Pollution Control Dams Overflow;
- Pollution Control Dams Breach;
- Berm Breach/Drain Overflow;
- Hydrocarbon Spill (diesel, oil, grease, etc.); and
- Veldt Fires.

The necessary actions required, as well as the responsible person for ensuring that the actions are followed through and the reporting requirements, to ensure effective and efficient response to each of the environmental emergency situations listed above are set out in this procedure.

10.1.5 Most likely Potential Environmental Emergencies

The following define the most likely potential environmental emergencies:

- Accidents;
- Fires, spontaneous combustion on co-disposal facilities, and underground workings;
- A major hydrocarbon spill or leak;
- A major spill or leak of process water;
- Flooding;
- Explosions;
- Subsidence; and
- Dump Failure.

10.1.5.1 Accidents

In the case of a medical accident or problem, the mine should have at least a first aid kit available and a First Aid officer should be on duty at all times. It is preferential that the mine has a First Aid room or a small clinic. In the event of an emergency a checklist of emergency response units must be consulted, and the relevant units notified. In this case, many of the emergency services will be sourced from the nearest main town, Kriel or Witbank.

10.1.5.2 Fire

Veld fires and fires resulting from other sources must be handled with extreme caution. Fire extinguishers should be placed around the mine.

The procedure to be followed involves the following:

- In the event of a fire, an alarm should be activated to alert all employees and contractors.
- Identify the type of fire and the appropriate extinguishing material. For example, water for a grass fire, and mono ammonium phosphate-based fire extinguisher for chemical and electrical fires.
- In the event of a small fire the fire extinguishers placed around the mine should be used to contain and extinguish the fire.
- In the event of spontaneous combustion, the area should be covered with unweathered material.
- In the event of a large fire, the local area council's fire department will be notified and should react timeously.

- All staff will receive training in response to a fire emergency on site.
- A Fire Association should be set up with the mine and surrounding landowners to facilitate communication during fire events and assist in fighting fires, where necessary.
- If possible, all surrounding drains, such as storm water drains need to be covered and or protected to prevent any contaminated water from entering the drains.
- In case of a chemical or petroleum fire, run-off from the area should be contained as far as possible using the most appropriate measures e.g. spill absorbent cushions, sand or a physical barrier.
- Contaminated run-off must be diverted into an oil sump or cleaned up.

10.1.5.3 Major Hydrocarbon Spill:

Hydrocarbons such as diesel, petrol, and oil will be kept on site as fuel for the mine machinery. As this is a coal mine there is also the possibility of a coal spillage occurring. In the event of a spillage, procedures must be put into place to ensure that there are minimal impacts to the surrounding environment.

Diesel, engine oil and hydraulic oil are the most likely hydrocarbons identified during impact assessments that can result in an emergency situation. The following procedure applies to a major hydrocarbon spill:

- In the event of a small spillage, the soil should be treated in situ, using Hazmat clean up kits.
- Every precaution should be taken to prevent the spill from entering the surface water environment.
- In the event of a large spillage, adequate emergency equipment for spill containment or collection, such as additional supplies of booms and absorbent materials, will be available and if required, a specialised clean-up crew will be called in to decontaminate the area. The soil should be removed and treated at a special soil rehabilitation facility.
- Reasonable measures must be taken to stop the spread of hydrocarbons and secure the area to limit access.
- Dispatch necessary services.
- The incident must be reported to the Environmental Manager immediately.
- The Environmental Manager will assess the situation from the information provided and set up an investigation team or relevant personnel. Included in this team could be the Mine Manager, Chief Safety Officer, the employee who reported the incident and any individual responsible for the incident.
- When investigating the incident, priority must be given to safety.
- Once the situation has been assessed, the Environmental Manager must report back to the Mine Manager.
- The Mine Manager and the investigation team must make a decision on what measures can be taken to limit the damage caused by the incident, and if possible, any remediation measures that can be taken.
- The Environmental Officer or person in charge should have a list of company contact details that will facilitate with the clean-up operations.

