DRAFT

SCOPING REPORT FOR THE PROPOSED DEVELOPMENT OF EXXARO DORSTFONTEIN WEST DISCARD DUMP FACILITY, PILLAR EXTRACTION MINING AT 4 SEAM AND A CONVEYOR BELT FROM DCM WEST TO DCM EAST WITHIN THE JURISDICTION OF EMALAHLENI LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

AUGUST 2019

NSOVO ENVIRONMENTAL CONSULTING

DRAFT SCOPING REPORT FOR THE PROPOSED DEVELOPMENT OF EXXARO DORSTFONTEIN WEST DISCARD DUMP FACILITY, PILLAR EXTRACTION MINING AT 4 SEAM AND A CONVEYOR BELT FROM DCM WEST TO DCM EAST WITHIN THE JURISDICTION OF EMALAHLENI LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

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Nsovo Environmental Consulting Cell: 071 602 2369 Fax: 086 602 8821 Tel: 011 041 3689 Email: admin@nsovo.co.za Date of Submission: 05 August 2019	NSOVO ENVIRONMENTAL CONSULTING "From the world we live to the world we seek"

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"From the world we live to the world we seek "

DOCUMENT CONTROL

PROJECT TITLE:		
Draft Scoping Report for the Proposed Development of Exxaro Dorstfontein West Discard Dump Facility, Pillar Extraction Mining at 4 Seam and a Conveyor Belt from DCM West to DCM East within the Jurisdiction of Emalahleni Local Municipality, Mpumalanga Province		
QUALITY CONTROL:		
Report:	**Compiled By:**	**Peer Reviewed By:**
Draft Scoping Report	Munyadziwa Rikhotso _____ Rofhiwa Magodi _____	Masala Mahumela _____ Rejoice Aphane _____

EXECUTIVE SUMMARY

Dorstfontein West Mine(Pty) Ltd also known as Dorstfontein Coal Mine (Pty)Ltd (hereafter referred as DCM West) is an underground mine with both 2 and 4 -Seams operated by Exxaro Coal Central (Pty) Ltd ("Exxaro"), located within the jurisdiction of Emalahleni Local Municipality in the Mpumalanga Province. Dorstfontein West is currently mining 2 and 4 Seam via bord and pillar underground mining method on the western portion of their mining right area and proposes to mine 4 Seam via pillar extraction method, which will extend the life of mine. The proposed pillar extraction will result in Run of Mine (ROM) production increasing to approximately 150 000 tons per month. Further, a discard dump facility is required to accommodate the disposal of the discard and slurry for the next 15 years of the Life of Mine. Subsequently, Exira proposes the following activities:

- Expansion of the existing discard dump which is coming to the end of its life a by 2022;
- Pillar extraction mining at 4 Seam; and
- The construction of a conveyor belt and associated service road, from DCM West which will be linked to the conveyor systems at DCM East to ensure coal is conveyed from DCM West to DCM East where the coal will be loaded into trains and thereafter transported to Richards Bay Terminal.

The proposed development triggers listed activities and an Environmental Impact Assessment (EIA) process must be undertaken in accordance with the EIA Regulations, 2014 (promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended. Subsequently, Nsovo Environmental Consulting (Nsovo) has been appointed by Exxaro to undertake the necessary authorisations, and licences to comply with the requirement of the legislation.

Objective of the Scoping process as indicated in the Regulations process is to, through a consultative process—

(a) identify the relevant policies and legislation relevant to the activity;
(b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
(c) identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;
(d) identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment
(e) identify the key issues to be addressed in the assessment phase;

(f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and

(g) identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

Accordingly, the Scoping Report has been prepared in accordance to the requirements of Appendix 2 of the NEMA EIA Regulations of 2014 as amended and it contains the following information:

(a) The details and expertise of the Environmental Assessment Practitioner (EAP) who prepared the report;

(b) The location of the proposed activities;

(c) A plan which locates the proposed activities to be undertaken;

(d) Description of the scope of the proposed project including the listed activities and the associated structures and infrastructures;

(e) Description of policy and legislative content within which the development is located and an explanation of how the development complies with and responds to the legislation and policy context;

(f) A motivation for the need and desirability of the proposed development;

(g) A full description of the process followed to reach the proposed preferred activities, site and proposed location of the development footprint within the site;

(h) A plan of study for undertaking the EIA process to be undertaken; and

(i) An undertaking under oath or affirmation by the EAP.

The Scoping phase entailed a detailed description of the baseline environment, which would form the backdrop of the impact assessment phase. Further, it allowed for the identification of critical issues and concerns based on input from the relevant stakeholders, I&APs, and the EAP's professional judgment based on experience and expertise in the field. Various alternatives for the conveyor belt and associated service road vs. the haul road and regional road as well as for the new site for the discard dump vs. the expansion of the existing site were identified and assessed. The proposed pillar extraction would be undertaken as detailed in the Rock Engineering Report, and no alternatives are considered for this activity.

In considering the alternatives, various aspects are considered, and this may include, the degree of sensitivity of the site, technical viability, and to a certain extent, the economic viability. The scoping assessment, including specialist input highlighted the following:

- During the Scoping Assessment Phase, other Route Alternatives were proposed by the Wetland and Biodiversity specialist and this route was named Route Alternative C. The route was assessed in detail by all

stakeholders involved and this was considered not viable and was therefore dismissed. The route was dismissed on the basis that it did not consider the planned pits.

- Further, consideration to utilise the Regional road for (R544 and R547) transfer of coal from Dorstfontein West to East was made, and as a result of the excessively high traffic impact on an already congested road made it not a viable option. It was therefore dismissed as an option.
- Four site alternatives for the discard dump have been assessed in the scoping report. Site Alternatives 1, 2 and 3 are considered not viable, therefore will not be assessed further during the EIA phase. The sites are dismissed on the following basis:
    - The alternatives pose the highest risk on the identified sensitive environments;
    - All sites are located directly above the area earmarked for pillar extraction i.e., the area is prone to subsidence.

Consequently, the EIA phase will only assess the following alternatives:

- Route A vs. Route B of the Conveyor Belt
- Discard Dump expansion
- Pillar Extraction; and
- No Go Option.

The identification and assessment of impacts was based on input from specialist studies that provided baseline information and the necessary detail in preparation of the Report. The details of Specialist is included in the Table below and the Reports are attached as Appendix C:

Specialist Study	Company	Specialist
Biodiversity (flora and fauna);	Vegetation Research and Ecological Consulting	Marianne Strohbach
Soil, land use and land capability	Scientific Aquatic Services	Braveman Mzila
Heritage;	Vhubvo Archeo Heritage Consulting	Munyadziwa Magoma
Wetland	WaterMakers	Willem Lube
Hydropedology	Scientific Aquatic Services	Braveman Mzila
Hydrology	Humba Environmental Consulting	Tinashe Maramba
Traffic	Eco Elemetum	Pieter Jooste
Air quality	Eco Elementum	Henno Engelbrecht
Socio-economic	NGT	Nkosinathi Thomose
Visual impacts	Outline Landscape	Katherin Hamelouw
Hydrogeological	GCS	Raymond Minnaar
Rock Engineering	Exxaro Coal Central	Rofhiwa Phadagi

This report will be made available to the Interested and Affected Parties (I&APs) as well as Organs of State for thirty (30) days to allow them to review and comment. All comments received will be included in the Comments and Response Report, which forms part of this report. The Plan of Study for the EIA is also incorporated in this report and is submitted to the Competent Authority (CA) (the DMR) in terms of section 24C of National Environmental Management Act (NEMA). The DMR will assess the draft scoping report and the plan of study for EIA and advice accordingly.

The Scoping Report has been prepared as dictated and thus achieved the primary objectives as detailed above.

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LIST OF ACRONYMS AND ABBREVATIONS

CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
MDARD	Mpumalanga Department of Agriculture and Rural Development
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GNR	Government Notice Regulations
I&APs	Interested and Affected Parties
MRA	Mining Right Application
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA)
NFEPA	National Fresh Water Ecosystem Priority Areas
NWA	National Water Act, 1998 (Act No. 36 of 1998)
ROM	Run of Mine
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
WML	Waste Management Licence
WULA	Water Use Licence Application

1 INTRODUCTION

Dorstfontein West Mine(Pty) Ltd also known as Dorstfontein Coal Mine (Pty)Ltd (hereafter referred as DCM West) is an underground mine with both 2 and 4 -Seams operated by Exxaro Coal Central (Pty) Ltd ("Exxaro"), located within the jurisdiction of Emalahleni Local Municipality in the Mpumalanga Province. Dorstfontein West is currently mining 2 and 4 Seam via bord and pillar underground mining method on the western portion of their mining right area and proposes to mine 4 Seam via pillar extraction method, which will extend the life of mine to 23 years. The proposed pillar extraction will result in Run of Mine (ROM) production increasing to approximately 150 000 tons per month for the next 15 years. Further, a discard dump facility is required to accommodate the disposal of the discard and slurry for the next 15 years of Life of Mine. Subsequently, Exxaro proposes to undertake the following activities:

- Expansion of the existing discard dump which is coming to the end of its life a by 2022;
- Pillar extraction mining at 4 Seam; and
- The construction of a conveyor belt and associated service road, from DCM West which will be linked to the conveyor systems at DCM East to ensure coal is conveyed from DCM West to DCM East where the coal will be loaded into trains and thereafter transported to Richards Bay Terminal.

The proposed development triggers listed activities and an Environmental Impact Assessment (EIA) process must be undertaken in accordance with the EIA Regulations, 2014 (promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended.

The EIA process will include the following applications:

- Environmental Authorisation (EA) for listed activities as contained in Government Notice Regulations (GN R) GN R984 and R985);
- Waste Management Licence (WML) in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA); and
- Water Use Licence (WUL) in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA).

Subsequently, Nsovo Environmental Consulting (Nsovo) has been appointed by Exxaro to undertake the necessary authorisations, and licences process to comply with the requirement of the legislation. The project proponent is Exxaro Dorstfontein Coal Mines (Pty) Ltd. whereas the Competent Authority is the Mpumalanga Department of Mineral Resources (DMR).

2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nsovo has been appointed by DCM West 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 2014 EIA Regulations 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 1 below provide Details of the EAP and relevant experience. A detailed CV and Qualifications are attached as **Appendix E**.

Table 1: 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	Private Bag x29 Postnet Suite 697 Gallo Manor 2052
Telephone Number	011 041 3689
Fax Number	086 602 8821
Email	Munyadzi@nsovo.co.za
Qualifications & Experience	B.Sc. Honours Geography **16 years of experience**
Project Related Expertise	In terms of project related expertise, the Environmental Assessment Practitioner has completed the following projects: • EIA for the proposed Maphutha-Witkop powerline in Limpopo Province. • 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. • Basic Assessment for Bloemendal Substation and loop in and out lines.

3 DETAILS OF THE APPLICANT

The Applicant for this development is the mineral rights owner and his details are included on Table 2 below.

Table 2: Details of the 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 71IS R547 Ga-Nala (Kriel)
Postal Address	Exxaro Coal Central Dorstfontein West, Regional Offices Dorstfontein Farm 71IS R547 Ga-Nala (Kriel)
Contact Person	Daniel Stapelberg
Telephone Number	011 441 6890
Fax Number	N/A
Project Manager	William Seabi

Email	Daniel.Stapelberg@exxaro.com

4 DESCRIPTION OF LOCALITY AND THE PROPERTY ON WHICH THE ACTIVITY IS TO BE UNDERTAKEN AND LOCATION OF ACTIVITY ON THE PROPERTY

This section provides detailed information of the location of the proposed project. The main aim is to provide the environmental aspects found within the area of the proposed development and to provide the baseline description of the surroundings.

4.1 LOCALITY OF THE PROPOSED PROJECT

Dorstfontein West area is situated in the Mpumalanga Province, 5 km north of Ga-Nala (Kriel), 60 km south of Emalahleni (Witbank) and 145 km east of Johannesburg. The proposed project is located within the existing Dorstfontein West (119MR, 123MR) and Dorstfontein East (51MR) mining right area, 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. The proposed activities are within the approved mining right area, i.e., within the current operations at the Dorstfontein complex. Figure 1 below is a locality map that depicts the proposed study area at a scale of 1:50 000. Refer to Appendix A for the A3 locality and sensitivity maps.

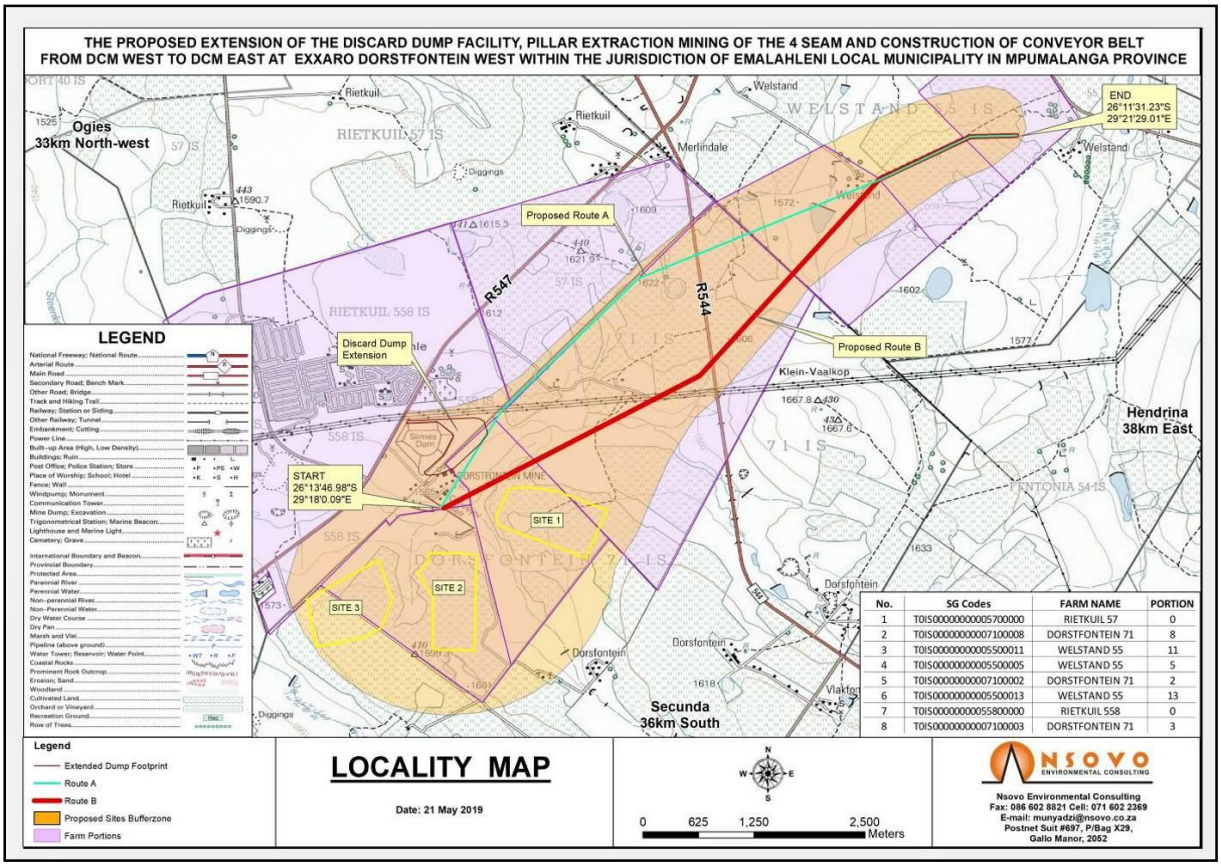


Figure 1: Locality map showing the proposed Dorstfontein West Study Area

4.1.1 PROVINCE AND PPROVINCIAL BOUNDARIES

The proposed development will be located within the Mpumalanga Province which is located in the eastern part of South Africa. The Province borders the Gauteng, North-west and Limpopo Provinces.

4.1.2 MUNICIPALITY AND WARDS

The proposed development is located within Municipal Ward Number 25 of Emalahleni Local Municipality within the jurisdiction of the Nkangala District Municipality in the Mpumalanga Province.

4.2 DESCRIPTION OF THE PROPERTY

The mining right area traverses various farm portion that will be affected by the proposed development and are listed in Table 3 below.

Table 3: Details of the proposed site property

Farm Name	Portion	Surveyor General 21 Digit Code
Rietkuil 57	Portion 0	T01S00000000005700000
Rietkuil 558	Portion 0	T01S00000000005580000
Dorstfontein 71	Portions 2, 3, 8	T01S00000000007100002 T01S00000000007100003 T01S00000000007100008
Welstand 55	Portions 5, 11, 13	T01S00000000005500005 T01S00000000005500011 T01S00000000005500013
Vlakfontein 72 IS	Portions 1,2,3,4,5,6,7, 8, 9	T01S00000000007200001 T01S00000000007200002 T01S00000000007200003 T01S00000000007200004 T01S00000000007200005 T01S00000000007200006 T01S00000000007200007 T01S00000000007200008 T01S00000000007200009
Fentonia 54 IS	Portion 0	T01S00000000005400000
Bosch Krans 53 IS	Portion 12	T01S00000000005300012

4.3 SURROUNDING LAND USES

This section provides the description of the land uses within and around the proposed study area which includes farming, mining and residential and are discussed as follows:

4.3.1 RESIDENTIAL

The residential communities located adjacent the study area includes informal, semi-suburban (township) as well as suburban households. Table 4 below provides a description of the affected communities.

Table 4: Residential Communities and Farms adjacent the study area

COMMUNITY	DESCRIPTION
Thubelihle	A low-medium income residential household located adjacent to the mine; with a recently established informal community directly opposite the main entrance to the mine.
Kriel	It is the closest town to the site located in the west; approximately 6km from the mine. Primarily medium-income residential households characterise the town.
Farms	The mine has leased their land to farmers and is currently used for both stock and crop farming. The crops cultivated include maize, and soya beans; while stock is primarily cattle.

4.3.2 COMMERCIAL AND INDUSTRIAL

The main economic sectors within the Emalahleni Local Municipality are presented in Table 5 below. These include the agriculture, community services, construction, mining, electricity, finance, manufacturing, transport, and trade.

Table 5: Main economic sectors (Integrated Development Plan (IDP), 2017)

Sector	Percentage Contribution
Agriculture	0.4%
Community services	7.2%
Construction	1.9%
Finance and business	6.9%
Manufacturing	5.%
Mining	59.8%
Transport	3.3%
Trade	7.6%
Utilities	8.0%

4.3.3 MINING ACTIVITIES WITHIN THE STUDY AREA

There are several mining activities taking place within the Emalahleni Local Municipality and some of the mining houses directly adjacent to Dorstfontein West include the Dorstfontein East and Anglo-American coal mines. It is evident that these mines play a considerable role in the general development of the surrounding communities, thus contributing to income generation, improvement of local economy and creation of employment of the locals.

4.3.4 SURFACE INFRASTRUCTURE

This section provides the description of the surface infrastructures within the study area, which include the description of road network, existing substations and powerlines.

4.3.4.1 Road Network

Access roads to the proposed study area are R547 (Witbank-Kriel) and R544 to Bethal, which are secondary roads. The Kriel - Witbank tarred road passes one kilometer from the northwestern boundary of the property but only gravel farm roads cross the reserve.

4.3.4.2 Powerlines and associated Infrastructure

There are existing transmission (22kV) and distribution (11kV/22kV) power lines as well as substations within the proposed study area. Other infrastructure includes roads, discard dumps, slimes dams as well as a greenhouse for the community agricultural project. Further, structures on site include offices and associated structures.

5 DESCRIPTION OF THE PROPOSED ACTIVITIES

This section provides the description of the proposed activities which include the scope of the proposed project mainly focusing on the listed activities which triggers the EIA process.

5.1 BACKGROUND AND THE PROPOSED SCOPE OF WORK

Exxaro Dorstfontein West (DCM West) is an operational coal mine, currently mining 2 and 4 Seams via underground mining methods on the western portion of their mining right area and proposes to further mine 4 Seam via pillar extraction method, thus extending the life of mine to 23 years and result in Run of Mine (ROM) production increasing to approximately 150 000 tons per month for the next 15 years. Subsequently, an additional discard facility is required to accommodate the disposal of the discard and slurry from the 4 Seam mining including additional ROM from pillar extraction. Further an overland conveyor belt and associated service road are required to transport beneficiated coal from Dorstfontein West to East mine. This application seeks to obtain the necessary authorisation for the proposed activities from the Competent Authority.

5.1.1 ACTIVITIES ASSOCIATED WITH THE PROJECT

The construction phase of the proposed project would take approximately 18 months, and the activities to be undertaken are indicated on the map below and discussed hereunder.

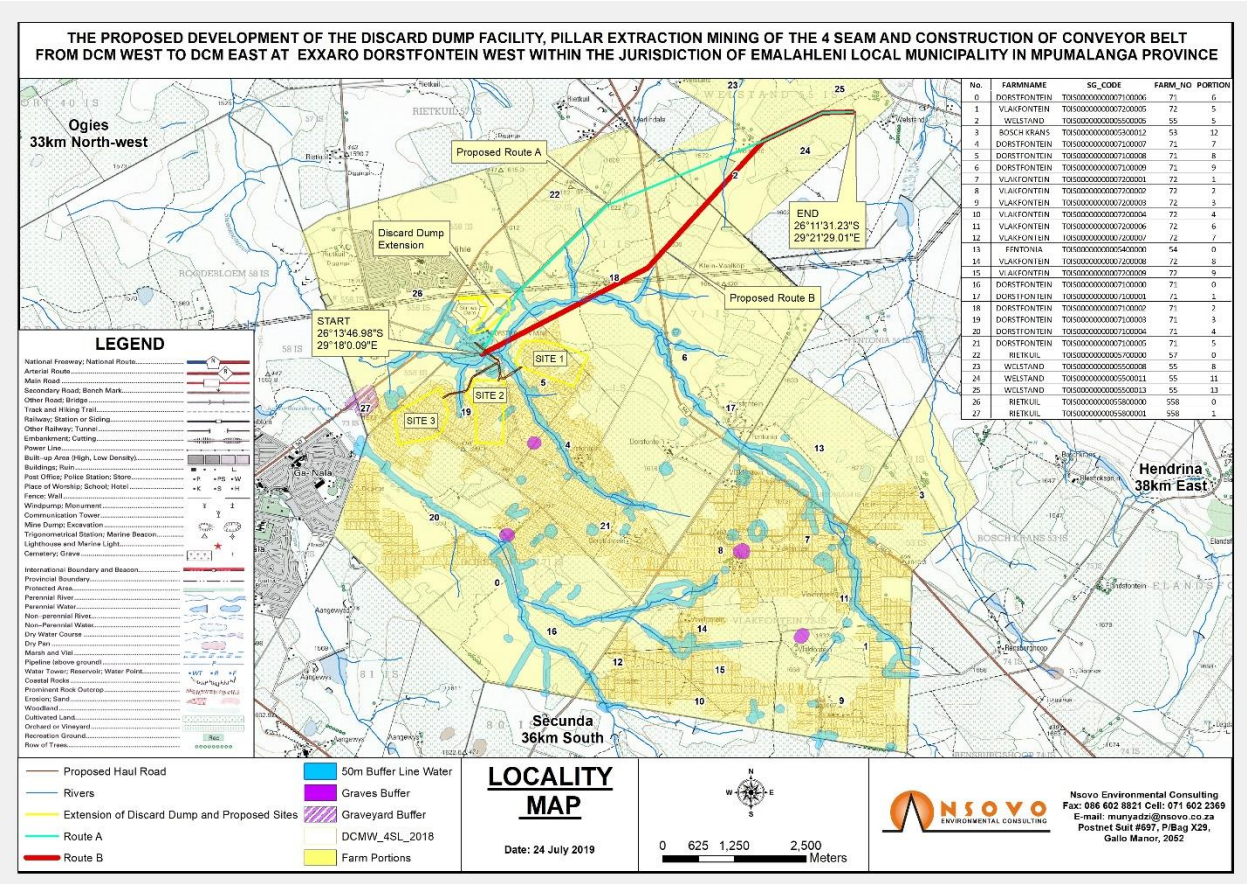


Figure 2: Map showing the proposed activities

5.1.1.1 Site walk-down

A site walk-down will be undertaken for the authorised alternatives. The main aim of the walk-down survey is to ensure that the identified sensitive areas are avoided and/or to create buffer zones for conservation purposes.

5.1.1.2 Access roads

Primary access to the mine is through the Regional Road 547 (R547) to Kriel and this is the same access to the proposed study areas that are within the mine. Secondary access will be other public roads as well as private farm roads negotiated with land owners. However, where there is no access, roads may need to be established. Service road to construction and maintenance for Overland conveyor (7.6km) will be 2.5m wide using existing farm roads and level roads 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.
- The construction of a 1.17km length and 4m wide gravel road for access to the new discard dump sites. However, should the option of extending the existing discard dump be approved, there will not be a need for the construction of this road.

Further, the proposed developed proposes the development of a conveyor belt, however, should this proposal not be approved, the alternative will be to construct an 16m wide and approximately 7.5km long haul road that will transfer coal from DCM West to East.

5.1.1.3 Vegetation clearance

Approximately thirty five (35) hectares are required for the proposed discard dump facility and only the immediate footprint within the study area will be cleared for construction. Further, clearance will be undertaken in accordance with the approved Environmental Management Programme (EMPr), permits, licences, Municipal by-laws as well as Exxaro's policies and guidelines.

5.1.2 CONSTRUCTION OF THE DISCARD DUMP

5.1.2.1 Barrier design

According to the Waste Disposal Facility Study Report by Jones & Wagner (2017), the development of the discard dump will entail 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 1x10-6cm/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.

However, should the type C liners system not be pursued in the case that less stringent barrier designs are considered, source-pathway-receptor modelling will be carried out to demonstrate the acceptance of such an approach versus instalment of Class C barrier systems as described above. In addition to the construction of the discard dump facility associated infrastructure including a gravel access road that will be constructed accordingly. It must be borne in mind

that new access roads will be required for the three new alternatives, while the proposed discard dump expansion may not necessarily require new access; rather expansion of the road. The access roads will be compliant with a Type 6 gravel road; which comprises of 6 meter 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.

The proposed discard dump development would be designed and constructed to meet the minimum engineering guidelines, legislative requirements, and world best practices.

5.1.3 PILLAR EXTRACTION MINING

Pillar extraction or retreat mining is a term used to reference the final phase of an underground mining technique known as room and pillar mining. This involves excavating a room or chamber while leaving behind pillars of material for support. This excavation is carried out in a pattern advancing away from the entrance of a mine. Once a deposit has been exhausted using this method, the pillars that were left behind initially are removed, or 'pulled', retreating back towards the mine's entrance. After the pillars are removed, the roof (or back) is allowed to collapse behind the mining area as depicted in the figure below. Pillar removal must occur in a very precise order in order to reduce the risks to workers, due to the high stresses placed on the remaining pillars by the abutment stresses of the caving ground.

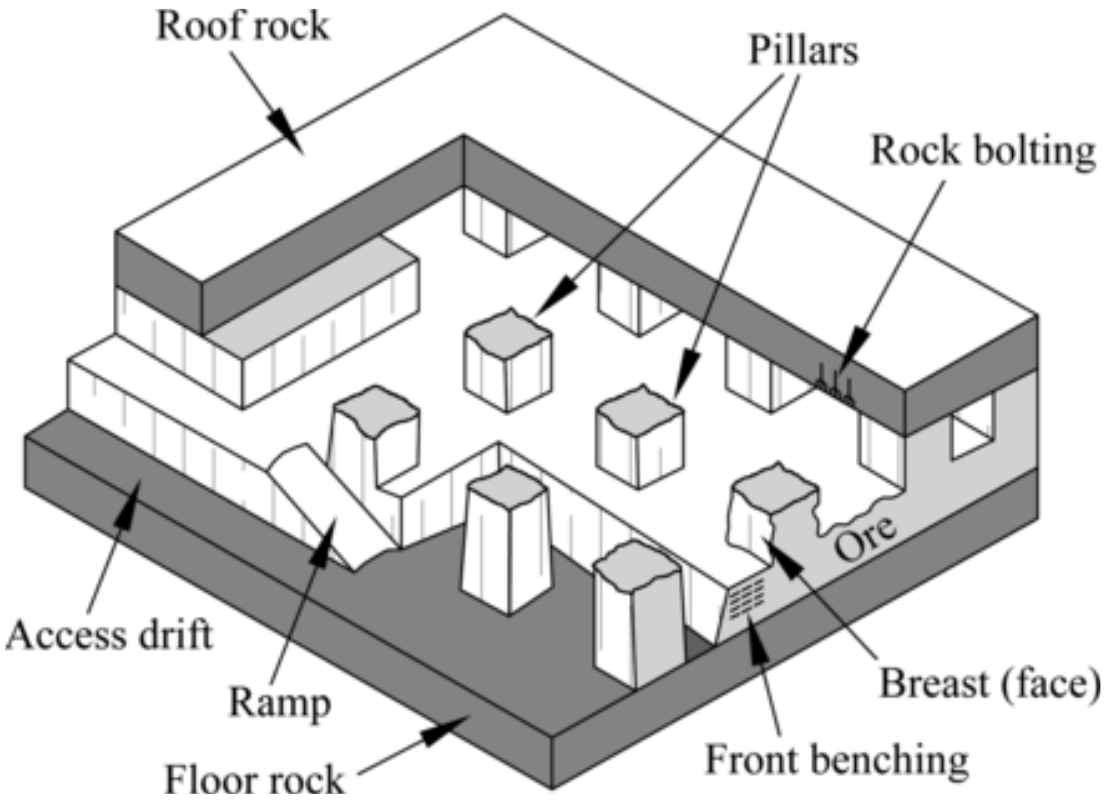
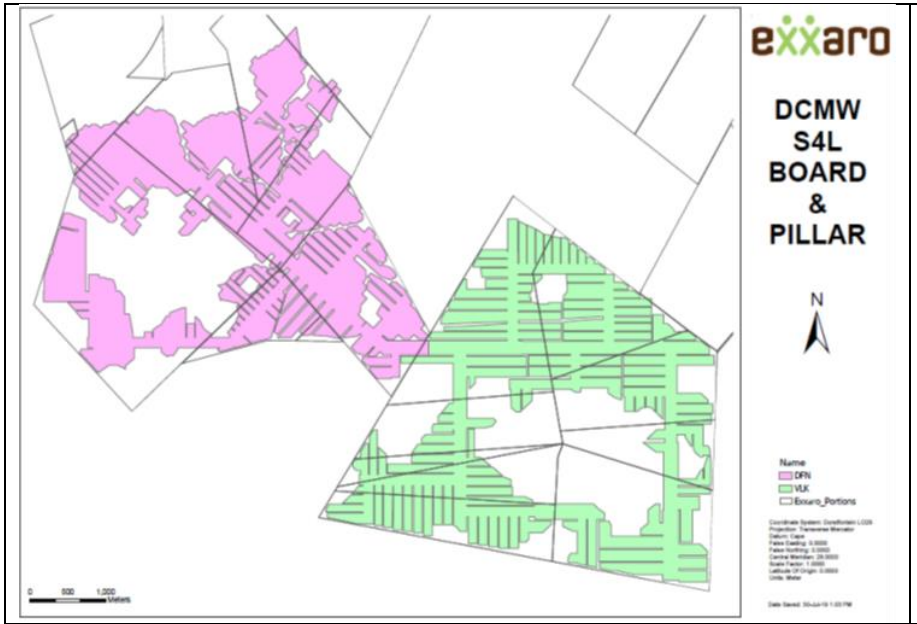


Figure 3: Diagrammatic representation of Pillar mining method

Dorstfontein Coal Mines is currently mining 2 and 4 Seams using bord and pillar mining method and plans to mine the No.4 Lower Reserve using pillar extraction method. Mining via Pillar extraction method will offer a benefit in the long term in that coal reserves that have been locked in the pillar support system of a normal board and pillar working can be extracted thereby increasing the extraction ratio.

According to the Rock Engineering Report by Exxaro Coal Central Rock Engineering Unit dated March 2019, the proposed pillar extraction panels would be designed on a 28.0m x 28.0m centre layout resulting in a panel width of175m for a 7-road panel, it is however, predicted that most of the panels will be nine-road panels. The required panel criterion will, therefore, be satisfied ensuring that goafing occurs during pillar extraction. Planning for the 4 Seam pillar extraction will exclude mining beneath sensitive surface structures such as graves, water features (dams, streams, wetlands and pans) as well as other constrained areas and sensitive areas as dictated by specialist findings and indicated on the Map below (Figure 4 Frame B). The total area for pillar extraction will be approximately 1703.6 hectares.



Frame A: Board and Pillar Total Area (1891.96 Ha)

Frame B:Proposed Pillar Extraction Mining area with exclusion of sensitive areas (1703.67 Ha)

Figure 4: Maps indicating the DCM West 4 Seam –Lower Total Pillar Extraction Area (Exxaro, 2019)

However, extraction would be done for pillars beneath man-made features such as powerlines and buildings as well as open velds. This decision is premised on the fact that powerlines can be re-routed, and buildings relocated depending on the economics of scale when weighing revenue to be derived from mining the reserves against the cost of re-routing or relocating. The attached Rock Engineering Report **(Appendix C-11)** provides detail into the pillar extraction mining and its technicalities.

Pillar extraction with continuous miners poses a risk of loss of roof control in the immediate working area or extracted area ("goaf") resulting in the continuous miners and even the operators being buried. The development of mobile roof supports has largely ameliorated this risk, but the safe application of such pillar extraction methods is still very heavily dependent on the judgment and experience of individuals employed. It therefore requires highly experienced individuals.

The advantage of pillar extraction mining which will be undertaken on the 4-seam is that it will extend the operational life of the mine and create an opportunity to derive value from resources that would have been sterilised. However, one of the highly likely impacts with this mining method is surface subsidence as well as a high safety risk which will be highlighted in this report and assessed further during the impact assessment phase.

5.1.4 CONSTRUCTION OF THE CONVEYOR BELT

The ROM coal from the underground operations will be transported via a conveyor belt to the plant areas from where the discard will be disposed of at the upgraded co-disposal facility. It is proposed that an overland conveyor belt and associated service road be established between the Dorstfontein West and East Mines to transfer ROM or beneficiated coal to the plant at the Dorstfontein East.

The conveyor belt will be constructed on the approved alignment 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 activities associated with the construction of the conveyor belt include the following:

5.1.4.1 Civil works

This civil works covers the ground works and service roads along the conveyor route as per drawing.

Ground works and concrete plinths for the conveyor support (outside wetlands area):

- Excavation need 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

Ground works 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

Ground works 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

5.1.4.2 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.

5.1.4.3 Service road

A single lane service road (2.5m wide) will be graded next to the majority distance of the conveyor. It will go around the wetland areas and utilise the existing farm roads as indicated on the conveyor routing drawing. No material will be excavated for the road.

5.1.5 REHABILITATION

On completion of construction work, the site will be rehabilitated as per the specifications of the EMPr, approved Method Statements and will meet the requirements of the Closure and Rehabilitation Plan. The rehabilitation activities will include:

- Removal of excess building material and waste;
- Repairing any damage caused by construction activities;
- Rehabilitating the area affected by temporary access roads;
- Reinstating existing roads; and

- Replacing topsoil and planting indigenous vegetation where necessary.

As highlighted in the Draft Annual Rehabilitation Plan by Kimopax (2019), the Rehabilitation and closure objectives are tailored. The overall rehabilitation objectives for the project are as follows:

- Establishment of the suitable post mining land capability, vegetation and biodiversity (grazing has been defined as the post mining land use and capability);
- Implement progressive rehabilitation measures, where possible and conduct monitoring of rehabilitated areas; and
- Comply with the relevant local and national regulatory requirements.

The proposed activities are activities that may not commence without Environmental Authorisation from the Competent Authorities as they trigger listed activities under NEMA, EIA Regulations of 2014 as amended. The listed activities are detailed.

5.2 LISTED ACTIVITIES APPLICABLE TO THE PROJECT

The proposed development triggers listed activities in terms of 2014 EIA Regulations as amended, National Environmental Management: Waste Act, 2008 (Act 59 of 2008), and National Water Act, 1998 (Act 36 of 1998). The listed activities applicable are listed and briefly described in the Table 6 below:

Table 6: Listed activities applicable to the project

Listed activities	Activity/Project description
Activities listed under National Environmental Management Act, 1998 (Act 107 of 1998)	
GN R. 983 Item 12: *"The development of–* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more;* *Where such development occurs –* *(a) Within a watercourse* *(c) If no development setback exists within 32 meters of a watercourse, measured from the edge of a watercourse".*	The proposed discard dump facility and conveyor belt will have a footprint greater than 100 square meters and these developments will be within watercourses including wetlands.
GN R. 983 Item 19: *Infilling or depositing of any material of more than 10 m^3 into, or the dredging, excavation, removal or moving of soil, sand,*	The proposed discard dump facility and conveyor belt are within a wetland.

Listed activities	Activity/Project description
shells, shell grit, pebbles or rock of more than 5 cubic meters from: a littoral active zone, a watercourse	
GN R. 983 Item 24: *The development of a road- for which an environmental authorization was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or with a reserve wider than 13.5m or where no reserve exits where the road is wider than 8m but excluding a road which is identified and included in Activity 27 in Listing Notice 2 of 2014 or roads where the entire road falls within an urban area or which is 1km or shorter*	The proposed development of a conveyor belt or haul road will be longer than 1 km and wider than 8 meters.
GN R. 983 Item 28: *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.*	The proposed development of a discard dump will require approximately 35 hectares and will be undertaken on existing agricultural land.
GN R. 983 Item 27: *"The development of a road wider than 4 metres with a reserve less than 13, 5 metres.*	The proposed project entails the development of access roads wider than 4 metres with reserve less than 13.5 meters within protected areas and Critical Biodiversity Areas (CBA) outside urban areas.
GN R. 984 Item 6: *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.*	The proposed development will require a Water Use and Waste Licences in terms of NWA and NEMWA.
GN R. 984 Item 17: *Any activity including the operation of that activity which requires a mining right as contemplated in Section 22 of the Mineral and Petroleum Development Act (Act No. 28 of 2002) (MPRDA) including associated infrastructure, structures and*	The proposed activities are within the approved mining right areas, and the proposed pillar extraction is directly related to the extraction of coal. Further the discard and conveyor belt are

Listed activities	Activity/Project description
earth works, directly related to the extraction of a mineral resources.	mining processes that are requisite for seamless operation and management of waste.
GN R. 985 Item 12: *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* ***F Mpumalanga*** *ii. within critical biodiversity areas identified in bioregional plans"*	The proposed conveyer belt route crosses a CBA and the project will require clearance of an area of 300 square meters or more of indigenous vegetation within CBA.
Activities listed under National Environmental Management: Waste Act, 2008 (NEMWA)	
Government Notice 636 of August 2013: Category B, Activity 7 *The disposal of any quantity of hazardous waste to land*	The proposed discard dump will cater for the disposal of both discard and slurry coal.
Government Notice R 921 under NEM:WA Category B, Activity 10 *The construction of facilities for a waste management activity listed in Category B of this schedule (not in isolation to associated activity*	The proposed project proposed the development of a discard dump facility that will cater for both discard and slurry coal and is expected to cater for the life of mine.
The National Water Act, 1998 (Act 36 of 1998) Activities	
Section21 (c) & (i) *21(c) Impeding or diverting the flow of water in a watercourse; and* *21(i) Altering the Bed, Banks, Course or Characteristics of a Water Course*	The proposed development is within watercourses including wetlands.
Section 21 (g)	

Listed activities	Activity/Project description
Disposing of waste in a manner which may detrimentally impact on a water resource; and	The development of discard dump facility is expected to have negative impacts on water resources.
Section 21 (j) *Removing, discharging or disposing of water found underground.*	The proposed activities will require dewatering of underground mining areas.

6 APPLICABLE LEGISLATION AND GUIDELINES

The EIA Regulations of 2014 as amended, under Appendix 2 Section 1(e) requires a description of applicable legislations in the Scoping Report. This section lists and describes the acts and legislations applicable to the proposed development and associated infrastructure. A list of the current South African environmental legislation, which is considered to be pertinent to the proposed development is described in Table 7 below.

Municipal policies, plans, and by-laws, as well as Exxaro policies and world best practices, were considered during the undertaking of the EIA process. Table 7 below provides a description of legislations that apply to the project, it is not an exhaustive analysis; however, it provides a guideline to the relevant aspects of each legislation.

Table 7: Legislation pertaining to the proposed project

Aspect	Relevant Legislation	Brief Description
Environment	• National Environmental Management: Act 1998, (Act No. 107 of 1998) as amended.	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.
	• Environmental Impact Assessment Regulations, December 2014 as amended	The EIA process followed is in compliance with 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

Aspect	Relevant Legislation	Brief Description
		environment and therefore require an EA from the relevant Competent Authority, in this case DMR.
Mining Rights	The Mine Health and Safety Act (Act No. 29 of 1996)	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 Africa. The main objectives of the act are: • 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: o Culture of health and safety in the mining industry; o Training in health and safety in the mining industry; and o 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

Aspect	Relevant Legislation	Brief Description
		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 No. 25 of 1999)	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) legislates the necessity for cultural and heritage impact 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)	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. 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.
Noise Management and Control	Noise Control Regulations in terms of	The assessment of impacts relating to noise pollution management and control, where appropriate, must form

Aspect	Relevant Legislation	Brief Description
	the Environmental Conservation, 1989 (Act 73 of 1989)	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. The proposed activities will encroach on watercourses such as the wetlands located within and nearby the study area, therefore, the necessary licence will be obtained in due course.
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	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…" The environmental right states that: "Everyone has the right - a) To an environment that is not harmful to their health or well-being; and

Aspect	Relevant Legislation	Brief Description
		b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that - • Prevent pollution and ecological degradation; • Promote conservation; and • Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."
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 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. The proposed development entails the development of a discard dump which will cater for coal discards and slurry.

7 DESCRIPTION OF THE NEED AND DESIRABILITY OF THE PROPOSED ACTIVITY

This section provides justification for the need and desirability of the proposed development with focus on its associated benefits and importance to the both the locals and the region at large.

7.1 MOTIVATION FOR THE DEVELOPMENT

Exxaro Coal Central (ECC) operates four mines namely Forzando North, Forzando South, Dorstfontein West and, East Mines. All mines are underground operations except Dorstfontein East Mine which is an opencast mine. DCM applied

to the DMR for the inclusion of two Prospecting Rights (Vlakfontein and Rietkuil) for its mining operations at the Dorstfontein West Coal Shaft, and these inclusions were granted in January 2013 and executed on the 23 July 2013.

After buying 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. Also, the re-valuation has shown pillar extraction on the Seam 4 Lower as a viable option. Subsequently, an application has been submitted for the amendment of the current mining areas (under Section 102 of Act No.28 of 2002) for the inclusion of pillar extraction and changes in the layout of the Seam 4 Lower, which exists above the current Seam 2 mining area. Through an intensive drilling exercise on these areas, economically viable blocks of Seam 4, Lower Coal have been defined. The plan is to access these newly defined blocks of coal from the existing Dorstfontein West Seam 2 incline to the Seam 4 lower. The addition of pillar extraction on the Seam 4 Lower in the existing Dorstfontein West Mining Right (119MR) is motivated by subsequent reduction of Reserves at Dorstfontein West Seam 2 mine as a result of the depletion of the Seam 2 Coal Life of Mine reserves.

Further, it has been established that the discard dump at Dorstfontein 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:

- Pillar extraction mining of the 4 Seam which would extend the operational life of the mine by 23 years, thus creating an opportunity to derive value from resources that would have been sterilised. Pillar extraction and Seam 4 Lower in the existing Dorstfontein West Mining Right (119MR) is motivated by subsequent reduction of Reserves at Dorstfontein West Seam 2 mine as a result of the depletion of the mine reserves;
- The development 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 to 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 Terminal.

Consequently, this development is an expansion project that aims to increase production and extend the life of the mine and further responds to the commodity demand, which is driven by the need for electrification. Further, the development of the discard dump and conveyor belt forms part of the new infrastructure that the mine has planned, the objective being to accommodate the increasing production. The proposed project will ensure the following:

- Reliable supply of coal for both local and export markets;
- Extend the life of the mine and thus create more stable job opportunities; and

- Improvement of South Africa's socio-economic status.

The socioeconomic benefits expected from the development and as highlighted by the socioeconomic specialist include the following:

- The proposed mine expansion and prolonged life of the mine will result in sustainable jobs at the mine and will ensure continued employment opportunities over the medium and long term. In the short term there will be minimal job opportunities during the construction of the proposed infrastructure. These include skilled, semi-skilled and under skilled labours which could consist of locals (in and around the mining area) as well as regional and national communities.
- The proposed conveyor belt and associated service road will undoubtedly result in reduced traffic volumes on the road from trucks transporting coal from DCM West to DCM East as well as from vehicles and trucks on roads i.e., the R547 and R544.
- The proposed development is located in an area characterised by a variety of agricultural activities which include among others maize and soya beans cultivated fields and grazing fields for livestock i.e. cattle and goats. The proposed conveyor belt and discard dump will impact on these ecological support services. However, these negative impacts are outweighed by the positive impacts.

7.2 BENEFITS OF THE PROJECT

It is recognised that mining activities are an essential component of South Africa's economic development. According to the Chamber of Mines of South Africa's Integrated Annual Review (2015), the mining sector accounted for 7.7% of South Africa's Gross Domestic Product (GDP) directly, and approximately 17% of direct, indirect and induced effects are included. Coal specifically is a national requirement to meet the demand for electricity supply. Further, coal provides 81% of the power generated within South Africa with imminent future expansions.

South Africa is home to 3.5% of the world's coal reserves thus it is likely that coal will continue to be utilised as a significant part of the energy generation mix. At national level, the proposed project will increase coal exports through the Port of Richards Bay and also deliver coal to several power stations within the country. At the regional level, the project will contribute security of local employment due the extension of the life of mine. There would also be a less tangible but nonetheless important benefit of positioning the Municipalities ahead in terms of job opportunities.

7.3 SUPPORTING STRATEGIES

At the **regional level,** the project would contribute to the improvement in the socioeconomic status of the adjacent communities and the region at large. At the **national level**, the project would contribute to implementing South Africa's new energy policy as embodied in the White Paper on Energy (Department of Minerals and Energy, 1998) which

highlights that amongst others, coal play a central role in the socio-economic development of our country, while simultaneously providing the necessary infrastructural economic base for the country to become an attractive host for foreign investments in the energy sector. The priorities to which this project would contribute are laying the groundwork for enhancing supply and electrification.

8 DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED, SITE AND LOCATION WITHIN THE SITE

The identification of alternatives is a crucial component of the EIA process. The identified alternatives are assessed in terms of environmental acceptability, technical as well as economic feasibility during the EIA process, wherein the preferred alternative is highlighted and presented to the Authorities.

Four (4) discard dump options including the expansion of the existing discard dump, conveyor belt and associated service road vs. haul road for transfer of coal from Dorstfontein East to West, and the no-go alternative are being considered for the proposed development. The study has also considered technical alternatives (Refer to Section 7.1) of which were found to be economically and environmentally viable compared to the other options. The alternatives are presented as part of this scoping report and would be scrutinised further during the EIA phase.

Site visits were undertaken by the environmental assessment practitioner and specialists and a site selection of the proposed development alternatives was undertaken by Jones & Wagner in 2017 and updated in 2019, and it was based on site selection process that technically determined the broad location based on the need of the development. Further, a detailed public consultation is underway to assess the viability of the selected options which may result in the identification of more options for consideration to assess the economic need and desirability of the project.

8.1 DETAILS OF ALTERNATIVES CONSIDERED

This section describes the alternatives/ options considered and includes the location and route alignments options as well as no-go alternatives which are discussed below.

Alternatives that have been considered include the following:

- Alternatives for coal transfer from Dorstfontein West to East including the conveyer belt which entails various route alignments, the haul road or the regional road; and
- Alternatives for the discard dump which entail an assessment of possible expansion vs a new site.

In considering the alternatives, various aspects are considered, and this may include, the degree of sensitivity of the site, technical viability and to a certain extent the economic viability.

The proposed pillar extraction would be undertaken as detailed in the Rock Engineering Report and no alternatives are considered for this activity.

The sensitivity map (Figures 5 and 6) below depicts the route alignments Alternatives A and B which are considered for the conveyor while Figure 7 below depicts that proposed alignment of the haul road.

During the Scoping Assessment Phase, other Route Alternatives were proposed by the Wetland and Biodiversity specialist and this route was named Route Alternative C. The route was assessed in detail by all stakeholders involved and this was considered not viable and was therefore dismissed. The route was dismissed on the basis that it did not consider the existing pit as well as the planned one.

Further, consideration to utilise the Regional road for (R544 and R547) transfer of coal from Dorstfontein West to East was made, and as a result of the excessively high traffic impact on an already congested road made it not a viable option. It was therefore dismissed as an option.