10.1.5.4 Major Water Leak or Spill:

Dam wall failures and burst high-volume dirty water pipelines have been identified as potential emergency situations. The following steps should be followed:

- Turn off all water supply to the dam/pipeline.

- Dispatch necessary emergency services.
- Take all reasonable measures to stop the spread of contaminated water.
- The incident must be reported to the Environmental Manager immediately.
- The Environmental Manager will assess the situation from the information provided and set up an investigation team or relevant personnel. Included in this team could be the Mine Manager, Chief Safety Officer, the employee who reported the incident and any individual responsible for the incident.
- When investigating the incident, priority must be given to safety.
- Once the situation has been assessed, the Environmental Officer must report back to the Mine Manager.
- The Mine Manager and the investigating team must take a decision on what measures can be taken to limit the damage caused by the incident, and if possible, any remediation measures that can be taken.

10.1.5.5 Flooding:

There is potential for flooding during the rainy season, but particularly November to January when severe thunderstorms can occur. This could result in a large volume of water flowing downstream or accumulating in a water containment facility and could cause major damage to equipment and endanger the lives of employees on site. Procedures must be put in place to ensure that there is a quick response to flood events and damage is kept to a minimum. The procedure for flooding includes:

- DHSWS's flood warning system should be reviewed annually.
- The use of emergency pumps should occur if the water floods the box cuts, where it may be exposed to contamination.
- Mine management should be made aware of any such event so they can take appropriate action to ensure production losses are kept to a minimum.
- All dams and water containment facilities should have a 0.8m free bord and an overflow or outlet to ensure that no damage occurs to the facilities.
- All contaminated water should be contained on site, as far as possible and discharges to the environment should only occur if absolutely necessary in an extreme flood event.

10.1.5.6 Explosions:

Explosions can occur underground with the presence of methane gas, or they can occur in the plant and workshop areas when working with gas cylinders and chemicals. These could result in large numbers of employees being injured and requiring medical assistance. The procedure for explosions includes:

- A Proto Team should be ready and deployed for assisting with the evacuation of employees working underground;
- Alternative evacuation routes should be devised, should a rock fall occur as a result of the explosion;
- Alternative air supply routes should be identified and implemented; and
- All relevant emergency response units must be notified, and hospitals informed of incoming patients.

10.1.5.7 Subsidence:

Subsidence underground can result in injuries to human life and damage to property.

The procedure for subsidence includes:

- Alternative evacuation and access routes should be identified and used, should the way in or out be blocked;

- A Proto Team should be ready and deployed for assisting with the location and extraction of employees trapped underground;
- There should be alternative air supply routes should the air supply become damaged in the rock fall; and
- All relevant emergency response units must be notified, and hospitals informed of incoming patients.

10.1.5.8 Dump Failure:

The dump could fail as a result of too much water being stored on it resulting in the slumping and collapse of a side.

The procedure for dump failure includes:

- Rescue, evacuation and medical assistance, where necessary, to any persons affected by the incident;
- Efforts will be directed to the containment and neutralisation of the influx and prevention of further injury; and
- It is essential to assess the extent of damage/pollution as soon as possible after the event.

This will best be accomplished by:

- Communication
- Site Controller;
- Media Controller;
- Media Consultant;
- Green Groups;
- Incident Controller;
- Political Representatives;
- Chief Inspector of Mines;
- Department of Environmental Affairs;
- Department of Human Settlements, Water and Sanitation;
- Transitional Local Council; and
- Any other relevant or statutory authority.

10.1.6 Emergency Preparedness and Response

Please refer to Table 31 for the emergency preparedness and response followed at Dorstfontein West.