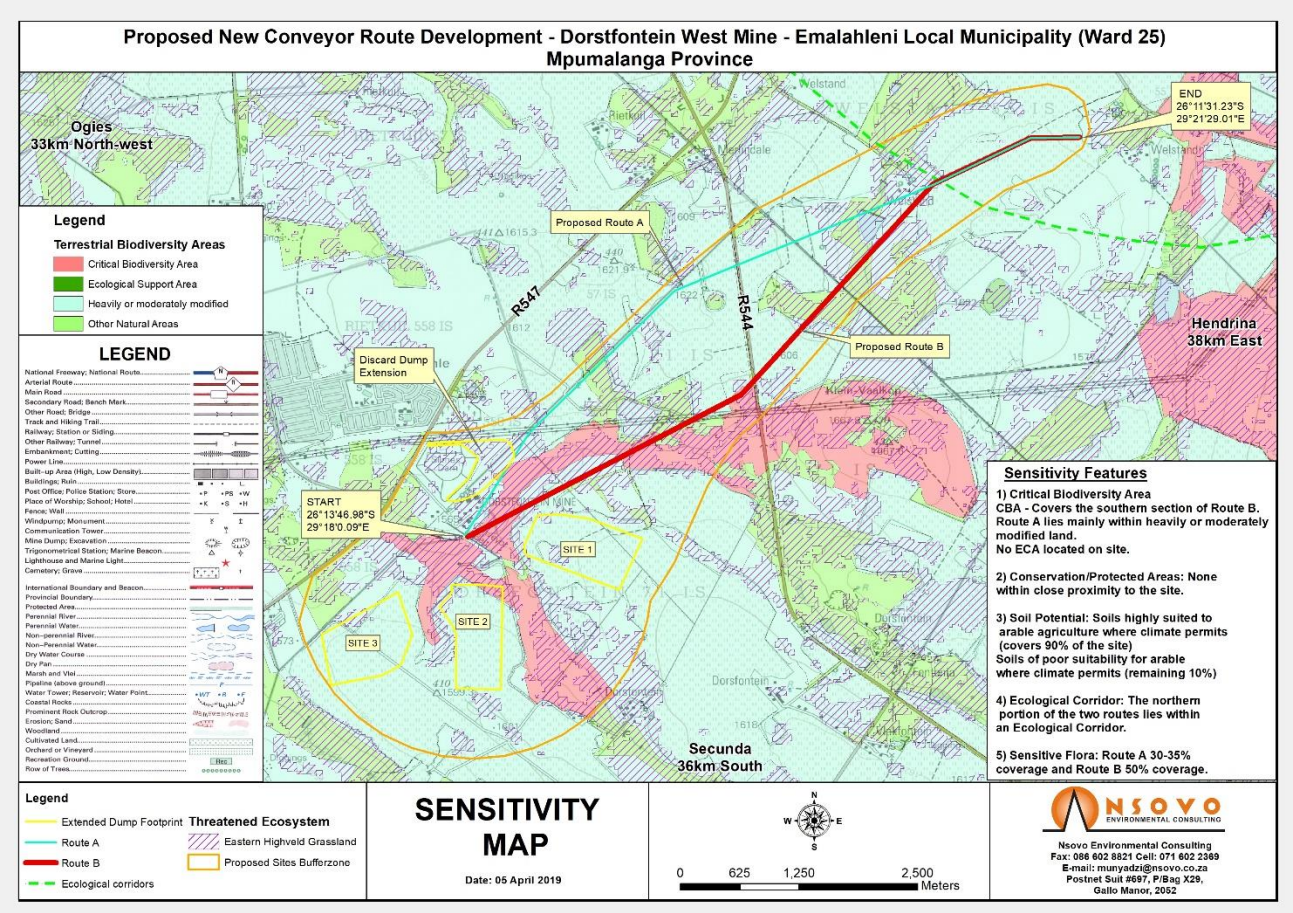


Figure 5: Sensitivity Map showing the Discard dump and Conveyor Belt Options

Figure 6 : Aerial Image of the Proposed Conveyor Belt Alternatives and Service Road

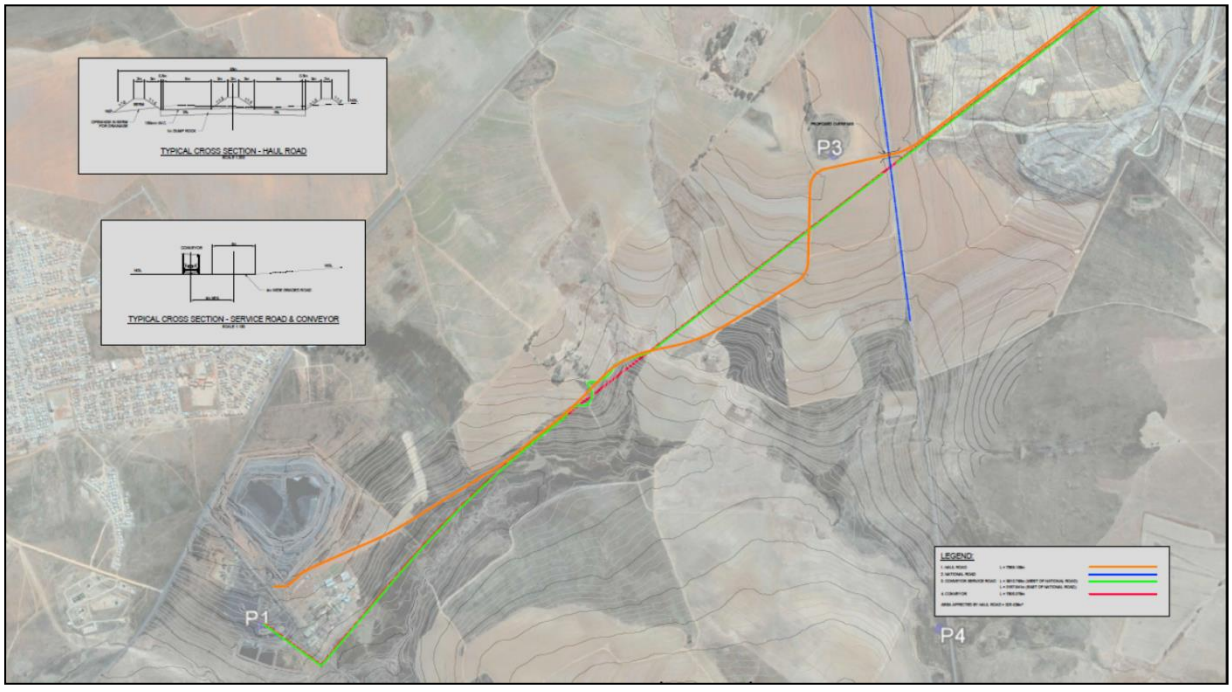


Figure 7: Map showing the proposed Haul Road in Orange

8.1.1 CONVEYOR BELT AND SERVICE ROAD ALTERNATIVES

This section provides detailed information of the conveyer belt route options considered. It should be noted that a conveyor gravel service road will be constructed alongside (parallel and adjacent) the conveyor belt. The assessment of impacts of the conveyor belt will take into consideration the impacts of the service road associated with the conveyor belt. Two conveyor routes, **Route A and Route B** have been proposed and shall be assessed. The proposed alignment is depicted on the locality map attached as Route A and B in blue and red respectively.

8.1.1.1 Comparison of haul road vs. conveyer belt

Two alternatives to transport coal from DCM West to East have been identified for the proposed project (i.e. the overhead conveyor and associated service road vs. haul road). The proposed construction of a haul road to transport coal from Dorstfontein East to West has been assessed vs the conveyor belt and based on the severity of the possible impacts it is not considered more feasible compared to the overhead conveyor belt. The proposed haul road will be approximately 16m wide and 7.6km long and it will require total vegetation clearance for the entire alignment.

The expected impacts from the haul road alternative include the following:

- Removal of soil which is highly suitable to arable agriculture situated within the study area.
- Removal of vegetation of approximately 325 429m^2 including sensitive areas such as CBA, Ecological Support Areas (ESA), indigenous vegetation, exotic and cultivated cover and other natural vegetation on site.
- Increase of greenhouse gas emissions from the quantity and frequency of trucks transporting coal.
- Ecological effects such as the loss of ecological structure and habitat function.
- The haul road would result in low productivity, high fuel costs and higher accidental risks.
- Increased noise levels due to increased traffic.
- Potential hydrocarbon spillages.
- Increased safety risk on the road for surrounding communities.

On the contrary, the proposed conveyor belt would also require expansion of the existing a single-lane service road is depicted in orange in Figure 6 above and it is approximately 2.5m in width and 3.9km in length alongside the alignment; this would have similar impacts to the haul road although reduced. Such impacts would include the following:

- Total clearance of the vegetation for the entire alignment of the service road; and
- Removal of soil which is highly suitable to arable agriculture situated within the study area.

The conveyor belt would only require the excavation of the foundation footprint to support the carriage every 4m on areas outside the wetlands as far as practically possible. It is anticipated that the conveyor belt would have less environmental impacts as compared to the haul road. The impacts of the conveyor vs. the haul road would include the following:

- Reduced traffic and associated impacts;

- Reduced greenhouse gas emissions;
- Less removal of sensitive vegetation such as CBA and ECA since the excavation will be done only for the foundation footprint; and
- Increased impact on bird interaction and a distinct visual impact.

The assessment of the impacts of the conveyor belt will take into consideration the impacts of the service road associated with the conveyor belt. Two conveyor routes, Route A and Route B, have been proposed and shall be assessed. The proposed alignment alternatives are depicted as Routes A and B in blue and red respectively; including the start, middle and end coordinates are presented in Table 8 below.

Table 8: Conveyer Belt options coordinates

Conveyer Belt options	Start	Middle	End
Route A	26°13'46.98"S 29°18'00.09"E	26°12'17.09"S 29°19'26.43"E	26°11'31.23"S 29°21'29.01"E
Route B	26°40'01.42"S 28°36'56.33"E	26°13'11.85"S 29°19'08.55"E	26°11'31.23"S 29°21'29.01"E

8.1.1.2 Conveyer Route A and Associated Service Road

Route A is depicted on the map in blue, and it starts at the Dorstfontein West mine and proceed towards the existing discard dumped and crosses the Eskom transmission powerlines northwards in parallel to the R547. The route then bends eastward to cross the R544 secondary road and aligns with Route B to cross an ecological corridor into Dorstfontein East. The corridor is approximately 7.5km.

Alternative Route A lies mainly within heavily or moderately modified land with no conservation areas along the alignment; however, the northern portion towards Dorstfontein East lies within an ecological corridor. This route has approximately 35% of sensitive flora coverage as depicted in the map below. The Table below is a summary of the specialist findings relating to the Route A.

Table 9: Summary of Specialist Findings

Specialist	Description
Hydropedology	This option is located in the up-gradient areas of the catchment of the wetlands. Both proposed conveyor belt and service route options traverse wetlands as well as areas regarded essential for wetland recharge, the only difference being the extent in length of conveyor traversing the wetlands. Route A - Traverses HGM 19 and 18, and interflow soils regarded important for wetland recharge. Route A should be given

Specialist	Description
	consideration since the portion traversing the wetlands and wetland recharge soils is **shorter** than that of Route B.
Wetland	Two conveyor Routes A and B have been proposed, neither of which are deemed preferred from a wetland perspective. Route A traverses HGM 18 higher up in in the catchment which contain significant seasonal and large permanent wetland zones. These seasonally and permanent wet areas will make the construction of the route demanding and likely result in a significant impact on HGM 19.
Terrestrial Biodiversity	Sensitive receptors for both routes include: • Secondary Grassland on a hillslope seep (approximately 800 m) • Primary Grassland, but disturbed (approximately 40 m) • Seepage Slope Grasslands (two sections approx. 290 m • Riparian Vegetation (approx. 155 m wetland area) Route A is **preferred** over B, although they are both considered to be challenging from a biodiversity perspective.
Heritage	The topography on which this proposed conveyor belt and service road will transverse is currently under heavy farming. There is no archaeological material expected since the area is disturbed however, chance finds remain a possibility. Both Route A and B are considered viable.
Socio-economic	From a socio-economic point of view, the significance of positive socio-economic benefits associated with the proposed development exceed the significance of negative socio-economic impacts. For example, the proposed mine expansion and prolonged life of the mine will result in sustainable jobs at the mine and short term employment opportunities during construction. These include skilled, semi-skilled and under skilled labours which could consist of locals (in and around the mining area) as well as regional and national communities. The proposed conveyor belt will undoubtedly result in reduced traffic volumes on the road from trucks transporting coal from DCM West to DCM East as well as from vehicles and trucks on roads i.e., the R547 and R544. There will always be negative socio-economic consequences associated with the project regardless of the efforts by the project proponent to minimise them. The proposed development is in an area characterised by a variety of agricultural activities which include among others maize and soya beans cultivated fields and grazing fields for livestock i.e. cattle and goats. The proposed conveyor belt and discard dump will impact on these ecological support services. However, these negative impacts are outweighed by the positive impacts.

Specialist	Description
	In terms of conveyor belt route selection, Route A traverses the most agricultural cultivated fields and also poses access restrictions for farmers' cattle to the tributary that traverses the site from the west to east. The selection of Route A would mean that the mine has to make provision for the cattle to access the identified water bodies or drill boreholes, and construct wells that would be used for stock consumption, which will increase the investment on the project. Furthermore, the area has low yield and fractured aquifers which could also impact on other underground water users in terms of water abstraction by the mine.
Air quality	Construction activities, movement of vehicles, levelling and compacting of surfaces, as well localised drilling will have implications on ambient air quality. The above -mentioned activities will result in fugitive dust emissions containing TSP (total suspended particulate, giving rise to nuisance impacts as fallout dust). In addition, fugitive dust (containing TSP, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns giving rise to health impacts)). It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity, the specific operations, and the prevailing meteorological conditions. Conveyor Route B is the preferred option over Route A due to the predominant wind direction and distance from the sensitive receptors. Route A is much closer to communities. It should be emphasised that the above options may differ when enough information becomes available to conduct air dispersion modelling.
Noise	The proposed developments will take place in the vicinity of existing mining activities (Dorstfontein West & Dorstfontein East) and the R544 and R 547 roads respectively. The potential environmental noise impact of the proposed overland conveyor/haul road will be insignificant. The hauling of coal along the abutting provincial roads will increase the prevailing ambient noise levels along these roads on an intermittent basis, however, this is not anticipated since the conveyor system is preferred.
Traffic	This activity is expected to generate construction traffic. Once construction is completed, this conveyor belt is not expected to generate traffic on the external road network during its operational phase. It is however also assumed that a number of additional employees will be appointed at Exxaro DCM West as a result of this activity, which might possibly increase the number of commuting trips to and from the study site. By comparing the expected operating conditions during the project's construction and operational phases with the baseline, it can be stated that an insignificant traffic impact is expected for both these project phases. Based on the assessment and the impact rating from the traffic specialist report, the intensity of the traffic impact can be described as "minor" for both the project phases (construction and operation).
Visual	The study area is moderately populated, with a higher population in a township settlement across the R547 road, Thubelihle (north-west) of the site and the town, Kriel, to the south-west. The residents of the

Specialist	Description
	settlements and farming communities surrounding the mine may experience a low degree of visual intrusion. The current presence of the mines in the visual field of the residents will reduce the impact experienced, however the introduction of the conveyor belt will be a new element of visual intrusion. The proposed Route B will have a lower visual impact on residents than Route A. The Visibility Analysis indicates that residents from Thubelihle and Kriel will be more affected by Route A than B. Agricultural communities will be affected by both new routes.
Soil and land Capability	The conveyor belt route A is anticipated to result in a high loss of arable agricultural land as per current layout compared to conveyor route B which largely occurs within soils which are not considered high potential agricultural soils although a small portion of Hutton soils is traversed which is considered a high productivity soil type.

8.1.1.3 Alternative Route B and associated Service Road

Alternative Route B is depicted on the map in red, and it starts at the Dorstfontein West mine shaft and proceeds towards the southern side of the discard, and northward of the proposed Discard Dump site 1. Similar to Route A, it crosses the Eskom transmission powerlines as well as the R544 secondary road and bends northward to align with Route A. The alignment crosses an ecological corridor into Dorstfontein East. The corridor is approximately 7.5km.

The southern section of Alternative Route B lies mainly within a Critical Biodiversity Area while the northern section of both the routes lies within an ecological corridor. This route has approximately 50% of sensitive flora coverage as depicted in the map below — further soils of high agricultural potential cover 90% of the site.

The Table below shows a summary of the specialist findings relating to Conveyer Belt and Service Road Option B. This route also runs in south-east of the R547 but is more than 1km from the R547, also crosses over the R544 and then joins the same alignment as Route A towards the Dorstfontein East Mine.

Table 10: Summary of Specialist Findings.

Specialist	Description
Hydropedology	Route B traverses two hillslope seeps and valley bottom twice, and this is regarded to have the highest impact from the hydropedological point of view since valley bottom soils are highly susceptible to compaction than soils at the crest and mid slopes. Compaction may potentially affect the subsurface flow, particularly at the A/B soil interface and subsequently affecting hydropedological driver component. Further, Route B is in the valley bottom areas, and traverses HGM 2, 13, 16 and 23, as such, it is least preferred from a hydropedology point of view.
Wetland	Route B traverses the valley-bottom wetland (HGM 2) with high Hydrological and Functional Importance twice, diagonally for more than a kilometre in total, which would likely result in large

Specialist	Description
	negative long-term impacts. Crossing the wetlands diagonally is also not desired, as such linear development typically result in unnatural and concentrated flow paths which increases the risk of erosion and structure failure.
Terrestrial Biodiversity	Sensitive receptors for this route include: • Floodplain Grassland, species of conservation concern (four sections approx. 830 m) • Riparian Vegetation along the channelled valley bottom wetland, species of conservation concern (two sections approx. 270 m) • Secondary Grassland on a hillslope seep (two sections approx. 1412 m) • Primary Grassland (approx. 275 m)
Heritage	This alternative also traverse on active farms, and there is no chance that any material can be found in this area. Both routes are viable.
Socio-economic	Route B is the preferred route as it will have less impacts on agricultural-cultivated fields (it traverse the least agricultural-cultivated fields as compared to Route A). This route will not pose access restrictions for local farmer's cattle to the tributary that traverses the site from west to east as is the case with Route A for the conveyor belt.
Air quality	The air quality impact assessment undertaken for the project includes a meteorological overview of the area. Nonetheless, activities of vehicles on access roads, levelling and compacting of surfaces, as well localised drilling will have implications on ambient air quality. The above-mentioned activities will result in fugitive dust emissions containing TSP (total suspended particulate, giving rise to nuisance impacts as fallout dust). In addition, fugitive dust (containing TSP, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns giving rise to health impacts)). It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity, the specific operations, and the prevailing meteorological conditions. Route B is the preferred option due to the predominant wind direction and distance from the sensitive receptors.
Noise	The proposed developments will take place within in the vicinity of existing mining activities (Dorstfontein West & Dorstfontein East) and the R544 and R 547 roads respectively. The potential environmental noise impact of the proposed discard facility extension, Options 1, 2 and 3, overland conveyor/haul road will be insignificant. The hauling of coal along the adjoining provincial roads will increase the prevailing ambient noise levels along these roads on an intermittent basis, however, this is not anticipated since the conveyor system is preferred.
Traffic	The construction phase of the proposed development is expected to generate construction traffic. Once construction is completed, this conveyor belt is not expected to generate traffic on the

Specialist	Description
	external road network during its operational phase. It is however also assumed that a number of additional employees will be appointed at Exxaro DCM West as a result of this activity, which might possibly increase the number of commuting trips to and from the study site. The impact will be similar for both alternatives. By comparing the expected operating conditions during the project's construction and operational phases with the baseline, it can be stated that an insignificant traffic impact is expected for both these project phases. Based on the assessment and the impact rating from the traffic specialist report, the intensity of the traffic impact can be described as "minor" for both the project phases (construction and operation).
Visual	Route B is regarded as the most preferred conveyor belt alternative. Its alignment follows along a line that is further away from the main transportation route, the R547. The Visual Absorption Capacity of Route B is significantly higher than Route A, which would be more visible from the road. The Visible Analysis for Route B clearly indicates that this route will be less visible to residents of nearby Thubelihle and Kriel.
Soil and land Capability	The conveyor belt Route A is anticipated to result in a high loss of arable agricultural land as per current layout compared to conveyor Route B which largely occurs within soils which are not considered high potential agricultural soils although a small portion of Hutton soils is traversed which is considered a high productivity soil type. Therefore, conveyor belt Route B may be the preferred as it may have minimal impacts in loss and splitting on the arable agricultural land.

The Table below highlights the summary of the advantages and disadvantages of the route alternatives considered as follows:

Table 11: Comparative Analysis of the Conveyor Route and Service Road Alternatives

Comparison of Route Alternatives	
Conveyor Belt and Service Road - Route A	**Conveyor Belt and Service Road- Route B**
• Route A traverses a Secondary Grassland on a hillslope seep for approximately 800m.	• Route B traverse Secondary Grassland on a hillslope see for 1,412m.
• It runs through arable agricultural land considered to be of high agricultural potential.	• It runs through an area which is not considered high potential agricultural soils.
• It will traverse Primary Grassland for 40m which is a shorter distance compared to Route B.	• Primary Grassland within Route B corridor will be affected for 275m.
• It traverses HGM 18 higher up in the catchment which contain significant seasonal and large permanent wetland zones.	• It traverses the valley-bottom wetland (HGM 2) with high Hydrological and Functional Importance twice diagonally for more than a kilometre in total which would likely result in large negative long-term impacts.
• This route will affect Riparian Vegetation and Seepage Slope Grasslands for approximately 155m and 290m respectively.	• Riparian Vegetation along the channelled valley bottom wetland with species of conservation concern will be affected for 270 m.
• Route A would have a higher visual, noise, air quality and socioeconomic impact as it is in close proximity to the communities.	• It would have reduced visual, noise, air quality and socio-economic impacts.
• From a hydrology perspective, Route A has fewer (2) crossings as compared to Route B.	• Route B is not preferred as it has more (4) crossings as compared to A.

8.1.2 DISCARD DUMP FACILITY ALTERNATIVES

This section provides detailed information of the discard dump facility options considered. This entails the description of four discard dump options were identified as 1, 2, 3 and expansion of the existing one as well as no-go alternatives which are discussed as follows:

Four discard dump options were identified as Options 1, 2, 3 and expansion of the existing discard dump and they are shown in Table 12 below. The most viable option will be recommended based on recommendations by the specialists and the assessment of the impacts by the EAP.

Table 12: Discard dump facility options coordinates

Discard Dump options	Latitude	Longitude
Discard dump facility expansion	26°13'20.46"S	29°18'09.09"E
Option 1	26°13'50.46"S	29°18'39.37"E
Option 2	26°14'22.54"S	29°18'04.32"E
Option 3	26°14'23.65"S	29°17'26.41"E

8.1.2.1 Discard Dump Extension and Haul Road

The Table below is a summary of the specialist findings relating to the discard dump extension. The expansion of the existing discard dump will cut into a hillslope seepage area directly above a valley-bottom wetland and associated habitats and it will also extend into a section of highly sensitive primary vegetation with a known population of a species (of which the exact identification still needs to be confirmed).

Table 13: Summary of the Specialist Findings

Description			
Discard Dump Expansion	**Discard Dump Option 1**	**Discard Dump Option 2**	**Discard Dump Option 3**
Hydropedology			
Although the extension of the existing discard dump will impact a larger footprint of the wetland in comparison to Options 1, 2 and 3, impacts resulting from the existing discard dump are already directly or indirectly affecting wetlands (Valley bottom 2 and hillslope seep 19). **Therefore, expansion of the existing discard dump should be strongly considered.**	Option 1, 2 and 3 are equally exposed to risk of subsidence since they all occur within areas which have been previously undermined. As such, all the three proposed alternative sites should be avoided due to the risk of subsidence, which might impact on the hillslope process. The specialist recommended that geotechnical studies should be consulted in this regard. However, the Rock Engineering report confirmed that subsidence is a definite where pillar extraction is employed. This implies that the proposed locations for **discard dumps 1, 2 and 3 are not viable.**	If the hierarchy of mitigation measures is considered, all the three proposed alternative sites should be avoided due to risk of subsidence which might impact on the hillslope process. However, should the proposed sites be declared safe (in terms of risk of subsidence), **Site 2 is ideal** since it largely avoids wetlands and small effects on the hydropedological process are predicted since it is largely occurring in soils which are only significant in terms of wetland recharge during rainy seasons.	Options 1, 2 and 3 are equally exposed to risk of subsidence since they are located within areas where underground mining has previously taken place. **As such, all the three proposed alternative sites should be avoided due to risk of subsidence** which might impact on the hillslope process. A site-specific Geotechnical study should be consulted in this regard.
Wetland			

Description			
Discard Dump Expansion	**Discard Dump Option 1**	**Discard Dump Option 2**	**Discard Dump Option 3**
As per the current proposed lay-out for the discard dump Options, several wetlands will be partially destroyed as a result of the proposed footprints. Thirty-eight (38) separate hydro-geomorphic units (HGM), comprising four HGM types, namely unchannelled valley bottom wetlands, channelled valley bottom wetlands hillslope seepage wetlands connected to a watercourse and depressions (pans), were delineated and classified within the study area and within 500m surrounding the study area. Most of the wetlands likely to be impacted were regarded as largely degraded, however, it is especially the recharge and interflow soils and associated hydropedological flow paths that could likely interact with the discard dumps that is of concern. These	Similar to the Discard Dump Expansion.	Similar to the Discard Dump Expansion.	Similar to the Discard Dump Expansion.