Table 28: Emergency Preparedness and Response at Dorstfontein West

Possible Environmental Related Emergency	Action Plans / Remediation	Time / Period	Responsible Person / Party
Discard Dump Burning	The burning discard will be removed from the dump and spread out where it will not be in contact with other discard or coal. Temperature measurements of the discard dump will be taken to determine whether there are other hot spots. The discard at any hot spot will be treated as in above.	Immediately	Plant Manager
Discard Dump Failure with Breach of Slurry Pond	A containing earth wall will be built around the slurry and collapsed discard to prevent it spreading and contain polluted water. The discard and slurry will be removed immediately and placed on a secure part of the discard dump. If the material cannot be removed immediately a drain will be cut below the containment wall that leads to a sump from which polluted water can be pumped to the pollution control dams. The soil polluted by the carbonaceous material will be removed and placed on the discard dump or will be treated. If necessary, topsoil will be brought in to replace the removed soil. The vegetation will be restored to its previous state	Immediately	Plant Manager
Stockpile Burning	The burning coal will be removed from the stockpile and spread out where it will not be in contact with the rest of the coal. Temperature measurements of the stockpile will be taken to determine whether there are other hot spots. The coal at any detected hotspot will be removed and spread out away from the rest of the coal.	Immediately	Plant Manager
Pollution Control Dams Overflow	Stop all pumping from underground if this is compounding the problem. Pump the water from the overflowing dam to any other dam that is not full, preferably one of the underground water containment areas. Pump as much water as possible into the underground containment areas to increase the capacity of the surface dams to contain run-off water. Monitor the spillway for erosion of the dam wall. If erosion occurs, reinforce the wall with sandbags.	Immediately	Plant Manager
Pollution Control Dams Breach	Prevent overflow from the adjacent dam by sandbagging the overflow point. Stop all pumping from underground. Pump remaining water in the breached into the underground water containment areas or into the other pollution control dams. Pump as much water as possible into the underground containment areas to increase the capacity of the surface dams to contain run-off water.	Immediately	Plant Manager

Berm Breach/Drain Overflow	Where there has been overflow due to a blockage, the drain must be cleaned as soon as possible. Where the overflow is the result of a lack of capacity the dimensions of the drain must be increased. A breached berm must be repaired as soon as possible. The dimensions of a breached berm must be increased to prevent a recurrence.	Immediately	Mine Manager / Plant Manager
Hydrocarbon Spill (diesel, oil, grease, etc.)	In the event of a small spill the soil will be treated in situ using a spill kit. In the event of a large spill a specialized crew will be called in to decontaminate the area and remove and rehabilitate the soil. The Environmental Officer will have the contact details of companies that provide this service.	Immediately	Immediate Supervisor
Veldt Fires	The responsible person must ensure that trained personnel are appointed and that firefighting equipment is in serviceable order. The responsible person must ensure that fire breaks are maintained. The responsible person must undertake periodic inspections of firefighting equipment. In the event of a fire on site the fire master and firefighting crew must immediately respond and in instances where the mines firefighting team is unable to control the fire, the services of the local municipal fire brigade must be called in. The fire master is responsible for ensuring that adequate arrangements are made with the local municipal fire brigade to ensure timeous response to veldt fires.	Immediately	Fire Master (Dorstfontein – Safety Officer)

10.1.7 Reporting

The responsible person will as soon as possible verbally report the occurrence to the Mine Manager and the Environmental Management Representative. A detailed non-conformance report will be written by the responsible person and handed in to the Environmental Department for investigation.

Environmental Incidents which may cause pollution of water resources will be reported to the Department Human Settlement Water (DHSWS) and Sanitation in accordance with the requirements of the National Water Act, 1998 (Act No. 36 of 1998). If necessary, the Department of Mineral Resources and Energy and/or the Department of Environment, Fisheries and Forestry will be notified of the occurrence by the Environmental Management Representative.

10.1.8 Emergency Response Testing

Emergency response testing will be undertaken on an annual basis and it is the responsibility of the Environmental Management Representative to determine what tests should be conducted on mentioned potential emergency situations. Consideration to the practicalities involved will be taken and efforts should be undertaken to affect minimum disruption to the operations. As such it is preferable to conduct mock tests. Once a Mock test has been done, a meeting will be held between interested parties to validate if planned arrangements were effective and responses were adequate.

10.1.9 Records

Records derived from the implementation of this procedure will be controlled in accordance with the requirements as defined in Procedure SOP 02, available in the Environmental Management System documents.

10.1.10 Emergency Incident Reporting

Environmental incident reporting is a vital part of communication at Dorstfontein. Employees are required to report all environmentally related problems, incidents and pollution, so that the appropriate mitigatory action can be implemented timeously. In the event of an Environmental Incident, the reporting procedure as indicated in Table 32 should be followed:

Table 29: Environmental Incidence reporting procedures

Environmental Incident Reporting Structure	Actions Required
Person causing or observing the incident	<ul style="list-style-type: none"> • Shall report the incident to an immediate supervisor in the area/section where the environmental incident is observed.
Line Management in relevant area of responsibility where the incident occurred	<ul style="list-style-type: none"> • Shall investigate the incident and record the following information: <ul style="list-style-type: none"> • How the incident happened; • The reasons the incident happened; • How rehabilitation or clean up needs to take place; • The nature of the impact that occurred; • The type of work, process or equipment involved; and • Recommendations to avoid future such incidents and/or occurrences. • Shall inform the Environmental Manager and the Mine Manager on a daily basis of all incidents that were reported in the area/section. • Shall consult with the relevant department / person for recommendations on actions to be taken or implemented where appropriate (e.g. clean-ups). • Shall assist the Environmental Manager and/or Mine Manager with applicable data in order to accurately capture the incident into the reporting database
Area / Line Managers	<ul style="list-style-type: none"> • Shall forward a copy of the incident form to other line managers. • Shall forward a copy of the incident form to the Environmental Manager. • Shall inform the relevant department / person on a weekly basis of the incident by e-mail or by submitting a copy of the incident report. Once a High Risk Incident (any incident which results from a significant aspect and has the potential to cause a significant impact on the environment) occurred it must be reported immediately to the Environmental Manager and the Mine Manager by telephone or email to ensure immediate response / action. • Shall forward a copy of the completed Incident Reporting Form (and where applicable a copy of the incident investigation) to the relevant department / person.
Environmental Manager / Line Manager	<ul style="list-style-type: none"> • Shall complete an incident assessment form to assess what level of incident occurred. • Shall make recommendations for clean-up and / or appropriate alternate actions. • Shall enter actions necessary to remediate environmental impacts into the database in conjunction with the responsible line manager.

Environmental Incident Reporting Structure	Actions Required
	<ul style="list-style-type: none">• Shall enter the incident onto the database in order to monitor the root causes of incidents.• Shall include the reported incidents in an appropriate monthly / quarterly report.• Shall highlight all incidents for discussion at HSEC meetings.

10.2 ENVIRONMENTAL AWARENESS PLAN

10.2.1 Communication Sectors

The communication of the environmental risks for each phase of the project will take place for the management, administrative and mine worker sectors of the mine, as well as contractors.

10.2.2 Management Sector

A workshop will be conducted to inform all mine management of the risks associated with the mining operation. The risks for all aspects will be explained and the appropriate management options discussed. The workshop will also elaborate on the monitoring programmes that will be implemented to identify and monitor the mines level of impact on the environment and discuss various remediation actions, should there be a deterioration. The evaluation process is integral in the assurance that the mine reduces any possible environmental risks associated with the operation.

The workshop will be conducted prior to the construction phase to ensure that all risks are discussed before there is any chance of the impacts occurring. The workshop may be repeated at certain stages during the life of the project, in the case of new employees.

10.2.3 Administrative Sector

The communication of the environmental risks to the administrative sector will occur through a workshop / half day course. This workshop will seek to explain the following necessary actions:

- Firstly, each aspect will be described as shown in Table 28; Table 29 and Table 30. Risks associated with each aspect will be discussed to ensure that there is an understanding of how each action of the project may impact on the environment.
- The mitigation of the environmental risk will be elaborated on. It is important that each person understand these management strategies as it ensures that the impact on the environment is kept to a minimum. Data collection regarding each aspect will also be explained to ensure that each aspect is monitored according to those protocols specified by the mine and the DMRE. Along with data collection the reporting of findings will be discussed.
- This workshop will take place before the construction phase begins, thus ensuring a full understanding of the project and its associated environmental risks before any construction activity is undertaken. The course will be repeated at the beginning of the operational phase and the material will be integrated in the induction for new personnel.
- The following communication channels and media will/can be used to communicate environmental issues within DCM:
 - **HOD Meetings:** The Mine Manager communicates information to senior management on environmental issues and the information is minuted/recorded.
 - **HSEC Meetings:** 'Environmental issues' should be an agenda item on the plant and section monthly safety, health & environmental meeting agendas.
 - **Publications:** Leaflets, posters etc. are produced by the relevant department or other designated persons, for use on notice boards, and distribution. Quarterly newsletter will also be made available. Email notifications and or relevant articles are also distributed.
 - **EMS Database** (if established): Feedback from line management on objectives, targets and actions.