Description			
Discard Dump Expansion	**Discard Dump Option 1**	**Discard Dump Option 2**	**Discard Dump Option 3**
interacting hydropedological flow paths associated with the local hill slopes will likely mobilise sulphites, pirites and various metals from the discard facility and be transported to the valley-bottom wetlands via hillslope seepage processes. The establishment and or extension of a discard facility will cause reduction of recharge areas and or impact significantly on interflow soils and or cause the destruction of responsive soils within effected wetland areas themselves which would result in significant changes to the hydrological regime of the local hillslope hydropedology.			
Terrestrial Biodiversity			
Several impacts of the discard dump facilities would be similar for all the facilities. Such impacts include loss of indigenous vegetation (loss of	In terms of the loss of ecological function, access to the site, if not via existing national roads, will potentially cut across No-Go habitats to the	In terms of the loss of ecological function, access route to the existing mine entrance and associated access routes is shortest, which implies that	In terms of the loss of ecological function, access route to this site will have to cross sensitive wetland habitats, whilst also necessitating the movement of materials

Description			
Discard Dump Expansion	**Discard Dump Option 1**	**Discard Dump Option 2**	**Discard Dump Option 3**
portions of remaining primary vegetation of a Vulnerable Ecosystem), removal of Exotic Vegetation Cover, loss of available faunal habits and associated resources and increase in alien invasive vegetation. The expansion of the existing discard dump will cut into a hillslope seepage area directly above a valley-bottom wetland and associated habitats, whilst it will also extend into a section of highly sensitive primary vegetation with a known population of a Disa species (of which the exact identification still needs to be confirmed).	north. The area is on the edge of a hillslope seep, from which acid drainage may enter more sensitive and unique habitats to the north of the dump.	the same access routes should be used for moving materials to this site. The area is on the edge of hillslope seeps from which acid drainage may enter more sensitive and unique habitats to the west of the dump.	up a steeper slope. The elevated position relative to the landscape implies that unforeseen leakage of acid drainage and dust will be deposited on larger areas of sensitive habitats downslope to the west and north of the dump, where it will also directly affect species of conservation concern. The area is on the edge of hillslope seeps from which acid drainage may enter more sensitive and unique habitats.
Heritage			
The extension of the discard dump will not have any impact from a heritage point of view. **Most preferred.**	Option 1 is located within a secondary land which had been farmed for the past century, there is no heritage resource expected in this area due to	The area around Option 2 is disturbed as it is mainly used for farming. There is no chance that any material can be	Option 3 is located within an active agricultural farm and there is no chance that any material can be found in this area.

Description			
Discard Dump Expansion	**Discard Dump Option 1**	**Discard Dump Option 2**	**Discard Dump Option 3**
	the disturbances. **Not preferred as a result of possible subsidence.**	found in this area. **Not preferred as a result of possible subsidence.**	**Not preferred as a result of possible subsidence.**
Air Quality			
The movement of vehicles on access roads, levelling and compacting of surfaces, as well localised drilling and blasting will have implications on ambient air quality. The above-mentioned activities will result in fugitive dust emissions containing Total Suspended Particulate (TSP), giving rise to nuisance impacts as fallout dust. In addition, fugitive dust containing TSP, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns giving rise to health impacts)). It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity, the	The impacts anticipated for Option 1 are similar to those of the Discard Dump expansion however, **Option 1 is preferred due to the predominant wind direction and distance from the sensitive receptors.**	Specialist findings are similar to those of the Discard Dump Expansion Option.	Specialist findings are similar to those of the Discard Dump Expansion Option.

Description			
Discard Dump Expansion	**Discard Dump Option 1**	**Discard Dump Option 2**	**Discard Dump Option 3**
specific operations, and the prevailing meteorological conditions.			
Noise			
The proposed activities will take place in the vicinity of existing mining activities (Dorstfontein West and Dorstfontein East) as well as the R544 and R547 roads. The potential environmental noise impact of the proposed Discard Dump Expansion, Options 1, 2 and 3, overland conveyor/haul road will be insignificant.	Similar to the Expansion of the Discard Dump Option.	Similar to Expansion of the Discard Dump Option.	Similar to Expansion of the Discard Dump Option.
Traffic			
The proposed activity will not generate traffic on the external road network. It is however assumed that a number of additional employees will be appointed at Exxaro DCM West as a result of this activity, which might possibly increase the number of commuting trips to and from the study	Similar to the Discard Dump expansion Option.	Similar to the Discard Dump expansion Option.	Similar to the Discard Dump expansion Option.

Description			
Discard Dump Expansion	**Discard Dump Option 1**	**Discard Dump Option 2**	**Discard Dump Option 3**
site. Implementation of this facility is also expected to generate construction traffic. **The impact will be similar for all four Options of the discard dump**. By comparing the expected operating conditions during the project's construction and operational phases with the baseline, it can be stated that an insignificant traffic impact is expected for both these project phases.			
Visual			
The extension of the existing dump will have the least visual impact on viewers within the surrounding areas. For all four proposed alternatives, the great advantage lies in the fact that viewers are already exposed to a similar mining activity.	The severity and significance of visual impact for the proposed alternatives for the discard dumps, on motorists will be low. The speed at which motorists travel and the association of the regional area with coal mines has a moderate effect on the severity of the visual impact and further reduces visual exposure. Further, the severity of the visual impact of the	Similar to the Discard Dump Option 1.	Similar to the Discard Dump Option 1.

Description			
Discard Dump Expansion	**Discard Dump Option 1**	**Discard Dump Option 2**	**Discard Dump Option 3**
	development of the discard dump on tourists will be low, causing a low visual impact.		
Soil and land Capability			
The extension of the existing discard dump is anticipated to result in a significant loss of some portions of agriculturally important soils.	Discard Dump Site Options 1 and 3 will impose detrimental impacts on valuable soils capable of supporting cultivated commercial agricultural production due to occurrence of arable agricultural soils, adequate rainfall (600 to 800 mm) as well availability of irrigation options, such as center pivots. These soils are considered to contribute to the provincial and national agricultural production system. Further, these arable soils are located within the footprints of discard dump Options 1 and 3, therefore, it is anticipated that they will be permanently destroyed due to the nature of the proposed mining operation.	**The discard dump Site 2 is the preferred option** as the soils within the vicinity of this option have low agricultural importance and the suitable land use is grazing.	Similar to the Discard Dump Site Option 1.

Description			
Discard Dump Expansion	**Discard Dump Option 1**	**Discard Dump Option 2**	**Discard Dump Option 3**
Hydrology			
The catchment characteristics of the DCM West sub-catchment will be altered by the proposed extension/construction of a new discard dump. The discard dump has been classified as “dirty” in terms of the DWA Best Practice Guideline (BGP). Every effort must be made to separate clean and dirty area by containing runoff from “dirty” areas. Surface water runoff from the discard dump area should be collected and contained in order to ensure the following objectives are met: • Minimisation of contaminated areas and reuse of dirty water (where possible); • Minimisation of seepage from the discard facility; and	Similar to the proposed expansion.	Similar to the proposed expansion.	Similar to the proposed expansion.

Description			
Discard Dump Expansion	**Discard Dump Option 1**	**Discard Dump Option 2**	**Discard Dump Option 3**
• Prevention of overflows and minimization of seepage losses from storage facilities (pollution control dams) Prevention of further deterioration of water quality. Being dirty, surface water emanating from the discard dump would be captured as close as possible. The return water dam would also cause an increase in hydrologically ineffective areas. Consequently, the calculated flood peak flow values and MAR would decrease. Further the Mean Annual Runoff (MAR) of the sub-catchments that the proposed discard dump would affect would be significantly distorted as a result of the discard dump.			

Table 14: Comparative Analysis of the Discard Dump Options

Comparative Analysis of Alternatives			
Discard Dump Extension	**Discard Dump Option 1**	**Discard Dump Option 2**	**Discard Dump Option 3**
Biodiversity			
• The relative areas of indigenous vegetation affected is ± 12 ha. • Removal of exotic vegetation cover will be ± 10 ha. • Loss of ecological function – the expansion will cut into a hill slope seepage area directly above valley bottom wetland and it will also extend into section of highly sensitive primary vegetation.	• Indigenous vegetation affected: ± 4 ha • Removal of exotic vegetation cover will be ± 52 ha. • Loss of ecological function access to the site will potentially cut across no-go habitat towards the north the site is on the edge of the hillslope seepage from which acid drainage may enter more sensitive and unique habitats.	• Indigenous vegetation affected ±2.7 ha • Removal of exotic vegetation cover will be ± 48 ha. • Loss of ecological function the site is on the edge of the hillslope seepage from which acid drainage may enter more sensitive and unique habitats to the west of the dump.	• Indigenous vegetation affected ± 2 ha • Removal of exotic vegetation cover will be ± 51 ha. • Loss of ecological function Access site to the site will have to cross sensitive wetland habitats.
Soil and land capability			
The extension of the existing discard dump is anticipated to result in a significant loss of some portions of agriculturally important soils.	Severe impacts on arable soil is anticipated to be prominent on the proposed discard dump site	The discard dump site 2 is the preferred option as the soils within this site have low agricultural importance and the suitable land use is for this site grazing	This option is anticipated to impact small patches of arable soils
Heritage			

The area proposed for the discard dump extension is invaded by shrub grass, an indication that the area was used for farming in the past, therefore is preferred.	This site is within the secondary land which had been farmed for the past century, there is no heritage resource expected in this area due to the disturbances.	This option is within an active agricultural farm, and there is no chance that any material can be found in this area.	Similar to Options 1 and 2, this alternative is within an active agricultural farm, and there is no chance that any material can be found in this area.
Hydropedology			
Although the extension of the existing discard dump will impact a larger footprint of the wetland in comparison to the other options, impacts resulting from the existing discard dump are already directly or indirectly affecting wetlands (Valley bottom 2 and hillslope seep 19). Therefore, this should be strongly considered.	From a risk point of view, all proposed alternative sites (Option 1, 2 and 3) are equally exposed to risk of subsidence since they all occur within areas which have been previously undermined. As such, all the three proposed alternative sites should be avoided due to the risk of subsidence, which might impact on the hillslope process. However, the Rock Engineering report confirmed that subsidence is a definite where pillar extraction is employed. This implies that the proposed locations for Discard Dump 1, 2 and 3 are not viable.		
Air quality			
Although the expansion of the discard dump and Site 1 are predicted to have the least air quality impact at the sensitive receptors when mitigated and, all discard dump options fall within the relevant air quality limits			
Noise			
The noise specialist assessed the overall noise impacts associated with the proposed development. The impacts were found to be insignificant for the proposed project which will not exceed the threshold value of 7.0dBA			
Visual Impact			
The Extension of the Existing Dump will have the least visual impact on viewers	From visual perspective, Option 1 is recommended as it will have less impacts on the surrounding communities followed by Option 2. Option 3 will have the highest visual impact on residents of the surrounding areas; therefore it is not recommended.		

within the surrounding areas. As viewers are already exposed to it. Therefore, it is highly Recommended.	
Hydrology	
The existing dump site has already impacted on the in-situ hydrological regime of the study area and has all the existing infrastructure, e.g., haul roads, in place. As such, extending the existing dumpsite would be the preferred alternative option.	The discard dump site options are all "sandwiched" between drainage lines which makes the rationale for a preferred site inconsequential as the level of risk on the hydrologic regimes that surround them is ubiquitous. As such, this report finds that the existing Dump Site and Alternative sites 1,2 and 3 are all suitable for the location of a discard dump provided all mitigation measure presented herein are adhered to. However, when environmental best practice is taken into consideration, it is deemed as less of an environmental risk when "impacts are put upon impacts". Proposing the construction of a new dump site, i.e. Alternatives sites 1, 2, and 3 would mean introducing impacts to currently undisturbed areas.

8.1.3 PILLAR EXTRACTION MINING

The Table below shows a summary of the specialist findings relating to the Pillar Extraction Mining.

Table 15: Summary of Specialist Findings – Pillar Extraction Mining

Specialist	Description
Hydropedology	From a risk point of view, all proposed alternative sites (Option 1, 2 and 3) are equally exposed to risk of subsidence since they all occur within areas which have been previously undermined. As such, all the three proposed alternative sites should be avoided due to risk of subsidence which might impact on the hillslope process. Geotechnical studies should be consulted in this regard.
Wetland	The proposed pillar extraction has the potential to cause subsidence and permanently destroy hydropedological pathways while potentially creating a drawdown effect in the vadose zone thereby severely negatively affecting the seepage wetlands as well as the valley bottom wetlands or sections hereof. Approximately 1218ha of wetland habitat could be negatively affected by the proposed pillar extraction which will require a comprehensive Offset-program
Terrestrial Biodiversity	Degradation of due to post-mining subsidence • Change of soil surface and sub-surface hydrology, depleting or reducing replenishment of moisture of lower-lying habitats depending on hillslope seeps. • Change in soil chemistry of al lower-lying habitats affected by acid leachate causing die-off of indigenous plants and loss of resources to fauna, • Degradation of soil moisture reserves as well as water resources in more sensitive habitats, such as riparian areas
Heritage	Pillar extraction must not be undertaken underneath surface structures such as graves. However, the proposed activity will create subsidence which might result graves disturbance if not managed appropriately.
Soil and land Capability	The proposed pillar extraction mining of 4 seam is anticipated to impact on agriculture as this act of mining using the pillar extraction method at the limited depth of at least 30.0 meters below ground level, will ultimately result in some sort of surface subsidence. Thus, land capability suitable in supporting cultivation will be lost through alteration of both biological, physical and chemical characteristics of the soil medium occurring in vicinity of the development foot print due to subsidence.
Hydrology	The investigation found that pillar extraction will be not be undertaken in areas with surface water features (dams, streams, wetlands and pans) and graves. These areas will not be undermined with either bord and pillar mining or pillar extraction. These have been termed

Specialist	Description
	"constrained or restricted areas". Secondary pillar extraction is feasible for panels outside of the constrained or restricted and a buffer of at least 50m will be left against constrained or restricted zones. Pillar extraction will also be limited to a cover depth of a least 30m below ground level.

8.1.3.1 No-go alternative

Under GN R.982, consideration must be given to the option not to act, which an alternative is usually considered when the proposed development is envisaged to have significant negative environmental impacts that mitigation measures cannot ameliorate effectively. There would be no economic benefits i.e., extended employment for local communities. Should the no-go option be adopted, the proposed mine expansion shall not materialise, and as such, the life of the mine shall not be prolonged. This would result in the loss of sustainable jobs at the mine and reduce employment opportunities over the medium and long term. Based on information provided in the Mining Works Programme, the proposed project will certainly require both skilled and unskilled labour which is expected to yield positive spinoffs for the locals, the province, and the country at large. However, this could be hindered if the no-go option is adopted. The mine is already a socioeconomic anchor within the immediate communities and more so for the country.

The proposed project's planned infrastructure, excluding the actual mine investment, will further, stimulate the local economy given that total expenditure of R120 000 000.00 is budgeted for the proposed project's infrastructure. Should the no-go option be adopted, this huge investment will be forfeited, which will negatively affect the local economy as well as the Emalahleni's Gross Geographic Production (GGP). Furthermore, the provision of coal product to existing power stations to secure South Africa's power supply would not be met, should this be the option to Eskom in the future. Also, the no-go alternative would result in lost foreign revenues from the planned export coal product.

9 PUBLIC PARTICIPATION PROCESS

The NEMA EIA Regulations require that during the EIA process, the Organs of State together with Interested and Affected Parties (I&APs) be informed of the application and allowed to comment on the application.

Public Participation Process (PPP) is any process that involves the public in problem-solving and decision-making; it forms an integral part of the Scoping and EIA process. The PPP provides I&APs with an opportunity to provide comments and raise issues of concern or to make suggestions that may result in enhanced benefits for the project.

The primary purpose of the PPP report is as follows:

- To outline the PPP that was undertaken;

- To synthesise the comments and issues raised by the key stakeholders, I&APs; and
- To ensure that the EIA process fully address the issues and concerns raised.

Chapter 6, Regulation 39 through 44, of the 2014 EIA Regulations stipulates the manner in which the PPP should be conducted as well as the minimum requirements for a compliant process. These requirements include but not limited to:

Fixing a notice board at or on the fence of-

(i) The site where the activity to which the application relates is or is to be undertaken; and
(ii) A place conspicuous to the public at the boundary of the site.

- Giving written notice to-
- The occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
- The owners or persons in control of that land occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
- The municipal councillor of the ward in which the site and alternative site is situated and any organisation of rate payers that represent the community in the area;
- The municipality which has jurisdiction in the area;
- Any organ of state having jurisdiction in respect of any aspect of the activity; and
- Any other party as required by the competent authority.

Placing an advertisement in-

One of the local Newspaper within or around the proposed site.

9.1 PUBLIC PARTICIPATION PRINCIPLES

The principle of Public Participation holds that those who are affected by a decision have the right to be involved in the decision-making process (i.e., the public's contribution will influence the decision). One of the primary objectives of conducting the PPP is to provide Interested and Affected Parties with an opportunity to express their concerns and views on issues relating to the proposed project. The principles of public participation are to ensure that the PPP:

- Communicates the interests of and meet the process needs of all participants.
- Seek to facilitate the involvement of those potentially affected.
- Involves participants in defining how they participate.

- Is as inclusive and transparent as possible, it must be conducted in line with the requirements of Regulation 39 through 44 of the EIA Regulations as amended.

9.2 APPROACH AND METHODOLOGY

The Public Participation approach adopted in this process is in line with the process contemplated in Regulation 39 through 44 of the EIA Regulations as amended, in terms of NEMA, which provides that I&APs must be notified about the proposed project.

9.2.1 PRE-APPLICATION CONSULTATION

Pre-application meetings were scheduled with the competent authorities responsible for the authorising the project namely:

- Department of Mineral Resources – the meeting was scheduled for 17th January 2019 with and minutes of the meetings are attached as **Appendix D7-1**.
- Department of Water and Sanitation - a site visit was undertaken on the 23rd January 2019 and the minutes are attached as **Appendix D7-2**.

9.2.2 IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES

Interested and Affected Parties (I&APs) identified include pre-identified stakeholders (government department), landowners and the general public. Notification and request for comments were submitted to the following key stakeholders:

- Mpumalanga Department of Agriculture and Rural Development and Land Administration
- Mpumalanga Department of Water and Sanitation;
- Mpumalanga Department of Transport and Public Works;
- Mpumalanga Heritage Resources Agency;
- South African Heritage Resource Agency;
- Wildlife and Environmental Society of South Africa;
- Emalahleni Local Municipality;
- Eskom SOC Limited – Transmission
- Nkangala District Municipality

The notifications together with Background Information Documents (BID) were sent to stakeholders by registered mail during the week ending 24 May 2019; refer to **Appendices D3 and D6** respectively.

9.2.3 PUBLIC PARTICIPATION DATABASE

In accordance with the requirements of the EIA Regulations under Section 24 (5) of NEMA, Regulation 42 of GN R. 982, a register of I&APs must be kept by the public participation practitioner. In fulfilment of this requirement, such a register is compiled and details of I&APs including their comments will be updated throughout the project cycle. The database is attached as **Appendix D5.**

9.2.4 SITE NOTICES

A2 size notices were fixed at different conspicuous locations within and around the proposed project study area on the 23rd, 24th and 28th May 2019, in Thubelihle, Kriel, Dorstfontein West Mine entrance, and Kriel Library. Photographic evidence of the site notices is attached as **Appendix D1.**

9.2.5 DISTRIBUTION OF NOTICES TO SURROUNDING LAND OWNERS / OCCUPIERS

Notification letters were posted via registered mail to stakeholders on the 31st May 2019 (Refer to **Appendix D3** for proof of postage), whereas site notices in English and isiZulu were hand delivered to landowners/occupiers on the 23rd, 24th and 28th May 2019. These notifications were informing stakeholders and the public of the project as well as allowing them an opportunity to register as I&AP and also to comment or raise any issues pertaining to the proposed project.

9.2.6 PLACEMENT OF AN ADVERTISEMENT IN THE LOCAL NEWSPAPER

An advertisement was placed on The Ridge and Witbank newspapers on Tuesday the 28th and 31st May 2019 respectively. The advertisement was aimed at further informing the I&APs of the proposed activity. A 30-day period was allowed for the public to register as I&APs, submit their comments, issues and concerns. Proof of newspaper advertisement is attached as **Appendix D2.**

9.2.7 PLACEMENT OF THE DRAFT SCOPING REPORT FOR COMMENTS

The Draft Scoping Report will be placed for review and comment from the 08th August 2019 for 30 days.

9.2.8 PUBLIC MEETINGS

Public and focus group meetings are scheduled for 20th -22nd August 2019.

9.3 A SUMMARY OF ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Comments, issues and concerns raised together with the responses provided by the Environmental Assessment Practitioner (EAP) are presented as **Appendix D4**. The comments received to date relate to job opportunities and this will be addressed accordingly.

10 DESCRIPTION OF THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES FOCUSING ON THE GEOGRAPHICAL, PHYSICAL, BIOLOGICAL, SOCIAL, HERITAGE AND CULTURAL ASPECTS

This section outlines parts of the socio-economic and biophysical environment that could be affected by the proposed development. Using the project description, and knowledge of the existing environment, potential interactions between the project and the environment are identified below. The potential effects of the project on the human environment, socio-economic conditions, physical and cultural resources are included.

10.1.1 SOCIO-ECONOMIC DESCRIPTION

This section presents the socio-economic aspects focusing on the Province and Municipalities within which the proposed study area is located.

10.1.1.1 Provincial Description of the Proposed Project

Mpumalanga Province is located in the north-eastern part of South Africa. The province borders two of South Africa's neighbouring countries viz. Mozambique and Swaziland; and other South African provinces namely; Gauteng, Limpopo, KwaZulu-Natal and Free State Provinces (Figure 8 below). Mpumalanga is characterised by the high plateau grasslands of the Middleveld, which rolls eastwards for hundreds of kilometres. In the north-east, it rises towards mountain peaks and terminates in an immense escarpment (www.municipalities.co.za).

Mpumalanga province covers an area of 76 495km² and has a population of approximately 4 335 965 (IDP, 2017). The capital city of Mpumalanga is Mbombela (previously Nelspruit) and other major cities and towns include Emalahleni (previously Witbank), Standerton, eMkhondo (previously Piet Retief), Malelane, Ermelo, Barberton and Sabie. The province is divided into three district municipalities namely, Gert Sibande, Ehlanzeni and Nkangala Districts. These three districts are further subdivided into 17 Local Municipalities of which the proposed development falls within the Emalahleni Local Municipality of the Nkangala District Municipality.

Mpumalanga is rich in coal reserves and home to South Africa's major coal-fired power stations with Emalahleni the biggest coal producer in Africa and also the site of the country's second oil-from-coal plant after Sasolburg (www.municipalities.co.za). Further; the best-performing sectors in the province include mining, manufacturing and services.

Figure 8: Map of South Africa showing the provinces (Source: www.odm.org.za).

10.1.1.2 District Municipality within which the study area is located

The proposed development will be undertaken within the Nkangala District Municipality, which is a Category C municipality in the Mpumalanga Province with a total are comprises of six local municipalities i.e. Victor Khanye, Emalahleni, Steve Tshwete, Emakhazeni, Thembisile Hani, and Dr. JS Moroka (www.municipalities.co.za). The District's headquarters are in Middelburg. Nkangala is at the economic hub of Mpumalanga, and is rich in minerals and natural resources. A strength of the District is the Maputo Corridor, which brings increased potential for economic growth and tourism development. The proximity to Gauteng opens opportunities to a larger market, which is of benefit to the district's agricultural and manufacturing sectors. The main economic sectors within the District include mining, manufacturing, energy and agriculture.