- Daily/ Weekly Safety Meeting: All meetings are scheduled to commence with a discussion on safety, health & environmental topics.

10.2.4 Mine Workers Sector

The mine workers associated with the construction activities will attend a half day induction course to ensure that each person is aware of the environmental risks associated with the project. This induction will form part of the health and safety induction. This induction course will explain and describe the relevant phases of the project as well as those environmental risks that may occur during these phases. The environmental risks of each aspect as well as the mitigation will be elaborated on.

10.2.5 Contractors

An environmental awareness section will be added to the contractor's health and safety induction programme. The environmental induction will focus on activities that carry an environmental risk, actions to be taken to reduce these risks, and procedures to be followed in the event of an incident.

10.3 METHODS OF COMMUNICATION

10.3.1 Induction

All full-time staff and contractors are required to attend an induction session. Employees are inducted when they start at the mine and when they return from leave. Any contractor, who works on the mine for a period of 24 hours or more, is required to undergo the respective Head of Department (H.O.D.) induction training. These workshops will be conducted in English, as well as one of the local languages. This induction will form part of the health and safety induction.

Environmental issues and aspects related to the operation phase and other relevant phases will be addressed in the induction sessions. All environmental impacts and aspects and their mitigatory measures will be discussed, explained and communicated to employees. The induction sessions will be modified according to the level of employee attending the induction session, so that all employees gain a suitable understanding of environmental issues and pollution.

10.3.2 Environmental Symposiums

Environmental symposiums can be held with management, and selected groups of supervisors/foremen and/or employee representatives. This will take the form of an open discussion between the relevant department and these individuals. The symposiums will aid in environmental awareness being generated at all levels, as well as to assist the relevant department in defining all and identifying new environmental issues, concerns and pollution sources.

10.3.3 In-house Training

In-house training sessions will be held with relevant employees. The training sessions will be determined by the relevant department and will allow for employees to participate in determining what the environmental issues and concerns are with regard to their specific occupation. Education with regard to environmental incident reporting will be detailed at these sessions.

10.3.4 On the Job Training

On the job training is an essential tool in environmental awareness. Employees will be given details of the expected environmental issues and concerns specifically related to their occupation. Employees will be trained on how to respond if an environmental problem or source of environmental pollution arises. The training will be on-going, and all new employees will be provided with the same standard of training as existing employees.

10.3.5 General Training and Skills Development

Human Resources Development Programmes will include appropriate training and skills development programmes as required by the workforce in support of operation specific business plans (both mining and non-mining related). Training will be offered in portable skills, being competencies that will enable employees to find jobs elsewhere within the mining industry, or to become self-employed. Basic environmental and pollution control skill will be included in this training.

10.3.6 Environmental Open Days

Environmental open days will be arranged for at least once a year by DCM's environmental/management and liaison departments. Open days will be utilised to discuss environmental issues in a less formal manner, thereby allowing employees the opportunity to participate in environmental management by educating them about environmental pollution and waste management in areas beside the workplace (e.g. at home). The open days will not be confined to employees only, but to identify interested and affected parties including surrounding landowners and all stakeholders, so as to ensure that the principles of environmental management, pollution prevention, waste management and sustainable development are communicated to the communities surrounding the operation.

10.3.7 Environmental Talk Topics

Monthly environmental talk topics must be undertaken by the Environmental Officer with the different working teams on a monthly basis to raise awareness on environmental, health and safety issues. A register of attendees at these sessions must be kept in the environmental file.