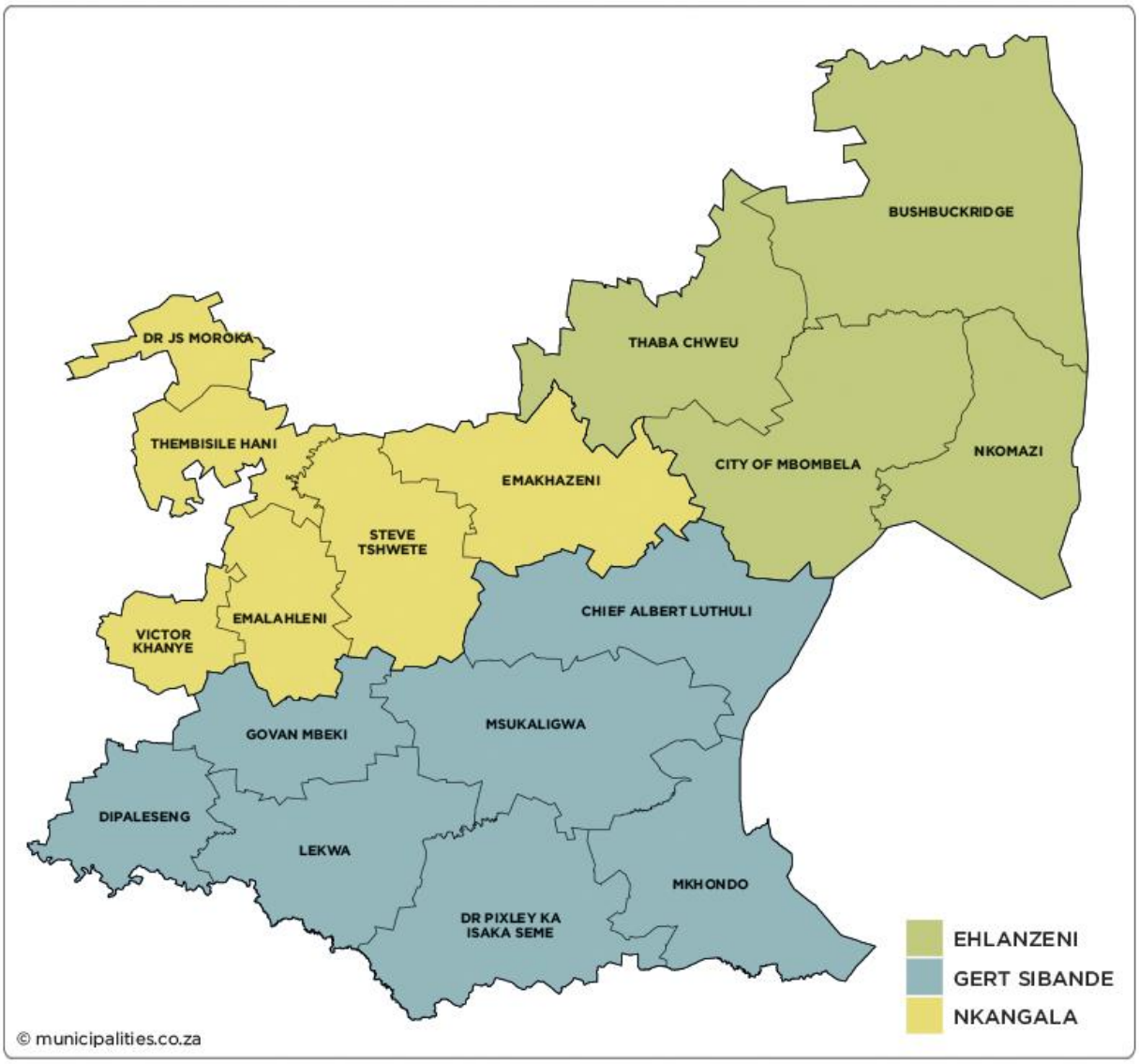


Figure 9: Photograph shows the map of District Municipalities in Mpumalanga

10.1.1.3 Local Municipality within which the proposed study area is located

The proposed development is located within the Emalahleni Local Municipality which is a Category B municipality with a total area of 2 678km², within the Nkangala District Municipality. The Emalahleni Municipality forms part of the western regions of the province and borders onto the Gauteng Province. Thembisile Hani and Victor Khanye, and City of Tshwane Metro in Gauteng, border the municipality to the north and west. The Gert Sibande District borders it to the south and Steve Tshwete is located to the east). It is situated in close to the City of Ekurhuleni, City of Johannesburg and City of Tshwane Metropolitan Municipalities in Gauteng, and is connected to these areas by the N4 and N12 freeways. The southern areas of the Emalahleni Municipality form part of the region referred to as the Energy Mecca of South Africa, due to its rich deposits of coal reserves and power stations. Emalahleni and Middelburg (situated in the adjacent Steve Tshwete Municipality) are the highest order settlements in the Nkangala District. These towns offer

the full spectrum of business and social activities, and both towns have large industrial areas. The towns fulfil the function of service centres to the smaller towns and settlements, as well as farms in the district. The main economic sectors include mining, power generation, steel, vanadium, and chrome.

10.1.2 CLIMATIC CONDITION OF THE PROPOSED AREA

The study area is in the Highveld climatic region of South Africa, which is a summer rainfall area. Temperature classifications for the region are hot in summer and mild to warm in winter, with significant diurnal fluctuations. Climate Data was obtained from the South African Weather Service (SAWS) and databases of WR2005.

The local climate can be described as semi-arid high-veld conditions, with warm summers and moderate dry winters. Average daily summer temperatures of approximately 27°C are experienced, while peak temperatures of up to 36°C do occur. Average daily winter temperatures are approximately 4°C, with minimum temperatures reaching around -4°C. The number of days when heavy frost occurs is however, limited and freezing of wet soils, frost heave and permafrost do not occur (SAWS, 2017).

Relative humidity ranges from a minimum of 34% to a maximum of 94%, with dry atmospheric conditions dominating. The average annual rainfall of 700 mm is considerably less than the average annual A-pan evaporation of 1 600 mm. This results in the project area experiencing a negative water balance in relation to rainfall and evaporation. Evaporation, off open surfaces of water (lake evaporation), though less than A-pan values, will be significant (calculated at 1500 mm per annum) and plant-life in natural local grasslands will be dormant for long periods during the year.

10.1.3 GEOLOGY WITHIN THE STUDY AREA

The project area is situated on the Witbank coal field, which forms part of the Karoo basin extensively covering the central areas of South Africa. The basement rocks within the Karoo Basin are overlain by the Karoo Super Group. The basement of the Karoo Super Group is the Dwyka tillites that are regularly deposited over the basin with the exception of paleo-topographical highs. The Dwyka tillites are overlain by the Vryheid formation which include the coal seams. The Vryheid formation consists of various sequences of sandstones, shales and siltstones with the various coal seams located within them. In terms of the area's structural geology, during the Jurassic period a large number of dolerite dykes and sills intruded into the Karoo formation acting as important geological structures diverting and impending groundwater movements (DWA, 2009). A dolerite intrusion is indicated in the south of the mining area (1:250,000 Geological map for the study area (2628 Eastrand; Department of Mines – Geological Survey). Further, there are porhyritic rhyolite intrusions with interbedded mudstone and siltsone in the north eastern and eastern sections of the study area. Refer to Figure 11 below for geological map of the study area.

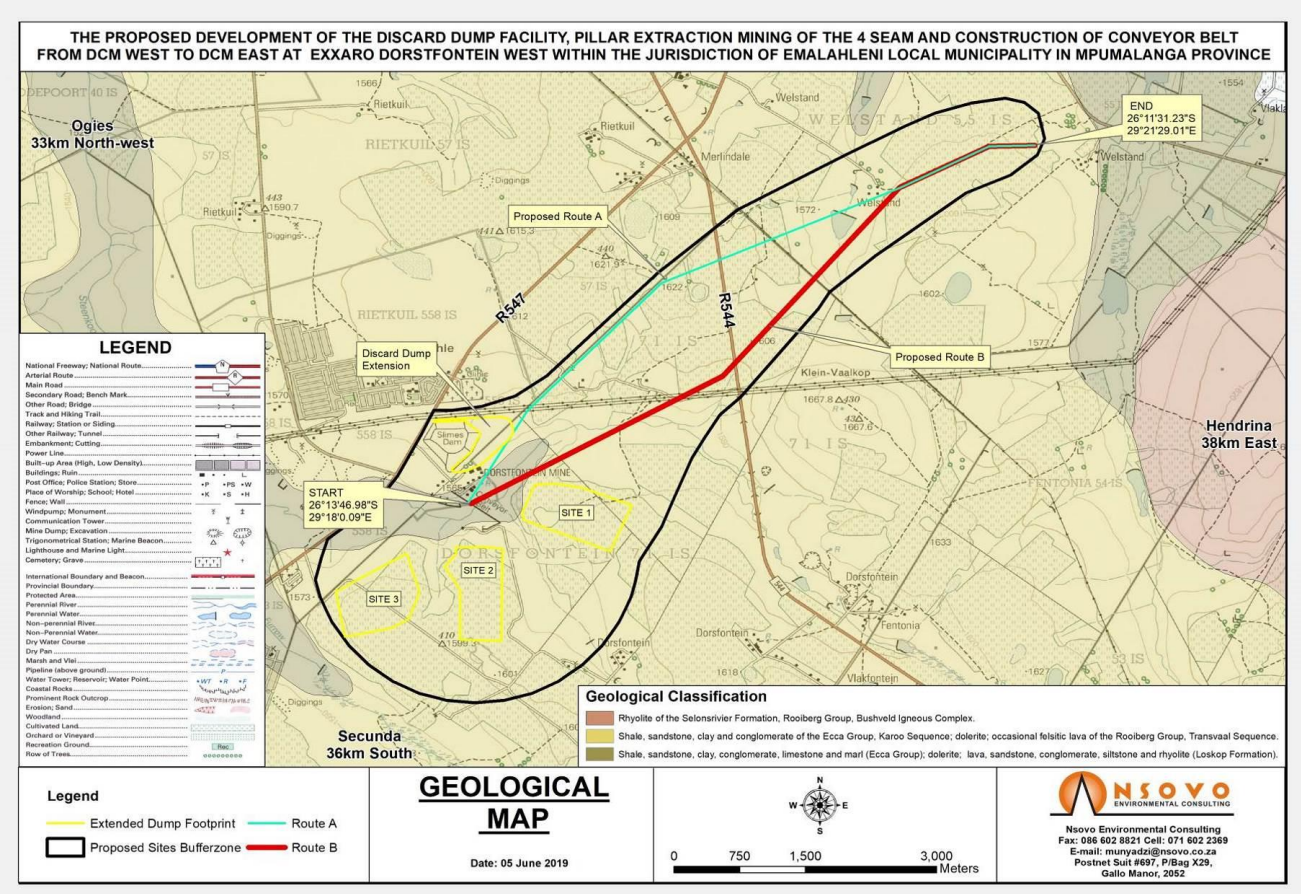


Figure 10: Geological map of the study area

Further details highlighted the hydrogelogical report by GCS (2019) indicate that the structural nature of the coal seam and the overburden formation has resulted in sub- outcropping occurring in the western portions of the farm Dorstfontein. The seams targeted at DCMW are the No. 2 seam and No. 4 seam. The No. 4 Seam is divided into an Upper and Lower Seam. Both seams are widely developed, but it is the No. 4 Lower Seam that is the prime economic target of this coal field. Dolerite sills and dykes are also common in the Witbank field. Granite outcrops close to the box cut. The No. 2 coal seam occurs at about 20 – 30m below the No. 4 coal seam and is also laterally continuous. The thickness of the No. 2 seam varies between approximately 1m and 3m. Locally the No. 2 coals seam is divided into an upper and lower seam with a parting thickness of up to 0.7m, based on available data.

From available information the No. 4 Lower Seam is laterally continuous and is economically the most important of the No. 4 Seam. The No. 4 Lower Seam varies from 1.4m to 5.5m in thickness where it is laterally continuous, but locally in the west and north-east it may be up to 8m thick. It consists mainly of dull coal. The average thickness of the No. 4 Lower Seam is 4m. Shale intercalations are common in the upper part of the seam, which consists mainly of dull coal (Snyman, 1998).

The floor elevations of the No. 4 Coal Seam do not indicate any general dipping trend. The coal seam is more or less undulated with anticline elevation at approximately 1590 mamsl and syncline elevation at approximately 1510 mamsl. However, the coal seam in the area of western expansion project shows certain dipping trend of angle approximately 0.5° in a south-westerly direction. The sulphur level in the coal varies between 0.8% and 1.4% with an average of just above 1%. Generally, the sulphur particles are very small (approximately 50 microns). Approximately 50% of the sulphur is pyretic and 50% is organic, which results in a reduction in the sulphur content after beneficiation has taken place.

10.1.4 TOPOGRAPHY OF THE STUDY AREA

The catchment consists of moderately hilly to flat areas. The DCM West is bordered by a small stream in the south, flowing in a westerly direction, away from the mine. Rainfall that infiltrates the weathered rock soon reaches an impermeable layer of shale underlying the weathered zone. The movement of groundwater on top of this shale is lateral and in the direction of the surface slope. This water reappears on surface at fountains where a barrier, such as a dolerite dyke, paleo-topographic highs in the bedrock, obstructs the flow paths or where the surface topography cuts into the groundwater level at streams. It is suggested that less than 60% of the water recharged to the weathered zone eventually emanates in streams. The Geohydrological report by GCS highlighted that a linear correlation was observed between groundwater levels and surface topography elevations. A good correlation of groundwater levels in the Dorstfontein area was found (R2 = 85%) and the correlation of groundwater levels versus surface topography is good and suggests that the groundwater levels for the area generally follow topography.

10.1.5 HYDROLOGY

The study area is situated in Quaternary catchments B11B, B11C and B11D in the Upper Olifants Water Management Area (WMA) which is situated in the north eastern part of South Africa, in the Mpumalanga Province. The Olifants River originates east of the mine flows in a northerly direction. The Steenkoolspruit is located south and west of the mine. These two rivers converge north of the mine, from which point the river is called the Olifants River. Refer to the Figure below for the hydrological map.

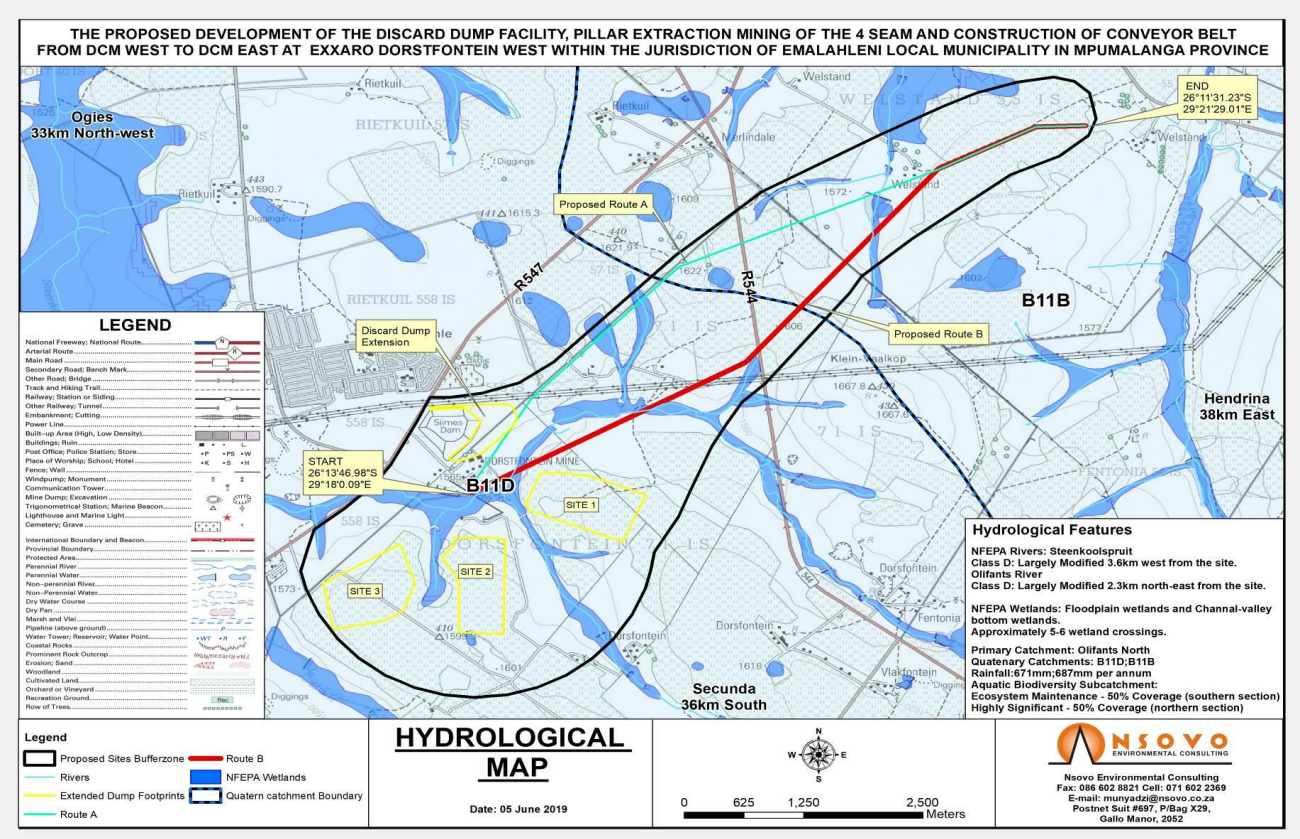


Figure 11: Hydrological map of the proposed location

An unnamed tributary of the Steenkoolspruit flows in a westerly direction across the farm Dorstfontein towards the Steenkoolspruit which flows to a confluence with the Olifants approximately 33 km north of DCM West complex area. The Olifants River continues north through Witbank Dam, through Loskop dam before flowing in an easterly direction through Limpopo and into Mozambique. An unnamed tributary to the Steenkoolspruit traverses the site from east to west just south of the pollution control dams (PCDs). The existing conveyor system passes over the tributary on an elevated platform and runoff from the site all ends up in the Steenkoolspruit.

On the eastern portion of the mining area the unnamed tributary of the Olifants River flows north across the farms and is situated in the quaternary catchment B11B. There are two tributaries of the unnamed tributary that flow east across the Farm Fentonia. The Steenkoolspruit catchment (B11D), has a Mean Annual Runoff (MAR) of 26.41 million cubic meters (mcm) for the catchment (551 km^2) and this equates to 47 930 m^3/km^2. The project area covers an area of 0.5 km^2 of the B11D which accounts for a reduction of MAR of 0.09%.

10.1.5.1 THE DESCRIPTION OF THE CATCHMENT AREA

The catchment area was determined from the surveyor general 1:50,000 map contours and ortho photos and delineated for the site (Figure below) and the catchment size listed in the table below.

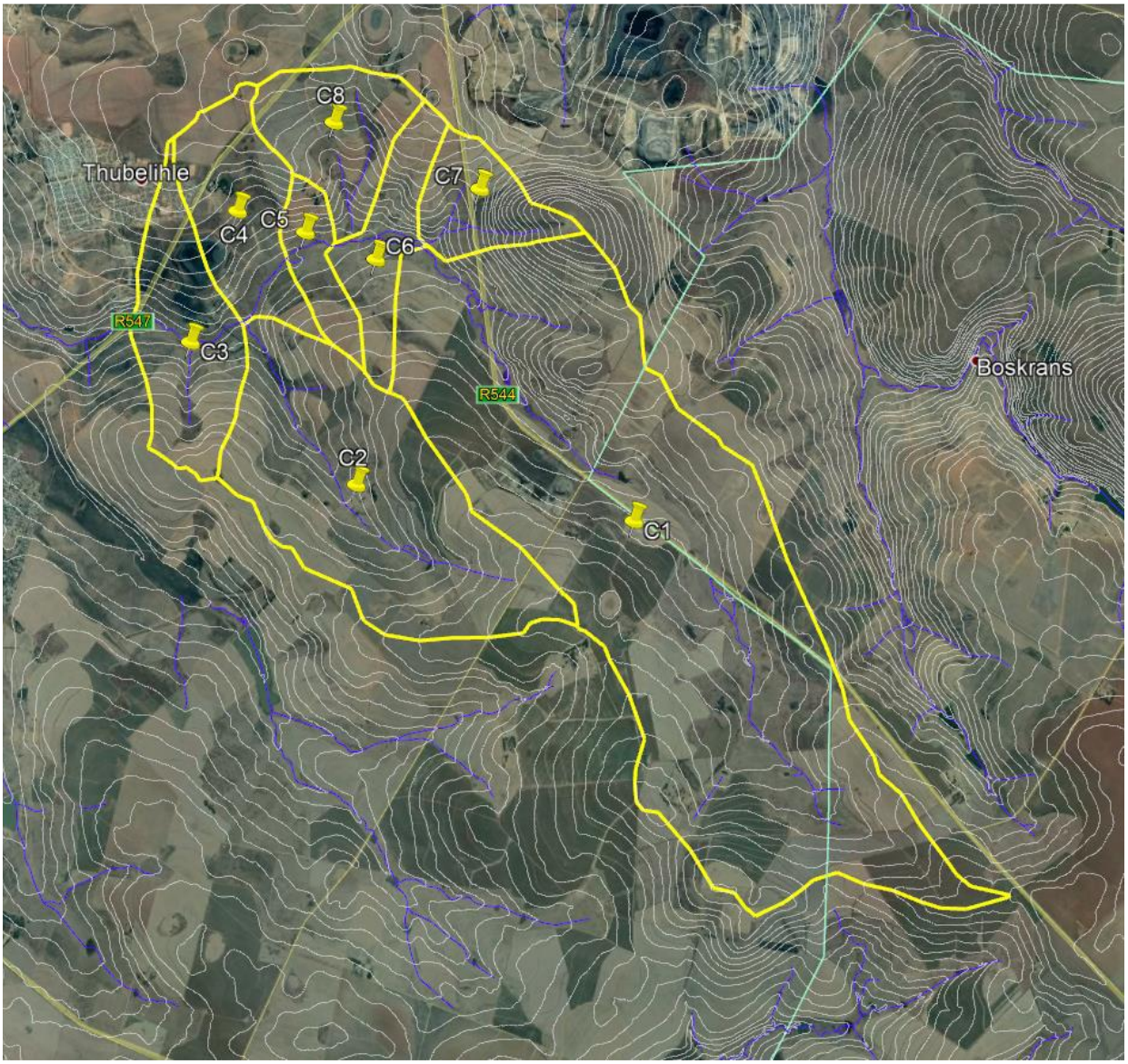


Figure 12: Catchment area as delineated by the hydrologist (Humba, 2019)

The associated sizes of each catchment and its characteristics are detailed in the Table below:

Table 16: Catchment Characteristics

The catchment characteristics are listed in the table below. **Catchment Site**	**Catchment area (km2)**	**Longest water course, L (km)**	**Height difference along 10-85 slope (m)**	**Average slope Sav (m/m)**	**Time of concentration, Tc (hours)**	**% Slope**	**MAP (mm)**	**Run-off factor C**
Catchment 1	19.484528	10.343	70.039	0.0090288	2.455129242	0.90%	680	0.311
Catchment 2	7.03346	5.193	68.199	0.0175105	1.119224295	1.75%	680	0.311
Catchment 3	2.696483	2.295	49.289	0.0286356	0.493865573	2.86%	680	0.311
Catchment 4	2.371512	2.996	58.606	0.0260819	0.628581488	2.61%	680	0.311
Catchment 5	0.892523	1.735	32.931	0.0253072	0.417567321	2.53%	680	0.311
Catchment 6	1.558621	1.838	33.238	0.0241117	0.444736864	2.41%	680	0.311
Catchment 7	1.422585	1.389	35.437	0.0340168	0.313973987	3.40%	680	0.311
Catchment 8	2.053274	1.986	49.023	0.0329124	0.418770008	3.29%	680	0.324

10.1.5.2 Wetlands

According to the Wetland specialist report, Thirty-eight separate hydro-geomorphic units (HGM), comprising four HGM types, namely unchannelled valley bottom wetlands, channelled valley bottom wetlands hillslope seepage wetlands connected to a watercourse and depressions (pans), were delineated and classified within the study area and within 500m surrounding the study area. These wetlands serve to improve habitat within and potentially downstream of the study area through the provision of various ecosystem services. Many of these functional benefits therefore contribute directly or indirectly to increased biodiversity within the study area as well as downstream of the study area through provision and maintenance of appropriate habitat and associated ecological processes.

The valley bottom wetlands, HGM 1, HGM 2, HGM 3 and HGM 4 were regarded as having a high Hydrological and Functional Importance as a result of the relatively intact nature and various important ecosystem services they provide. Direct human benefits were associated with the provision of natural resources as well as grazing opportunities afforded by most wetlands within the study area. Collectively, the valley bottom systems along with their supporting hillslope seepages, play an important role in contributing to good water quality and quantity to the downstream environment, more specifically the Olifants River. Below is a map showing the wetlands within the study area as delineated by Watermakers in 2019.