10.3.8 Other

Other ways of engagements which can help in increasing the awareness of the community regarding environmental constraints and opportunities shall be implemented where necessary. At corporate level, this includes providing support for NGOs involved with specific environmental awareness programmes.

10.4 ENVIRONMENTAL COMMUNICATION STRATEGIES AT DORSTFONTEIN WEST

Dorstfontein West management shall continue to establish and maintain procedures for the internal communication between the various levels and functions of the organisation, and receiving, documenting and responding to relevant communication from external interested & affected parties. The communication of the environmental risks for each phase of the project will take place for the management, administrative and mine worker sectors of the mine, as well as contractors. The organisation shall consider processes for external communication on its significant environmental aspects and record its decision.

Communication is a management responsibility. All supervisors are responsible for effective communication within their own sections. Environmental communication can be divided into two categories: internal communication and external communication.

10.4.1 External Communication

External communication is done within the Administrative Sector. Please refer to Section 10.5 for details pertaining to internal communication within the administrative sector.

10.5 EXTERNAL COMMUNICATION STRATEGIES

The following communication channels and media will/can be used to communicate environmental issues to individuals who are not employed by Dorstfontein West:

Table 30: DCM West Communication Strategy

Communication Mode	Communication Strategy	Responsible Parties	Period/Frequency
Environmental Committee	An Environmental Committee should be established and used as a forum to keep interested and affected parties informed of the significant environmental aspects identified through the Environmental Impact Assessments and Management Plans. This should also be the forum where interested and affected parties get the opportunity to raise environmental concerns. Records must be kept of all decisions and concerns for a minimum of 10 years. The Environmental Committee should be chaired by the Mine Manager, or another appropriately appointed competent individual.	Mine Manager	10 years
Publications	Selected publications should be produced and used to communicate environmental issues to outside parties. Examples include newsletters and Annual Reports.	Exxaro Communications	As and When Required
Communication from External Parties and Employees	Clear communication point should be established within the company that will be responsible for liaison with the media in respect of any crisis that may arise within DCM. A complete procedure for media liaison must be made available to all employees. Communication from external interested and affected parties may be received by e-mail, fax, telephonically or by mail. Where required, a written response will be sent, on receiving such communication, by the	Exxaro Communications	As and When Required

Communication Mode	Communication Strategy	Responsible Parties	Period/Frequency
	appropriately appointed individual under signature of the Mine Manager, to the respective interested and/or affected party. All telephonic or facsimile correspondence received on the mine must be forwarded to the relevant department for action. All events or concerns will be captured and actioned on an existing and/or future database.		
E-mail	Email communication received must be stored, with replies, in an appropriate folder on a server. E-mail messages, relevant to environmental management, should be kept for a minimum of two years before deletion.	ALL employees	2years
Mail	Correspondence received by mail must be filed, along with the response (where relevant), within the relevant department's filing system for a minimum period of two (2) years. Paper correspondence will be archived in the Environmental department.	Communications	2 years
Telephone	A register of telephonic environmental queries should be kept by the relevant department detailing caller, contact details, date, query, action taken and response. Furthermore, the person answering the call will be responsible for logging their particulars against the call, as well as ensuring that all communication that leads to an aspect or an impact, is entered on the database.	Communications	2 years
Storage of Correspondence	All original correspondence must be retained by the DCM Mine Manager for a minimum period of two years.	Mine Manager	2 years

Communication Mode	Communication Strategy	Responsible Parties	Period/Frequency
Environmental Reports:	Copies of relevant Specialist Study Reports and Environmental Impact Assessments will be made available on request from an external party for a period of 3 years.	Consultant Environmental Manager	3 years
Queries and Requests from the Media	Requests for articles from the media on environmental issues at DCM will be co-ordinated by the HR Manager, with input from the relevant department, as approved by the General Manager, in line with the DCM Communication Strategy. The DCM Communication Strategy is based on a behavioural approach. Due to the environmental awareness generated by induction, on the job training etc., employees are able to identify environmental problems, issues, concerns and pollution timeously.	Exxaro Communications	As and When Required
Queries from Interested and Affected Parties	Response to queries about environmental impacts and aspects will be addressed by the relevant department and approved by the Mine Manager.	Environmental Manager	As and When Required