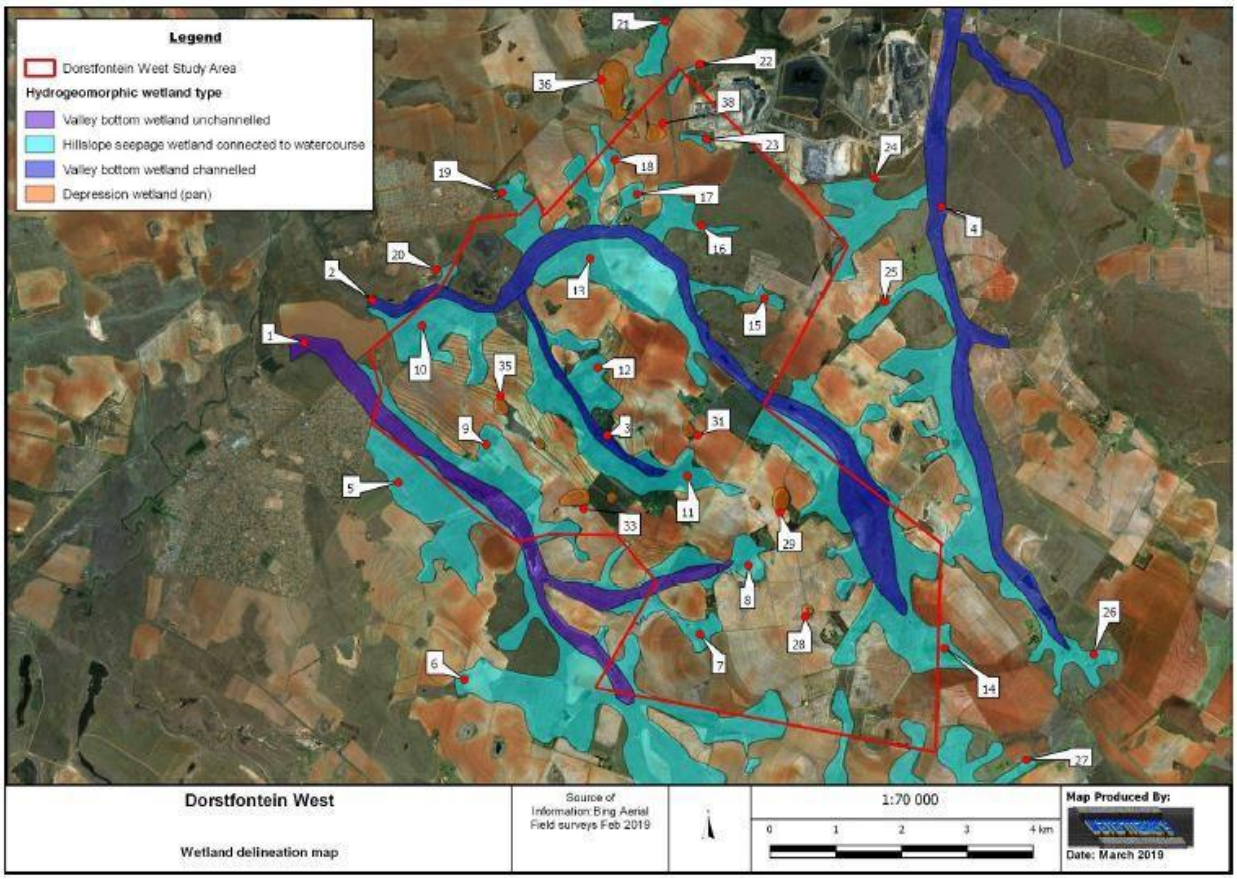


Figure 13: Wetlands within the study area as delineated by Watermakers

According to Kimopax Water Liability draft Report of 2018, due to the location of the mine within a regional coal mining hub, surface water resources have been largely degraded, with many rivers and streams exhibiting poor water qualities. The Present Ecological State (PES) of the Upper of Olifants River is classified as being moderately modified (Class C). DCM West is located within the Highveld/Witbank coalfields that is the already strained Upper Olifants River catchment, resulting in closure-related focus needing to be placed on limiting further future contribution to contamination of local groundwater and surface water resources. Further, the mine has a role to play in meeting the Olifants Water Quality Objectives. The Olifants WMA, in terms of section 13(1) (a) and (b) of the National Water Act (Act 36 of 1998) (NWA) developed their own classes and Resource Quality Objectives (RQOs). These RQOs of water resources for the Olifants catchment area detailed in the Government Gazette, No 39943 of 22 April 2016. The RQOs are defined for each prioritised resource unit, and there are no stipulated RQOs for the B11D quaternary catchment.

It is noted that DCM West has an existing surface water and groundwater monitoring characterised by monthly surface water quality monitoring at specific locations. Quarterly Water Quality Monitoring. Reports are submitted to the mine by Aquatico Laboratories. During the 1st quarter of 2019, of the eleven (11) surface water monitoring localities (three waste water and nine resource localities) located in the 2 seam area, five (5) were sampled in every month.

Currently DCM West buys water from Kriel Municipality for domestic purposes and uses it to make-up water if needed in the coal beneficiation plant.

10.1.6 HYDROGEOLOGY

According to the Hydrogeological specialist study attached as Appendix C12, the conceptual hydrogelogical model of the area is based on the generally accepted model for the Mpumalanga coalfields. Three principal aquifers are identified: the weathered aquifer; the fractured Karoo aquifer; and the fractured pre-Karoo aquifer (Hodgson & Krantz, 1998). The Karoo rocks are not known for the development of aquifers, but occasional high-yielding boreholes may be present. The aquifers that occur in the area can therefore be classified as minor aquifers (low yielding), but of high importance (Parsons, 1995).

These types of groundwater systems are common to the groundwater regime that characterises a Karoo environment. The systems do not necessarily occur in isolation of one another; more often than not forming a composite groundwater regime that is comprised of one, some, or all of the systems. Good hydraulic connectivity often exists between the two top aquifers and they have consequently been treated as a single unit in the modelling of groundwater flow.

Intrusion-related systems are also often characterised by discrete and/or erratic development. The weathered aquifer is perched and occurs at depths of 0 – 15 metres below ground level (mbgl). The lower 5 to 10 meters of the perched aquifer is saturated due to the impervious nature of the competent, horizontally stratified lithologies of the underlying Vryheid Formation, which occur at depths of 5 – 15 mbgl. The saturated depth of this aquifer is dependent on rainfall recharge, thus influx of water into a bord and pillar mining operation is also expected to vary seasonally. Highly variable recharge occurs over the area, but generally values are between 1 and 3% of the Mean Annual precipitation (MAP) based on work by Kirchner et al. (1991) and Bredenkamp (1995) in other parts of the country.

10.1.6.1 Shallow weathered aquifer

Rainfall that infiltrates the weathered rock of the shallow aquifer soon reaches an impermeable layer of shale underlying the weathered zone. The movement of groundwater on top of this shale is lateral and in the direction of the surface slope. This water reappears on surface at fountains where the flow paths are obstructed by a barrier, such as a dolerite dyke, paleo-topographic highs in the bedrock, or where the surface topography cuts into the groundwater level at streams.

The aquifer within the weathered zone is generally low-yielding (range 100 – 2000 l/h) because of its insignificant thickness. Few farmers therefore tap this aquifer by borehole. Wells or trenches dug into the upper aquifer are often sufficient to secure a constant water supply of excellent quality.

10.1.6.2 Fractured Karoo rock aquifer

The pores within the Ecca sediments are too well cemented to allow any significant permeation of water. All groundwater movement is therefore along secondary structures, such as fractures, cracks and joints in the sediments. These structures are better developed in competent rocks such as sandstone, hence the better water-yielding properties of the latter rock type.

Of all the un-weathered sediments in the Ecca Group, the coal seams often have elevated hydraulic conductivity. Packer testing of the No. 2 seam and underlying Dwyka tillite (WRC Report No 291/1/98) has low hydraulic conductivity distribution. Due to its low hydraulic conductivity, the Dwyka tillite may form a hydraulic barrier between the overlying mining activities and the basal floor. In terms of water quality, the fractured Karoo aquifer always contains higher salt loads than the upper weathered aquifer. These higher concentrations are attributed to the longer contact time between the water and the rock. The occasional high chloride and sodium levels are attributed to boreholes in the vicinity of areas where salts naturally accumulate on surface, such as pans.

Previous reports indicate that the groundwater in the DCM West mining area occurs in two main aquifer systems, namely an upper aquifer within the weathered zone of the sandstone and dolerite, and a deeper aquifer system in localised fracture zones associated with faults and dykes. The plant, coal slurry and existing discard dump are located on basement granites, which do not carry much groundwater. The water of the area is associated with a north-south dyke fault zone and the shallow perched weathered zone aquifer, both of which yield very little water.

Rest water levels in and around the mining area vary from a depth of about 1 m below surface along the lower lying areas adjacent to the two spruits running through the mining area to about 15 m below surface in the more elevated areas between the spruits. Perched conditions occur adjacent to spruits and on localised zones of shallow outcrop, but the perched aquifer is not connected to the mining area, with groundwater flow directions generally to the north, north-west and west away from the mining area. The 2009 hydro census results indicated typical yields of 1 m3/hr - 2 m3/hr, with higher yields along dolerite dykes and related fracture zones.

10.1.6.3 Hydrocensus

The Hydrogeological study prepared by GCS as part of the draft Scoping indicated that they conducted a hydrocensus within a 5 km radius of the proposed mining activities where a total of 26 boreholes were visited in 2014. Further, during February 2019 they conducted another hydrocensus within a 10 km radius of the proposed mining activities. A total of 22 boreholes were visited during February 2019.

Information pertaining to water use of the 22 boreholes identified in 2019 is listed below:

- 12 boreholes were used for domestic, stock watering and irrigation purposes;

- Four (4) boreholes (three (3) owned by Exxaro and one (1) privately owned) are used for monitoring purposes;
- One (1) borehole was not in use;
- Two (2) boreholes were destroyed; and
- The use of three (3) boreholes was unknown.

10.1.6.4 Groundwater Use

Many of the privately-owned boreholes which were investigated within the immediate study area were either equipped or being pumped which prevented the measurement of static water levels (they are used on a daily basis for domestic water supply to farmers, communities and drinking water for livestock). In many of the instances water is used for single or several households for domestic use, as a water supply for farm workers and in two cases for small communities of 50 – 100 people. Three springs were found as part of the hydrocensus. All three springs are on privately owned land and are used for livestock.

At DCM West the potential decant points were identified that are located at the box cut and the lowest topographical point of the underground mine. The calculations show the time-to-decant ranges between 35 and 185 years. Decant volume calculations show discharge rates of approximately between 210 and 1270 m3/d. Once the mining has ceased, acid rock drainage (ARD) is still likely to form given the unsaturated conditions in the facility and contact of water and oxygen through natural processes including rainfall

Further as highlighted in the Kimopax Report, main sources of water contamination include the following:

- The discard dump forms the resultant deep seepage;
- The underground mine working decants of contaminated water;
- Seepage below the pollution control dam, although these have been lined and have a seepage cut off trench at the downstream potential damage to liners; and
- Coal stockpile areas.
- The seepage water was also confirmed where the monitoring of the adjacent river streams has shown the impacts of this constant seepage.

Detailed assessment of the proposed activities on ground water will be undertaken during the EIA.

10.1.7 Sites of Archaeological and Cultural Significance

The history of the area dates back some thousands of years before the establishment of any local towns. This started with the Early Stone Age (from 2.5 million to 250 000 years ago), the Middle Stone Age (the period from 250 000 to 22 000 years ago) and the Late Stone Age (from 22 000 years ago to 200 years ago). Evidence for the MSA has been excavated at the Bushman Rock Shelter near Ohrigstad. The oldest layers date back to 40 000 years BP and the

youngest to 27 000BP (Esterhuysen and Smith 2007). Evidence of LSA is widespread in Mpumalanga and includes four in Emalahleni, two in Lydenburg, 76 in White River and the southern Kruger National Park, 250 in Nelspruit, and eight in Ermelo (Smith and Zubieta 2007). The most well-known Early Iron Age site in Mpumalanga and South Africa is the Lydenburg head site which provided two occupation dates, namely AD 600 and AD 900 - AD 1100 (Evers 1981, Whitelaw 1996).

The Phase I Archaeological and Cultural-Heritage Impact Assessment study (Appendix C4) for the proposed DCM West expansion has revealed no archaeological or site of historical significance within the footprint of the proposed development. However, the findings must also be understood within the context of the proposed development. As aforesaid, the development proposal will entail underground pillar extraction, and it is known that pillar failure might occur during extraction resulting in the subsidence of the land surface. There are thus several heritage structures and graves which although they are not within the footprint of the proposed development, are within the area that may be affected by effects of pillar extraction as depicted in the map below (*Note that the discard dumps are incorrectly labelled on this map)*.

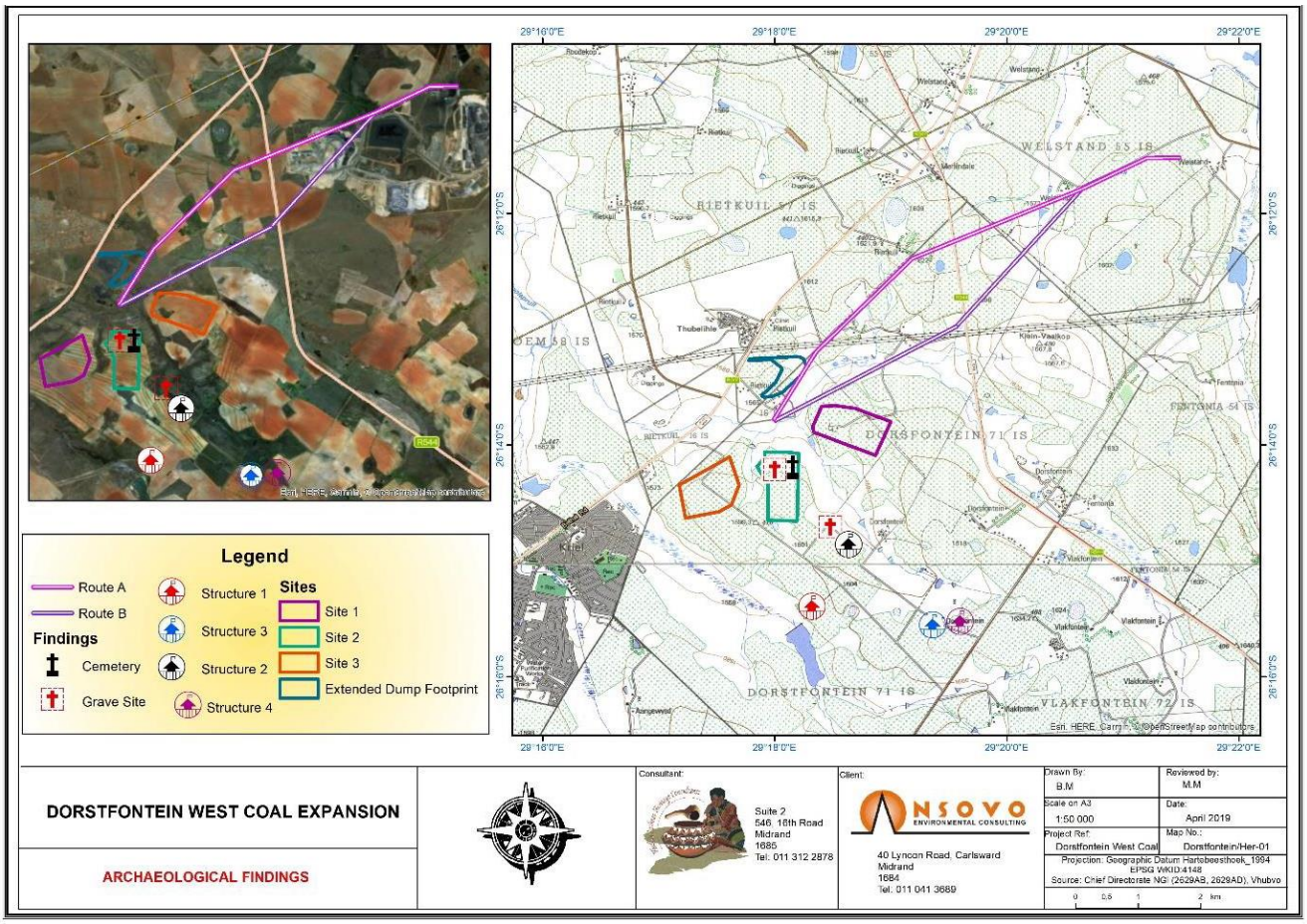


Figure 14: Archaeological findings in relations to the proposed development options (Vhubvo Archaeo-Heritage Consultant Cc., 2019).

10.1.8 AIR QUALITY AND POLLUTION

According to the Air Quality Impact Assessment Specialist Study (Appendix C4), it is assumed that the main impacting sources are dust generated from road transport on the mine discard dumps and wind-blown dust from exposed surfaces. A secondary source is the materials handling to load and offload the conveyor systems. However, there are few sources of air pollutants within the immediate proposed area. The motor vehicles along the R547, result in elevated ambient concentrations of particulates and Nitrogen Oxides (NO_2) at times. Sources identified in the immediate vicinity of the study area and proposed project area have been listed below:

- Vehicle Exhaust Gases;
- Veld Fires;
- Loading and Offloading Raw Materials;
- Wind Erosion as a result of ROM Material and Topsoil Stockpiles Dust;
- Material Handling (Loading, Hauling and Tipping); and
- Other fugitive dust sources such as wind erosion of exposed areas.

10.1.9 VEGETATION STRUCTURE AND COMPOSITION

The proposed study area falls within the following type of vegetation:

Dry Grasslands:

- Eragrostis species dominated Primary Grasslands, classified on the Mpumalanga Biodiversity Sector Plan (MBSP) as 'Other Natural Areas' as well as CBA areas. They were found mostly on gently undulating landscapes, with signs of slope seepage common throughout.
- *Eragrostis lehmanniana* dominated Secondary Grasslands, classified on the MBSP as 'Moderately Modified – Old Lands'. From historical satellite imagery it was apparent that these grasslands, mostly on gently sloping areas, had been cultivated or ploughed many years ago. The species composition also suggested that grazing was sown onto these lands after cultivation stopped.
- *Cheilanthes viridis* – Diospyros species Rocky Ledges. These were designated by the MBSP as CBA area, and had a very unique species composition due to the many niches created by the rocky boulders. Within the study area, they were located either side of the stream south of the current DCMW ore washing plant.

Moist Grasslands which are dominated by species typical for seasonally wet soils:

- *Eragrostis plana* Floodplain Grasslands, found mainly on the relatively flat floodplains adjacent to riparian areas or in channelled valley floor wetlands. Although degraded, these were designated by the MBSP as CBA area and have an important ecosystem functionality.
- Im*perata cylindrica* Seepage Slope Grasslands, found on moderately sloped seasonal seepage areas, often associated with either a stream or artificial inundated areas, as well as around small pans between cultivated fields. Most of these areas were rather degraded and heavily invaded by alien species, yet they retain an important ecosystem function.

According to Nel et al. (2011), the study area falls within the Mesic Highveld Grassland Group 4 wetland vegetation group. According to Macfarlane et al. (2014), the Mesic Highveld Grassland Group 4 wetland vegetation group is regarded as being Critically Endangered (Macfarlane et al., 2014)

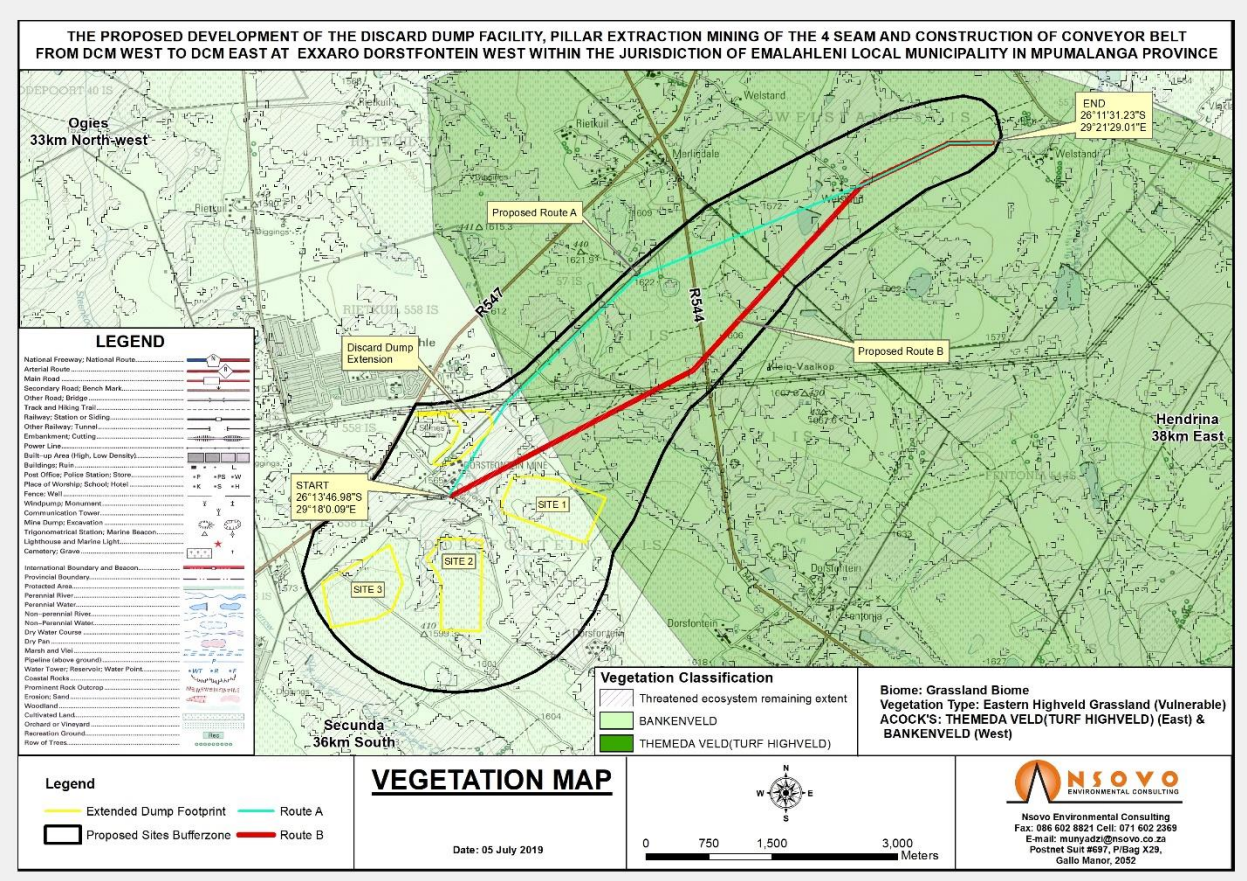


Figure 15: Vegetation Map of the proposed study site

10.1.10 SOIL AND LAND CAPABILITY

The proposed study area is dominated by arable soils such as Hutton, Lichtenburg, Avalon, Glencoe, Sepane, Bloemdal and Bainslvei forms which collectively constitute approximately 36.19% of the investigated areas, whilst shallow Dresden and Arcadia soil forms takes up approximately 22.87% of the proposed mining footprint (**Table 17**). Rensburg, Katspruit etc. soil forms which are associated with wetland resources occupy approximately 39.90% of the study area collectively, however the remaining percentage (%) of the investigated areas is situated in an area where soils are utilized as farm residences.

According to the soil and land capability specialist (Scientific Aquatic Services, 2019), discard dump sites Option 1 and 3 as well as both conveyor belt routes (although Conveyor Route A has a higher impact) are located within soils suitable for crop production. These soils are considered to contribute to the provincial and national agricultural production system and it is anticipated that they will be permanently destroyed as a result of the proposed activities. The Route A is anticipated to result in a high loss of arable agricultural land compared to conveyor Route B which largely occurs within soils which are not considered high potential agricultural soils although a small portion of Hutton soils is traversed which is considered a high productivity soil type.