Table 31: Environmental Awareness Plan for the Construction Phase at Dorstfontein West

Environmental Parameter	Risk	Communication Strategy				Mitigation Activity
		Management	Administration	Mine Workers	Contractors	
Soil	Increase in soil erosion	Workshop	Induction	Induction	Induction	Rehabilitate area as soon as possible; and Stockpile soil in the correct manner
	Contamination of Soil	Workshop	Induction	Induction	Induction	All hydrocarbons should be stored in designated, bunded areas with a capacity of at least 110% of the volume stored; Spill kits should be readily available and all employees must be trained in the utilisation thereof; Should a spill take place the area should be cleaned immediately and the contaminated area will be rehabilitated as appropriate; Prevent spillages by the implementation of good housekeeping practices; The management of chemicals and hydrocarbons should form part of the emergency preparedness and response programme; In the event of a major spill that could result in major soil and water contamination the Department of Water and Sanitation (DWS) should be informed immediately and a remediation strategy should be enforced; The management of chemicals and hydrocarbons should form part of the emergency preparedness and response programme; and No activities associated with hydrocarbons and or chemicals (i.e. wash bays etc.) may be undertaken outside of an effectively designed contained area
Fauna	Disturbance of fauna	Workshop	Induction	Induction	Induction	Workers must be educated on animal species; Report

						any rare or endangered species; and Hunting and trapping of fauna will be strictly prohibited
Flora	Damage to flora	Workshop	Induction	Induction	Induction	Limit the area of disturbance to the footprint area of the affected sites only.
Surface Water	Surface Water Consumption	Workshop	Induction	Induction	Induction	Limit water use and recycle where possible; and See above for the correct handling and storage of hydrocarbons
Groundwater	Groundwater Contamination	Workshop	Induction	Induction	Induction	Limit water use and recycle where possible; and See above for the correct handling and storage of hydrocarbons
Air quality	Generation of Dust	Workshop	Induction	Induction	Induction	Dust Suppression methods will be implemented
	Generation of Smoke	Workshop	Induction	Induction	Induction	Open fires will be prohibited on the property
Heritage	Destruction of Graves and archaeological sites	Workshop	Induction	Induction	Induction	All graves located on site will be fenced off and site recognition training for the types of archaeological sites i.e. lakes stone tools, bone and shell fragments

Table 32: Environmental Awareness Plan for the Operational Phase at Dorstfontein West

Environmental Parameter	Risk	Communication Strategy				Mitigation Activity
		Management	Administration	Mine Workers	Contractors	
Soil	Increase in Soil erosion	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	Rehabilitate area as soon as possible; and Stockpile soil in the correct manner and vegetate
	Contamination of Soil	Workshop	Induction	Induction & Monthly	Induction & Monthly	All hydrocarbons should be stored in designated, banded areas with a capacity of at least 110% of the

				Meeting	Meeting	<p>volume stored; Spill kits should be readily available and all employees must be trained in the utilisation thereof; Should a spill take place the area should be cleaned immediately and the contaminated area will be rehabilitated as appropriate; Prevent spillages by the implementation of good housekeeping practices; The management of chemicals and hydrocarbons should form part of the emergency preparedness and response programme; In the event of a major spill that could result in major soil and water contamination the DWAF should be informed immediately and a remediation strategy should be enforced; The management of chemicals and hydrocarbons should form part of the emergency preparedness and response programme; and No activities associated with hydrocarbons and or chemicals (i.e. wash bays etc.) may be undertaken outside of an effectively designed contained area</p>
	Loss of Soil Structure Fertility	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	<p>Topsoil will be stripped to at least 250mm or until hard rock is reached; Stockpile soils separately from rocks and or spoil material; Erosion control measures will be implemented; and The mine will ensure that equipment movement over the stockpiles is limited to reduce soil compaction, soil structure or the associated sandbank.</p>
Surface water	Surface Water Contamination	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	<p>See above for the correct handling and storage of hydrocarbons; and All contaminated water to be stored – zero discharge policy.</p>
Groundwater	Groundwater Contamination	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	<p>Water ingress into the underground mining sections will be prevented to limit acid mine drainage; and Precautions will be implemented to prevent acid mine</p>

						drainage.
Air Quality	Generation of Dust	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	Dust suppression methods will be implemented

Table 33: Environmental Awareness Plan for the Decommissioning Phase at Dorstfontein West

Environmental Parameter	Risk	Communication Strategy				Mitigation Activity
		Management	Administration	Mine Workers	Contractors	
Soil	Incorrect rehabilitation	Workshop	Workshop	Induction	Induction	The correct placement of soil layers will be implemented.
	Lack of soil fertility	Workshop	Workshop	Induction	Induction	Fertilization programmes will be introduced.
Flora	Alien invader species	Workshop	Workshop	Induction	Induction	Indigenous vegetation establishment will be encouraged; and A weed control programme will be implemented.
Surface water	Water quality deterioration	Workshop	Workshop	Induction	Induction	Detailed water monitoring programme to be implemented.
Groundwater	Groundwater contamination	Workshop	Workshop	Induction	Induction	Detailed water monitoring programme to be implemented.
Air Quality	Generation of dust	Workshop	Workshop	Induction	Induction	Dust suppression methods will be implemented

10.5.1 Evaluation of the Environmental Awareness Plan

The evaluation of the environmental awareness plan will be conducted by the management of the mine. This evaluation will entail the auditing of the operation in both the construction and operation phase once activity has commenced.

The environmental awareness plan described above is sufficient to make all those involved in the project aware of those risks that may occur as well as the necessary mitigation required to minimize these risks. The awareness plan indicates that Dorstfontein West is serious about the environments well-being, empowerment of the local people and returning the land to the appropriate use in the future. Environmental issues will be highlighted at monthly meetings scheduled at the mine.

11 GENERIC CONDITIONS

In order to ensure compliance with Exxaro's environmental policy as well as environmental legislation requirements, the following generic conditions are applicable:

11.1 SITE DOCUMENTATION / MONITORING

The standard Exxaro site documentation must be used to keep records on site. All documents must be kept on site and be available for monitoring and auditing purposes. The documentation must be signed by all parties to ensure that such documents are legitimate. Regular monitoring of all site works by the ECO is imperative to ensure that all problems encountered are solved punctually and amicably. When the ECO is not available, the Environmental officer, construction manager or supervisor shall keep abreast of all works to ensure no problems arise.

Monthly reports shall be forwarded to Exxaro with all information relating to environmental matters. The following Key Performance Indicators must be reported on a bi-weekly (every two weeks) basis:

- Complaints received from Landowners and actions taken.
- Environmental incidents, such as oil spills, concrete spills, etc. and actions taken.
- Incidents possibly leading to litigation and legal contraventions.
- Environmental damage that needs rehabilitation measures to be taken.

The following documentation shall be kept on site:

- Access negotiations and physical access plan
- Signed Landowner agreements where applicable
- Complaints register
- Site daily diary
- Records of all remediation / rehabilitation activities
- Copies of monthly ECO reports
- Copy of the EMPr
- Copy of the EA.
- Copies of all licences and permits

11.2 FAILURE TO COMPLY WITH THE ENVIRONMENTAL CONSIDERATIONS

The ECO and Exxaro will, acting reasonably, have the authority to instruct the Contractor to suspend part or all of the construction activity if such activity causes or may causes unacceptable damage to the environment by not adhering to the specifications. The suspension will be enforced until such time as the offending parties' actions, procedures and/or equipment are corrected, and adequate mitigation measures implemented.

12 FINALISATION OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

The EMPr is dynamic document, which must be updated as and when required. It is considered critical that this EMPr be updated to include site-specific information and specifications following the final-walk-through survey of the development site.

13 REFERENCES

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Vhubvo Archaeo-Heritage Consultant Cc (2020) Phase 1 Archaeological Report for Exxaro Dorstfontein West Expansion Project