Table 17: Land Capability classes for soil forms identified within the study area (Scientific Aquatic Services, 2019)

Soil Form	Code	Diagnostic Horizon Sequence	Land Capability	Areal Extent (ha)	Percentage (%)
Hutton	Hu	Orthic A/Red Apedal/ Unspecified	Arable (Class II)	95.10	2.58
Avalon	Av	Orthic A/Yellow-Brown Apedal/ Soft Plinthic	Arable (Class IV)	1237.80	33.61
Bloemdal	Bd	Orthic A/Red Apedal/Gleyic			
Bainslvie	Bv	Orthic A/ Red Apedal/ Soft Plinthic			
Lichtenburg	Lc	Orthic A/Red Apedal B/ Hard plinthic			
Sepane	Se	Orthic A/ Pedocutanic /Gleyic			
Glencoe	Gc	Orthic A/ Yellow-Brown Apedal/ Hard Plinthic			
Katspruit	Ka	Orthic A/ Gley	Grazing (Class V)	1439.60 Gleyic	39.90
Longlands	Lo	Orthic A/ Albic / soft Plinthic			
Rensburg	Rs	Vertic/ Gley			
Wasbank	Wa	Orthic A/ Albic / Hard Plinthic			
Westleigh	We	Orthic A/ Soft Plinthic/			
Dresden	Dr	Orthic A/ Hard Plinthic	Grazing (Class VI)	842.45	22.87
Arcadia	Ar	Vertic A/ Lithic			
Witbank	Wb	Unspecified	Wildlife (Class VIII)	72.12	1.96
TOTAL				**3683.17**	**100.00**

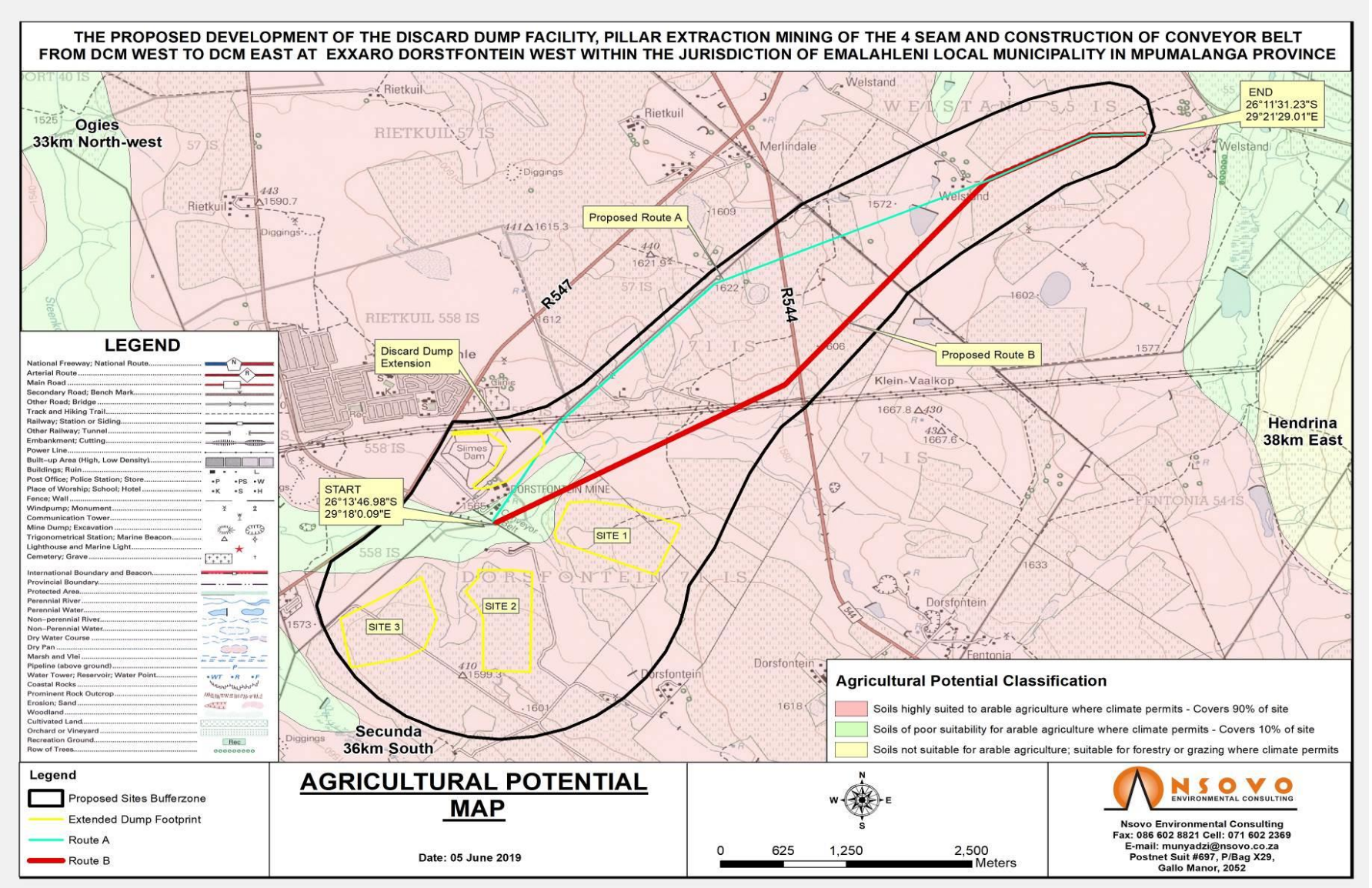


Figure 16: Agricultural potential within and around the study area

10.1.11 SENSORY ASPECTS

10.1.11.1 Noise

In terms of the Noise Regulations a noise disturbance is created when the prevailing ambient noise level is exceeded by 7.0dBA or more. Noise is part of our daily exposure to different sources which is part of daily living and some of these physical attributes which may at times be part of the ambient levels that people get used to without noticing the higher levels. Two aspects are important when considering potential impacts of a project:

- The increase in the noise levels, and;
- The overall noise levels which will be created by the rail yard activities.

There will be an upwards shift in the immediate environmental noise levels during the construction phase on a temporary basis and a more permanent basis during the operational phase in the vicinity of the different mine expansion activities. The noise increase at the abutting residential properties will however not exceed the prevailing ambient noise levels during the construction, operational and decommissioning phases as it will be below the threshold value of 7.0dBA. There will be a noise increase at Thubelihle, along the R544 and R547 roads, when coal will be transported along this corridor.

10.1.11.2 Visual Aspects

Visual appreciation or dislike is subjective and thus what is aesthetically pleasing to some can be displeasing to others. The visual analysis of a landscape the impact of new developments and structures tends to be complicated and it is evident from previous experience that when dealing with reaction to landscape changes, a large diversity of opinion exists. In this regard, it is imperative that the applicant be sensitive from a visual impact perspective, to the requirements of the local people, notably rural communities, and farmers. Many topographical features influence this environment and these features will need to be utilized when selecting an alignment so as to minimize visual impacts and intrusions.

The study area consists of large areas of agricultural land used for commercial purposes. There are few human settlements, like small towns and agricultural communities and the landscape is degraded around these settlements. Mining is one of the key land uses and contributes significantly to the visual degradation of parts of the study area. Within the receiving environment, specific viewers (visual receptors) experience different views of the visual resource and value it differently. They will be affected because of alterations to their views due to the proposed project. The visual receptors included in this study are:

- Residents;
- Tourists; and
- Motorists.

The study area is moderately populated, with lower population in the farming communities and higher population in the towns. The residents close to the mine are in Kriel and Thubehihle and may experience a low degree of visual intrusion. The entire study area is considered to have a low tourism potential, mostly because of the environmental degradation caused by the mining developments and human settlements. There is also no major thoroughfare to prominent tourist destinations.

10.1.12 CLIMATE CHANGE IMPACT

Scientific opinion suggests that the continued emission due to human activities of greenhouse gases, principally carbon dioxide and methane, may bring about significant and long-term changes to the functioning of the earth's atmosphere. Of great uncertainty still are the possible impacts and damage attributable to such climate change, although indications are that their scale could be significant. According to the White Paper on Energy, South Africa is responsible for 1,6% of global greenhouse gas emissions and the country's energy sector is the single largest source of greenhouse gas emissions in Africa, being dependent on coal for more than 75% of the country's primary energy needs during 1997. This level of emissions is also mainly as a result of the high level of coal use by the electricity generation and synthetic fuels industries, and the high level of industrialisation producing high energy content products. In order to fulfil the national energy policy of making clean, affordable and appropriate energy available to all sectors of the population, a balanced least-cost mix of energy supply is promoted. Coal will therefore dominate other energy sources in South Africa for many years to come. Although the country is faced with obligations to reduce its greenhouse gas emissions in the near future, international governance of this problem is an evolving area.

The Air Quality Specialist report highlighted that coal mining releases methane, a potent greenhouse gas. Methane is the naturally occurring product of the decay of organic matter as coal deposits are formed with increasing depths of burial, rising temperatures, and rising pressure over geological time. A portion of the methane produced is absorbed by the coal and later released from the coal seam (and surrounding disturbed strata) during the mining process. Methane accounts for 10.55% of greenhouse-gas emissions created through human activity. According to the Intergovernmental Panel on Climate Change, methane has a global warming potential 21 times greater than that of carbon dioxide over a 100-year timeline. Further, the process of mining can release pockets of methane, and these gases may pose a threat to coal miners, as well as being a source of air pollution. This is due to the relaxation of pressure and fracturing of the strata during mining activity, which gives rise to safety concerns for the coal miners if not managed properly. The build-up of pressure in the strata can lead to explosions during (or after) the mining process if prevention methods, such as "methane draining", are not taken.

Climate change is unlikely to have a major direct impact on the mining industry, for which regulations and management strategies are already in place to manage factors such as water usage, water conservation and demand strategies and environmental issues relating to rehabilitation and the provision of rehabilitation guarantees. While a lack of access to

water may affect some mining projects, most mining processes do not generally require potable water. Where high-quality water is required, some mines are already installing water treatment units.

According to the hydropedology specialist, although the effects of climate change dynamics were not it is acknowledged that the proposed activities and associated impacts might exacerbate the anticipated reduction in water inputs and the resultant hydrological function of the remaining wetlands beyond the extent of the proposed mining project.

11 METHODOLOGY FOR ASSESSING THE SIGNIFICANCE OF POTENTIAL IMPACTS

The assessment of impacts is largely based on the Department of Environmental Affairs and Tourism's (1998) Guideline Document: Environmental Impact Assessment Regulations. The assessment will consider impacts arising from the proposed activities of the project both before and after the implementation of appropriate mitigation measures.

The impacts are assessed according to the criteria outlined in this section. Each issue is ranked according to extent, duration, magnitude (intensity) and probability. From these criteria, a significance rating is obtained, the method and formula is described below. Where possible, mitigation recommendations have been made and are presented in tabular form.

The criteria given in the Table below will be used to conduct the evaluation. The nature of each impact will be assessed and described in relation to the extent, duration, intensity, significance and probability of occurrence attached to it. This will be assessed in detail during the EIA phase.

Table 18: Methodology used in determining the significance of potential environmental impacts

Status of Impact The impacts are assessed as either having a: negative effect (i.e. at a `cost' to the environment), positive effect (i.e. a `benefit' to the environment), or Neutral effect on the environment. **Extent of the Impact** (**1**) Site (site only), (**2**) Local (site boundary and immediate surrounds), (**3**) Regional (within the City of Johannesburg), (**4**) National, or (**5**) International. **Duration of the Impact** The length that the impact will last for is described as either: (**1**) immediate (<1 year)

(**2**) short term (1-5 years),
(**3**) medium term (5-15 years),
(**4**) long term (ceases after the operational life span of the project),
(**5**) Permanent.

Magnitude of the Impact
The intensity or severity of the impacts is indicated as either:
(**0**) none,
(**2**) Minor,
(**4**) Low,
(**6**) Moderate (environmental functions altered but continue),
(**8**) High (environmental functions temporarily cease), or
(**10**) Very high / Unsure (environmental functions permanently cease).

Probability of Occurrence
The likelihood of the impact actually occurring is indicated as either:
(**0**) None (the impact will not occur),
(**1**) improbable (probability very low due to design or experience)
(**2**) low probability (unlikely to occur),
(**3**) medium probability (distinct probability that the impact will occur),
(**4**) high probability (most likely to occur), or
(5) Definite.

Significance of the Impact
Based on the information contained in the points above, the potential impacts are assigned a significance rating (**S**). This rating is formulated by adding the sum of the numbers assigned to extent (**E**), duration (**D**) and magnitude (**M**) and multiplying this sum by the probability (**P**) of the impact.
S=(E+D+M)P

The significance ratings are given below
(**<30**) low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
(**30-60**) medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
(**>60**) high (i.e. where the impact must have an influence on the decision process to develop in the area).

12 DESCRIPTION OF THE ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS INCLUDING CUMULATIVE IMPACTS IDENTIFIED

This section describes the potential impacts that the proposed project may pose on the receiving environment. Impacts associated with the relevant environmental components within the study area as identified, have been assessed based on the EAP's opinion as well as consultation with specialist studies. Refer to the Tables below, for the potential impacts identified.

12.1 SUMMARY POTENTIAL ENVIRONMENTAL IMPACTS IDENTIFIED

Potential environmental impacts identified during the Scoping phase are described in Table 19 below. This is not an exhaustive list but insight into the potential impacts associated with the proposed project. It must be borne in mind that the EIA phase may identify more potential impacts and will assess them in more detail.

Table 19: Potential Environmental Impact Identified

Issue	Nature	Description
Employment	Positive-No mitigation required	The proposed project will result in the extension of the existing contracts with opportunities to the skilled and semi-skilled personnel in the local community during the construction as well as operational phases. This impact will be positive and provincial in extent.
Air Pollution	Neutral	Potential air pollutant during construction may be dust emanating from site preparation and excavations during construction. Given the nature and magnitude of the proposed project it is anticipated that before mitigation the impact will be local in extent, and short term. Mitigation measures such as dust suppression can reduce the impact to become site specific.
Visual Impact	Negative	The visual impact of an object in the landscape decreases quickly as the distance between the observer and the object increases. The visual impact at 1km is approximately a quarter of the impact viewed from 500m; and the visual impact at 2km is one eighth of the impact viewed from 500m. Therefore, objects appear insignificant in any landscape beyond 5km. The visibility of the proposed infrastructure would be a function of several factors, including landform, vegetation, views and visibility, genius loci (or sense of place), visual quality, existing and future land use, landscape character and scale. The proposed activity will change the visual character of the site particularly considering that the proposed site is located in an area that is sloping; the elevated points of the site can be viewed from the nearby roads, however, it

Issue	Nature	Description
		must be noted that there are already existing mines and waste dumps located within the vicinity of the proposed project site. Local variations in topography and man-made structures could cause local obstruction of views in certain parts of the view shed. Given the topography of the study area the impact can be considered definite, long term, local in extent but low significance.
Fauna	Negative	**Reptiles** The study area falls within the distribution range of 29 reptile species and the Southern African Reptile Conservation Assessment (SARCA, ADU 2019) indicated that 18 species have been recorded within the study area's grid, 2629A Half-degree Square. Of these, six endemic species, comprised of one gecko and five snakes, have a high to moderate expected occurrence within the study area. The Transvaal Gecko (*Pachydactylus affinis*) was the only endemic species recorded by SARCA within the 2629A Half-degree Square. Due to the presence of termitaria (although of limited size and availability) within the grassland area, there is a moderate likelihood of occurrence within the study area. However, the existing levels of disturbance and historic agricultural activities would have had a negative impact on existing populations. According to LepiMAP (ADU 2019), 101 butterfly species are known to occur within the 2629A Half-degree Square. 11 Threatened Lepidopterans have been recorded within Mpumalanga (Henning et al., 2009). Of these, *Metisella meninx* is the only species of conservation concern (Vulnerable locally, Least Concern according to IUCN) occurring within the study area. The host plant of the larva, Leersia hexandra, was noted within the some of the moist grassland and wetland areas. **Mammals** According to available data, approximately 90 mammal species have historically been recorded within the geographic area of the proposed development area (ADU, 2019). During the February 2019 survey, eight mammals were identified within the study area, these were dominated by small to medium sized species.

Issue	Nature	Description
		Amphibians Suitable environmental conditions and hence very specific habitats, particularly breeding sites, are critical for the presence and persistence of amphibians. According to available data, Mpumalanga contains 51 species (ADU, 2019). The study area falls within the distribution range of twenty amphibian species, with three species confirmed within the study area, and the possible presence of more species. Most of these amphibian species are common with a wide distribution. Some of the wetland areas appeared suitable as foraging and breeding habitat for Pyxicephalus adspersus (Giant Bullfrog; currently listed as Protected in terms of NEMBA).
Flora	Negative	Potential ecological impacts resulting from the proposed development would stem from a variety of different activities and risk factors associated with the preconstruction, construction, operational and closure phases of the project. During construction, vegetation clearing for access roads, laydown areas and the discard dump may impact intact vegetation. Increased erosion risk would occur due to the loss of plant cover and soil disturbance during the construction phase. Stripping of vegetation will increase the risk of erosion. This may impact downstream riparian and wetland habitats if a lot of silt enters the drainage systems. Further, it is anticipated that loss of indigenous vegetation will occur. This will impact on the remaining primary vegetation of a threatened ecosystem, plant species of conservation concern, unique sensitive habitats including CBA areas and wetlands as well as unique or suitable habitat for species of conservation concern to establish or persist. It is also anticipated that during both construction and operational phases, increase in Alien Invasive Plants will occur within all habitats. In addition, ecological structures and function of habitats will be lost at all wetland including surface and subsurface hydrological patterns essential for maintaining lower-lying habitats.

Issue	Nature	Description
		The development would contribute to the cumulative fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.
Noise	Negative	In South Africa, the assessment of noise levels in the environment is governed by the South African Bureau of Standards (SABS) noise standard 0103 – 'The measurement and rating of environmental noise with respect to annoyance and to speech communication' (SABS 1994). Additional SABS standards cover the measurement of noise over different distances from the source (SABS 0357 – 'The calculation of sound propagation by the Concave method'), and standards for different sectors (e.g. industry). There will be an upwards shift in the immediate environmental noise levels during the construction phase on a temporary basis and a more permanent basis during the operational phase in the vicinity of the different mine expansion activities. The noise increase at the abutting residential properties will however not exceed the prevailing ambient noise levels during the construction, operational and decommissioning phases as it will be below the threshold value of 7.0dBA. According to the SABS 0103 acceptable noise levels at day time is 45dBA, and a noise intrusion is disturbing if it exceeds 7dBA or more. The proposed development will not have significant noise increase as the noise will not exceed the threshold and has been identified as potentially low due to the nature of the proposed development.
Waste	Negative	Naturally, the inhabitation of the land will result in the accumulation of various forms of waste in the area. The aesthetic value of the area would decrease if such waste is not collected and disposed of appropriately. Waste material will be generated during the construction phase. Such waste may accumulate from the workers campsite or from litter left around the work area by the construction staff. Other waste substances may accumulate from cement bags amongst other construction material. The impact of waste is definite and will last for the duration of the construction phase as well as the operational phase, although reduced. It should also be noted that nature of the proposed activity results in

Issue	Nature	Description
		mining waste which will be deposited in the discard dump, hence the proposed expansion of the existing mine waste discard dump.
Soil	Negative	The proposed development is anticipated to contribute to loss of topsoil as a result of erosion and possible contamination of soil resources by dust and hydrocarbons due to the excavation activities. Soil compaction caused by heavy vehicles and machinery surrounding the discard dump areas is also anticipated to have a negative impact on the soil, which also exacerbates erosion. Construction activities will change the land use from arable and grazing land capability to mining, causing unsuitable conditions for any further commercial farming. The proposed development is anticipated to also contribute to loss of arable land. The disturbance of high potential arable soils is unavoidable, and it is unlikely that the natural landscape setting will be restored post closure to its pre-mining land capability. However, it can be rehabilitated to a freely draining landscape setting, using the stockpiled soil material so that it mimics the natural landscape setting and the area can be relatively productive beyond the life of mine. Other impacts on soils will include: • Change of soil surface and sub-surface hydrology, depleting or reducing replenishment of moisture of lower-lying habitats depending on hillslope seeps; • Change in soil chemistry of all lower- lying habitats affected by acid leachate, causing die-off of indigenous plants and loss of resources to fauna; and • Degradation of soil moisture reserves as well as water resources in more sensitive habitats, such as riparian areas.
Heritage	Negative	The Phase I Archaeological and Cultural-Heritage Impact Assessment study for the proposed DCM West expansion has revealed that there are no archaeological or site of historical significance within the footprint of the proposed development. However, there are several heritage structures and graves which are not within the footprint of the proposed development but may be affected by the effects of pillar extraction if not properly managed. Cracks and

Issue	Nature	Description
		subsidence of structures (graves, houses) around the mining area could be impacted negatively due to the proposed development, especially when blasting is involved.
Wetlands	Negative	The proposed study area is within an unchannelled valley bottom wetlands, channelled valley bottom wetlands hillslope seepage wetlands connected to a watercourse and depressions (pans). Wetlands within the study area serve to improve habitat within and potentially downstream of the study area through the provision of various ecosystem services. Many of these functional benefits therefore contribute directly or indirectly to increased biodiversity within the study area as well as downstream of the study area through provision and maintenance of appropriate habitat and associated ecological processes. In order to ensure that the water resources within the study area are managed properly and protected, a Water Use Licence will be lodges with the Department of Water and Sanitation. The wetland associated impacts include: • Subsidence of landscape tracts due to pillar extraction mining • Loss of indigenous vegetation • Removal of exotic and cultivated vegetation cover • Loss of or displacement of fauna • Loss of ecological structures and function of habitats • Increase in alien invasive plants
Surface Water	Negative	Subsidence and hydrology impacts occur at every underground mining operation bringing about changes to surface landforms, ground water and surface water. Construction impacts associated with surface water would include: • Surface Water Contamination • Siltation of surface water • Runoff and drainage from the discard dump continue to yield polluted water and siltation of water courses.

Issue	Nature	Description
		The proposed discard dump and pillar extraction will have negative impacts on surface water resources i.e., river systems, dams and pans and such may include the following impacts • Storm water control around the subsidence areas (free draining) • Storm water control around the discard dump (seepage/runoff) The construction of the conveyor belt and associated service would impact on surface as a result of encroachment or possible destruction. Operational phase impacts on surface water include • Change in Hydraulic Regime due to subsidence as a result of pillar extraction • Stream peak flow reduction as a result of the discard dump.
Groundwater Pollution	Negative	During the construction phase for the Discard Dump extension and conveyor belt, the following potential impacts on groundwater may result from the on-project site activities: • Potential project site contamination of groundwater due to hydrocarbon spillages and leaks from construction vehicles and waste; • Slight reduction of recharge to groundwater due to the compaction of the ground surface; and • Clearing of footprints, building of roads and other construction related activities. • Decrease in quality as a result of potential hydrocarbon spillages as well as seepage from the discard dump • Increased infiltration • Loss of storage underground • Change in the geo-chemistry • Monitoring changes (BH's)

Issue	Nature	Description
		As these activities are relatively small in magnitude this will only pose a project site specific low risk to groundwater if proper mitigation measures are implemented.
Socio-economic Environment	Negative/Positive	The socio-economic aspect has both positive and negative impacts. The significance of positive socio-economic benefits associated with the proposed development exceed the significance of negative socio-economic impacts. For example, the proposed mine expansion and prolonged life of the mine will result in sustainable jobs at the mine and will increase employment opportunities over the medium and long term. These include skilled, semi-skilled and under skilled labours which could consist of locals (in and around the mining area) as well as regional and national communities. The proposed conveyor belt will undoubtedly result in reduced traffic volumes on the road from trucks transporting coal from DCM West to DCM East as well as from vehicles and trucks on roads i.e., the R547 and R544. The negative socio-economic consequences associated with the project include that, for example, the proposed development is in an area characterised by a variety of agricultural activities which include among others: maize and soya beans cultivated fields and grazing fields for livestock i.e. cattle and goats. The proposed conveyor belt and discard dump will impact on the agricultural potential of the area as well as other ecological support services which the local communities depend on.
Climate	Neutral	Local climate conditions do not appear to be of a significant concern to the proposed project. In a broader scale the project will have no direct significant impact on the local and/or global climate change. The associated indirect impacts will be assessed in detail during the EIA phase.
Topography	Neutral	The topography of the study area is undulating and the proposed conveyor belt and associated road as well as the discard dump will not have significant impact on the topography. However, the proposed pillar extraction will result in surface subsidence which alter the topography of the area.

Issue	Nature	Description
Tourism	Neutral	The entire study area is considered to have a low tourism potential, mostly because of the environmental degradation caused by the mining developments and human settlements. There is also no major thoroughfare to prominent tourist destinations. The temporary exposure to possible unsightly views of the construction camps and the associated activity will be minimal and localised. The proposed new developments will only have an impact on tourists in near proximity to the mine, which will be mostly along main transportation routes. The severity of the visual impact of the mining activities on tourists will be low, causing a low visual impact.
Traffic	Neutral	Traffic operating conditions were determined and compared for the baseline, project construction phase and project operational phase scenarios. By comparing the operating conditions for the different scenarios, it was concluded that the proposed project will have an insignificant traffic impact on the surrounding road network. No traffic problems or congestion are expected as a result of the project activities, provided that the issues discussed in Section 7 of the Traffic Impact Report (Appendix C4) are considered.
Soil Potential and Land Capability	Negative	The proposed pillar extraction mining of 4 seam is anticipated to impact on agriculture as this act of mining using the pillar extraction method at the limited depth of at least 30.0 meters below ground level, will ultimately result in some sort of surface subsidence. Thus, land capability suitable in supporting cultivation will be lost through alteration of both biological, physical and chemical characteristics of the soil medium occurring in vicinity of the development foot print due to subsidence.
Geology	Negative	The proposed conveyor belt and associated road as well as the discard dump will not have significant impact on the geology. However, the proposed pillar extraction method includes that the removal of the geological coal and associated resources will permanently alter the geology of the area. No mitigation measures are proposed for this impact as mining permanently destroys the geological strata. The mine should make optimal utilisation of the coal resources which forms part of the mining rights area and should remain within the limits of the designated mining rights area.

Further, the potential impacts associated with the proposed project will also include impacts on:

- Biodiversity (flora and fauna);
- Soil, land use and land capability;
- Heritage;
- Agriculture;
- Wetland;
- Hydropedology;
- Hydrology;
- Traffic;
- Air quality;
- Socio-economic; and
- Visual impacts.
- Topographical changes - Subsidence as a result of pillar extraction
- Geological changes
- Climate Change Impact
- Geohydrology

The following section presents the impacts and the significance as rated by the specialists as well as the EAP. The Tables below highlight the significance of the identified impacts for both the construction and operational phases of the project. **In some cases the decommissioning phase was also assessed, however, impacts of this phase as well as rehabilitation and closure will be comprehensively addressed in the EIA phase.**

The ratings are assessed with and without mitigation and colour coded as follows to indicate the significance:

High
Medium
Low

12.1.1 HYDROPEDOLOGY

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
The hydropedological impacts were rated high during site preparation without mitigation measures and medium with the implementation of the appropriate mitigation measures. During operation of the proposed conveyor route, the impacts were rated medium and low without and with mitigation measures respectively. Further, during the operation of the discard dump the impacts were rated medium.							
CONSTRUCTION PHASE IMPACTS							
Site preparation prior to the commencement of the proposed development.	No	Negative	1 (Site)	2 (Short term)	6 (moderate)	5 (definite)	45 high
	Yes	Negative	1 (Site)	2 (Short term)	6 (moderate)	4 (high)	36 medium
Mitigation Measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• All development footprint areas to remain as small as possible and vegetation clearing to be limited to what is absolutely essential; • Retain as much indigenous vegetation as possible; • Exposed soils to be protected by means of a suitable covering; • Existing roads should be used as far as practically to gain access to site, and crossing the wetlands in areas where no existing crossing is apparent should be unnecessary, but if it is essential crossings should be made at right angles.							
Excavation activities as part of the conveyor pillar installation	No	Negative	1 (site)	3 (medium term)	6 (moderate)	4 (high)	40 medium
	Yes	Negative	1 (site)	2 (Short term)	6 (moderate)	4 (high)	36 medium
Mitigation Measures							
• If possible, vegetation clearing should be done in a phased manner to limit bare/exposed soils which are prone to erosion. • Exposed soils to be protected by suitable covering.							
Excavation activities as part of the site preparation	No	Negative	1 (Site)	2 (Short term)	6 (moderate)	5 (definite)	45 high
	Yes	Negative	1 (Site)	2 (Short term)	6 (moderate)	4 (high)	36 medium
Mitigation Measures							
• Discard dump extension must be slightly relocated out of the hillslope seep and be placed north of the study area where there is an occurrence of ground water recharge soils; • The discard dump must be lined with impermeable clay material to limit mobility of contaminants into the wetlands and groundwater regime; • All the three proposed sites should be avoided due to risk of subsidence which might impact on the hillslope process. Geotechnical studies should be consulted in this regard; • Should the proposed sites be declared safe, Site 2 is ideal since it largely avoids wetlands and small effects on the hydropedological process are predicted since it is largely occurring in soils which are event driven.							
Issue		**Impact rating criteria**					**Significance**

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
	Corrective measures	Nature	Extent	Duration	Magnitude	Probability	
During operation of the proposed conveyor route, the impacts were rated medium and low without and with mitigation measures respectively. Further, during the operation of the discard dump the impacts were rated medium.							
OPERATIONAL PHASE IMPACTS							
Operation of the Conveyor route	No	Negative	1 (site)	2 (short term)	6 (moderate)	3 (medium)	27 low
	Yes	Negative	1 (site)	2 (short term)	4 (low)	2 (low)	14 low
Mitigation Measures							
• Avoid installation of the conveyor within wetlands and interflow soils as far as practically possible; • Should it not be feasible, Route A should strongly be considered.							
Operation of the Discard dump	No	Negative	1 (Site)	3 (medium term)	6 (moderate)	4 (high)	40 medium
	Yes	Negative	1 (Site)	2 (Short term)	6 (moderate)	4 (high)	36 medium
Mitigation Measures							
• The discard dump must be lined with impermeable clay material to limit mobility of contaminants into the wetlands and groundwater regime; and • A dirty water trench (at least 1.5m) should be installed down gradient of the discard facility to capture seepage which might potentially pollute the wetlands							

12.1.2 SOCIO-ECONOMIC IMPACT ASSESSMENT

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
12.1.2.1 Impacts during the pre-construction phase							
Developing spin-off businesses to support proposed project	**No**	Positive	2	3	4	2	**Low (27)**
	Yes	Positive	2	3	2	2	**Low (14)**
Mitigation Measures							
• There could be initiatives developed to contribute towards educating and developing necessary skills for the locals to take advantage of opportunities associated with the proposed construction of the proposed project. • Local businesses could be incubated and developed to be able to take opportunities in the construction and operation of the proposed project which is highly technical.							
Employment expectations and an influx of migrant labour	**No**	Neutral	4	3	6	4	**Medium (52)**
	Yes	Positive	4	3	2	4	**Medium (36)**
Mitigation Measures							
• There could be initiatives developed to contribute towards educating and developing necessary skills for the locals to take advantage of opportunities associated with the proposed construction of the proposed project. • Local businesses could be incubated and developed to be able to take opportunities in the construction and operation of the proposed project which is highly technical. • When appointing subcontractors, Exxaro should give preference to appropriate subcontractors/SMMEs located in the surrounding communities, then in the municipal area, and then only to contractors located elsewhere or outside the province.							
Impacts during the construction phase							
Job creation	**No**	Positive	2	1	6	4	**Medium (36)**

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
	Yes	Positive	2	2	8	4	**Medium (48)**
Mitigation Measures							
• Employment of skilled, semi-skilled and unskilled labours in the construction of proposed project within the receiving environment and ELM. • Skills development initiative to prepare locals to have necessary skills to take up employment opportunities with the proposed project in line with the mine Social Labour Plan and the associated Employment Equity and Skills Development Plans. • Exxaro must promote the creation of employment opportunities for women and youth. The positions reserved for the youth and women may only be filled with persons outside of these categories if it can be demonstrated that no suitable persons can be employed from these categories.							
Development of tenders and contract opportunities for local businesses	**No**	Positive	3	3	2	2	**Low (16)**
	Yes	Positive	3	3	2	4	**Medium (32)**
Mitigation Measures							
• If possible, the local businesses should be incubated and developed to be able to take opportunities in the construction of the proposed project. This should be aligned with the mine Social Labour Plan and associated Employment Equity and Skills Development Plans. • It is recommended that Exxaro to consult with local business forums.							
Change in local land use in the affected area for the proposed project.	**No**	Negative	2	2	8	3	**Medium (36)**
	Yes	Positive	1	1	2	1	**Low (4)**
Mitigation Measures							
• Construction activities for the proposed project and the associated auxiliary infrastructure should be restricted within the footprint of this infrastructure and associated servitudes. • With mitigation construction activities will be restricted to the mine receiving environment and there will be not negative spill-overs. There is therefore no adverse change in land use in the area.							
Traffic impacts	**No**	Negative	2	2	6	5	**Medium (50)**
	Yes	Positive	1	1	2	2	**Low (8)**

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Mitigation Measures							
• Improvement in local road conditions and reduction of the number of trucks used to load and transport coal with the construction of the proposed project, such as the development traffic lights, and speed humps aimed at mitigating risk of uncontrolled traffic during and off-peak hours of the construction phase. • Traffic management systems should be developed to manage traffic during peak hours and off pick hours especially for construction trucks during the construction phase of the proposed project. This should include installation of traffic lights and/or traffic circles along the R547 which will also benefit the township herders in the long run in terms of accessing grazing fields and water bodies at the receiving environment pass the construction phase of the project. • Inform communities of planned construction activities that would affect vehicle/ pedestrian traffic							
Increase in occupation health and safety risks	**No**	Negative	1	2	6	5	**Medium (54)**
	Yes	Positive	1	1	2	1	**Low (4)**
Mitigation measures							
• The mine should consider installing traffic management systems such as traffic lights for people and pedestrians north existing Discard Dump and near Thubelihle cemetery. • Construction related vehicles should be restricted to daylight hours and the workweek if at all possible. Thus, it is recommended that trucks should not be operated after sunset or over weekends. • Roads must be adequately maintained to prevent deterioration of roads surfaces due to heavy vehicle traffic. Road maintenance should not be the sole responsibility of the ELM or the Department of Public Works. • Safe travelling speeds must be determined, and measures implemented to ensure that these restrictions are enforced.							
Increase in pressure for water demand and allocation to support the construction of the proposed project	**No**	Negative	2	3	10	4	**Medium (60)**
	Yes	Neutral	1	2	6	3	**Low (27)**
Mitigation measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Both Site 2 and 3 are situated within a 50m wetland buffer zones within the respective sites. Therefore, if Site 2 and 3 are chosen, there would be a higher risk of contaminating the wetlands situated within the sites. • Various water schemes that are in place in ELM and Mpumalanga Province in general should be considered and in partnership with the responsible authorities and other water intake stakeholders in the area, the mine should ensure that it applies for the relevant for water use and abstraction permits. • The mine should also ensure that it establishes the necessary water recycle measures such as water recycling and storm water management systems as there is a possibility of contamination of water bodies during construction of the proposed project.							
Reduction in agricultural land	**No**	Negative	4	4	8	5	High (> 80)
	Yes	Neutral	2	2	6	3	Medium (30)
Mitigation measures							
• The proposed project will to a degree result to decrease in agricultural land or agricultural potential of the receiving environment which is also characterized by agricultural activities such as cultivation land and grazing land for local livestock. With regards to livestock Route B should be considered as the preferred alternative to Route A as livestock grazes along Route A. • If Route B is chosen as the preferred route, only one section of the receiving environment will be impacted, and the remaining section can continue to be used for agricultural activities and food security will not be majorly affected. • From a socio-economic perspective, both the Discard Dump extension and Site 1 should be considered as the preferred site for the Discard Dump.							
Impact on heritage resources	**No**	Negative	2	5	10	2	**Medium (34)**
	Yes	Neutral	1	1	2	1	**Low (4)**
Mitigation measures							
• As per the Heritage Report, a Heritage Management Plan should be compiled before the project starts which must also include a monitoring plan which must be taken at infrequent or irregular intervals. This is important as the pillar extraction mining method might operate below grave sites that may be buried underground and may not have been identified during the site visits. Therefore, even though the pillar extraction will not be undertaken underneath graves there is a possibility that the pillar extraction may result in surface subsidence (Engineering Report: page 14), and the unidentified graves may consequently be impacted negatively.							
	No	Negative	2	3	8	4	**Medium (52)**

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Increase in negative public sentiments about the proposed project	**Yes**	Positive	2	2	2	2	**Low (12)**
Mitigation measures							
• To improve project public participation and communication strategies in order to strengthen multi-stakeholder engagement and participation in the planning and implementation of the proposed project. • Exxaro should inform and consult with its Stakeholders on all stages of the proposed project.							

12.1.3 HYDROGEOLOGICAL

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
The groundwater impacts were rated low during site preparation without and with the implementation of the appropriate mitigation measures. During operation of the proposed conveyor route, the impacts were rated low without and with mitigation measures respectively. During the operational and post closure phases of the discard dump the impacts were rated medium. During the pillar extraction the impact on water quality and quantity were rated low. Post closure decant water quality impacts were rated medium.							
Construction phase							
Site preparation prior to the commencement of proposed development.	No	Negative	1 (Site)	2 (Short term)	4 (Low)	3 (Medium)	21 low
	Yes	Negative	1 (Site)	2 (Short term)	2 (Minor)	2 (Low)	10 low
Mitigation measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Limit the vegetation clearance and topsoil stripping to the smallest area possible • Waste needs to be discarded • Spills cleaned up immediately according to standard operating procedures • If applicable, the appropriate authorities should be notified in the event of a spill							
Operational phase							
Operation of the Conveyor route	No	Negative	1 (Site)	4 (Long term)	4 (Low)	2 (Low)	18 low
	Yes	Negative	1 (Site)	4 (Long term)	2 (Minor)	1 (Improbable)	7 low
Mitigation measures							
• Waste needs to be discarded • Spills cleaned up immediately according to standard operating procedures • If applicable, the appropriate authorities should be notified in the event of a spill							
Water quantity - Pillar extraction mining at the 4-Seam	No	Negative	2 (Local)	4 (Long term)	2 (Minor)	3 (Medium)	24 low
	Yes	Negative	2 (Local)	4 (Long term)	2 (Minor)	3 (Medium)	24 low
Mitigation measures							
• Keeping the workings dry is necessary for mining and mitigation is not possible. • Impact on private users to be determined in EIA.							
Water quality - Pillar extraction mining at the 4-Seam	No	Negative	2 (Local)	4 (Long term)	2 (Minor)	3 (Medium)	24 low
	Yes	Negative	2 (Local)	4 (Long term)	2 (Minor)	3 (Medium)	24 low
Mitigation measures							
* There is nothing that can be done to mitigate contamination from the underground areas							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Water quality - Discard Dump Extension	No	Negative	2 (Local)	4 (Long term)	8 (High)	4 (High)	56 medium
	Yes	Negative	2 (Local)	4 (Long term)	6 (Moderate)	4 (High)	48 medium
Mitigation measures							
• A discard dump is needed to store the discard materials from the underground workings. • Clean water and rainwater need to be diverted away from the discard dump as much as possible to reduce seepage to groundwater.							
Water quality - Waste handling	No	Negative	2 (Local)	4 (Long term)	2 (Minor)	3 (Medium)	24 low
	Yes	Negative	2 (Local)	4 (Long term)	2 (Minor)	2 (Low)	16 low
Mitigation measures							
• Waste needs to be discarded and spills cleaned up immediately according to the IWULA conditions. • The DWS should be notified in the event of a spill.							
Decommissioning & Post-Closure phases							
Water quality - Seepage from Rehabilitated Mine Areas to Surface Water Streams	No	Negative	2 (Local)	5 (Permanent)	8 (High)	4 (High)	60 medium
	Yes	Negative	2 (Local)	5 (Permanent)	4 (Low)	4 (High)	44 medium
Mitigation measures							
• Groundwater levels in the underground mine will recover. Pollution plumes may migrate to surface water bodies. • All mined areas should be flooded as soon as possible to bar oxygen from reacting with remaining pyrite. • 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 recovery of water in the underground mining areas should be monitored.							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Water quality - Decant of groundwater	No	Negative	2 (Local)	5 (Permanent)	8 (High)	4 (High)	60 medium
	Yes	Negative	2 (Local)	5 (Permanent)	8 (High)	4 (High)	60 medium
Mitigation measures							
* 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 achieved by the installation of a treatment plant. TCSA 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 RO plant should be the last option. Hodgson et al. (WRC Report 1263/1/07; 2007) recommend the following measures for the management of mine water: The feasibility and effectiveness of employing these measures at Dorstfontein should be investigated. 1) Select the mining method based on environmental considerations (deep bord-and-pillar mining generates the smallest water volumes compared to opencast mining); 2) Mine from deep to shallow; 3) Flood the mine workings; 4) Flush the mines after being flooded.							
Water quality - Rehabilitated Mining Areas	No	Negative	2 (Local)	5 (Permanent)	8 (High)	4 (High)	60 medium
	Yes	Negative	2 (Local)	5 (Permanent)	8 (High)	4 (High)	60 medium
Mitigation measures							
Treating of decanting mine water to acceptable water quality levels can be achieved by the installation of a treatment plant. TCSA 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 DWEA. As a minimum, treated water should meet the standards for use for livestock watering and							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
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 timing, location and amount 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.							
Water quality - Discard Dump Extension	No	Negative	2 (Local)	5 (Permanent)	8 (High)	4 (High)	60 medium
	Yes	Negative	2 (Local)	5 (Permanent)	8 (High)	4 (High)	60 medium
Mitigation measures							
The same mitigation measures as mentioned during the operational phase 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							

12.1.4 TERRESTRIAL BIODIVERSITY

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
The impacts related to discard dump. The significance of these impacts will be the same for every option of the discard dumps, with exception of loss of ecological function, which is rated separately for each discard dump alternative. The impact on terrestrial biodiversity is more for the construction phase. Most of the identified impacts are of medium significance with mitigation measures.							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Loss if indigenous vegetation	No	Negative	2	5	8	5	75 High
	Yes	Negative	1	4	6	5	55 Medium
Loss of exotic vegetation	No	Negative	2	5	6	5	65 Medium
	Yes	Neutral	1	4	2	5	35 Medium
Loss of or displacement of fauna	No	Negative	2	5	8	4	60 Medium
	Yes	Negative	1	4	4	3	27 Low
Increase in alien invasive vegetation	No	Negative	3	5	6	5	70 High
	Yes	Negative	2	3	4	3	27 Low
Loss of ecological function (Expansion of existing discard dump)	No	Negative	3	5	10	5	90 High
	Yes	Negative	2	4	8	3	44 Medium
Loss of ecological function (Discard dump site 1)	No	Negative	3	5	8	5	80 High
	Yes	Negative	2	4	7	3	39 Medium
Loss of ecological function (Discard dump site 2)	No	Negative	3	5	8	4	72 High
	Yes	Negative	1	4	6	3	33 Medium
Loss of ecological function (Discard dump site 2)	No	Negative	3	5	10	5	90 High
	Yes	Negative	3	4	8	4	60 Medium

Issue	Mitigation measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impacts related to the conveyor belt routes and service road							
Loss of indigenous vegetation (Route A)	No	Negative	3	5	8	5	80 High
	Yes	Negative	2	4	6	5	60 Medium
Loss of indigenous vegetation (Route B)	No	Negative	3	5	8	5	80 High
	Yes	Negative	3	4	8	5	75 High
Loss of indigenous vegetation (Route C)	No	Negative	2	5	6	5	65 High
	Yes	Negative	1	4	4	5	45 Medium
Loss of exotic vegetation	No	Negative	2	4	4	5	65 Medium
	Yes	Neutral	1	4	2	5	35 Medium
Loss of or displacement of fauna	No	Negative	3	4	8	5	75 High
	Yes	Negative	1	4	4	3	27 Low
Loss of ecological function	No	Negative	3	5	8	5	80 High
	Yes	Negative	2	4	6	3	36 Medium
Mitigation Measures							

Avoid or minimise loss of sensitive habitats:

- 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.
- 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.
- After the final layouts of new mining operation components has been approved and prior to any new groundwork's, conduct a thorough footprint investigation (during summer) to assess all Protected or Threatened plant species (population location and its size).
- Parking and operational areas should be regularly inspected for oil spills and covered with an impermeable or absorbent layer (with the necessary storm water control) if oil and fuel spillages are highly likely to occur. Reinforce portions of existing access routes that are prone to erosion or seasonal inundation, create structures or low banks to drain the access road rapidly during rainfall events, yet preventing erosion of the track and surrounding areas.
- If filling material is to be used, this should be sourced from areas free of invasive species, and alien plant control measures are to be applied to all areas used for sourcing fill materials.
- Efforts will be taken to minimise the footprint of short-duration activities and/or linear infrastructure during construction, operation and decommissioning phases of the mine. Efforts to minimise such footprints will include grouping all infrastructure to the same servitude and/or as close as possible to existing and planned long-term physical disturbances. This will also reduce fragmentation due to mining operations.

12.1.5 LAND AND SOIL CAPABILITY

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
12.1.5.1 Impact on land and soil capability							
Soil erosion and dust emission	No	Negative	2	4	8	5	**70** (High)
	Yes	Negative	2	2	5	3	**27** (Low)
Mitigation Measures							
• Any disturbance of high potential agricultural soils must be actively avoided, should this be not feasible, the footprint of the proposed mining and infrastructure areas should be clearly demarcated to restrict the planned activities within infrastructure footprint as far as possible, thus minimising edge effects and reducing the extent and overall significance of impact; • 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: o Sheet runoff from cleared areas, paved surfaces and access roads needs to be curtailed; o Runoff from paved surfaces should be slowed down by the strategic placement of berms; and o All overburden stockpiles and waste stockpiles must have berms and/catchment paddocks at their toe to contain runoff of the facilities; • 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; • As the footprints of the proposed development are not vegetated it is best to be regularly dampened with water to suppress dust during the construction phase, especially when strong wind conditions are predicted according to the local weather forecast; • Bare soils adjacent to the infrastructural areas can be vegetated with an indigenous grass mix, if necessary, to re-establish a protective cover, to minimise soil erosion and dust emission; and Erosion control is regarded critical as the majority of the soils are susceptible to erosion, as they have finer particles, due their sandy texture and continuous tillage practises taking place.						

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on soil compaction	No	Negative	2	4	8	5	**70** (High)
	Yes	Negative	2	2	5	3	**27** (Low)
Mitigation Measures							
• All vehicular traffic should be restricted to the existing service roads and the selected road servitude as far as practically possible; to avoid unnecessary compaction of the surrounding soils; • Direct surface disturbance of the identified 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); • Compacted soils adjacent to the mining project footprints and associated infrastructure footprint can be lightly ripped to at least 25 cm below ground surface to alleviate compaction prior to re-vegetation, and • Compaction of soil can be mitigated by ripping the footprint and introducing both organic and inorganic fertilizers.							
Issue	**Corrective measures**	**Impact rating criteria**					**Significance**
		Nature	**Extent**	**Duration**	**Magnitude**	**Probability**	
12.1.5.2 Impacts on the loss of agricultural potential							
Loss of agricultural potential	No	Negative	2	5	9	5	**80** (High)
	Yes	Negative	2	5	9	5	**80** (High)
Mitigation Measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Unnecessary disturbances of the potentially arable soils outside the demarcated areas (i.e. Hutton) can be avoided where possible to minimise loss of arable soils; • During the decommissioning phase the footprint should be thoroughly cleaned, and all building material should be removed to a suitable disposal facility; • 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 fist then followed by topsoil); • 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; and • The footprint should be re-vegetated with a grass seed mixture as soon as possible, preferably in spring and early summer to stabilise the soil and prevent soil loss during the rainy season.							

12.1.6 IMPACT ON WETLANDS

Impacts on wetlands are similar for both the construction and operational phases of the project.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
12.1.6.1 Impact on wetlands during the Construction and operational phases							
Destruction and degradation of wetlands	No	Negative	3 Regional	5 Permanent	8 High	5 Definite	80 High
	Yes	Negative	2 Local	3 Medium term	6 Moderate	3 Medium	33 Medium
Mitigation Measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• All soils within the footprint of the discard facility must be appropriately separated and stored. • Avoid mining activities in the wetland areas identified as far as possible through proper planning, demarcation and appropriate environmental training. • Lay-out designs should 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; • Any proclaimed weed or alien species that germinate during the operational period shall be cleared by hand before flowering; • 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 storm water plan must include adequate attenuation facilities to ensure that peak flows do not cause negative impacts on wetlands. • Caution must be taken to ensure building materials are not dumped or stored within the proximity of the delineated wetlands; • Emergency plans must be in place in the case of spillages into wetland systems. • All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised and be surrounded by bunds. It should also only be stored for the minimum amount of time necessary; • Erosion control of all banks must take place to reduce erosion and sedimentation into wetland areas; • Littering and contamination of water sources during mining activities must be mitigated by effective camp management; • All construction materials including fuels and oil should be stored in a demarcated area that is contained within a bunded impermeable surface to avoid spread of any contamination (outside of wetlands); and • 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.						

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Sedimentation of wetlands and increased erosion.	No	Negative	3 Regional	3 Medium term	8 High	5 Definite	**70 High**
	Yes	Negative	2 Local	2 Short term	6 Moderate	3 Moderate	**30 Medium**

Mitigation Measures

- 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;
- An effective storm water and clean and dirty water separation system (that includes serviceable sedimentation basins) must be designed and approved by a wetland specialist as part of the WUL.
- Topsoil and subsoil must be stockpiled separately in low heaps;
- Stockpile any topsoil or any overburden material at least 40m outside of the outer boundary of wetlands;
- Erosion must not be allowed to develop on a large scale before effecting repairs;
- A wetland monitoring program should be initiated before the start of the construction phase. The Environmental Control Officer should be briefed by a wetland specialist on specific monitoring issues.
- 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
- Areas exposed to erosion due to construction should be vegetated with appropriate species naturally occurring in the area; and
- 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.

12.1.7 HERITAGE IMPACT

The impacts on heritage resources are similar for all alternatives.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
12.1.7.1 Impacts on Heritage							
Impact on heritage	No	Negative	1 Site	2 Short term	4 Low	4 Possible	28 Low
	Yes	Negative	1 Site	2 Short term	4 Low	4 Possible	28 Low
Mitigation Measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Sites of low significance require minimum or no mitigation. Minimum mitigation recommended could be a collection of all surface materials and/ or detailed site mapping and documentation. No excavations would be considered necessary. • However, it is recommended that a Heritage Management Plan be compiled before project resume. This plan must be compiled by a professional archaeologist and be tailored made to ensure protection of heritage sites which are not directly affected by the proposed development but are within the 2km radius of the proposed development. The plan must also include a monitoring plan which must be taken at infrequent or irregular intervals. • Prior to construction, contractors should be given training on how to identify and protect archaeological remains that may be discovered during the project. The pre-construction training should include some limited site recognition training for the types of archaeological sites that may occur during the construction phase. This should be done by an accredited archaeologist. • If any chance archaeological or previously unknown grave(s), be exhumed or discovered during the course of construction work, activities on the proposed development area should be stopped within a radius of at least 10m of such indicator, and a heritage specialist monitoring the project be notified immediately. The area should then be demarcated by a danger tape. In the meantime, it is the responsibility of the Environmental officer and the contractor to protect the site from publicity (i.e., media) until a mutual agreement is reached. It is mandatory to report any incident of human remains encountered to the South African Police Services, SAHRA staff member and professional archaeologist. Any measure to cover up the suspected archaeological material or to collect any resources is illegal and punishable by law under Section 35(4) and 36(3) of the National Heritage Resources Act, Act 25 of 1999. The developer should induct field worker about archaeology, and steps that should be taken in the case of exposing archaeological materials.						

12.1.8 VISUAL IMPACT

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
The visibility analyses consider worst-case scenarios, using line-of-sight, based on topography alone. The impacts for the construction phase are insignificant, while impacts for the operational phase are rated below.							
Visual Impact on residents during operational phase							
Conveyor Route A	No	Negative	2 (Local)	Long term	Moderate	Definite	Medium
	Yes	Negative	2 (Local)	Long term	Moderate	Definite	Low
Conveyor Route B	No	Negative	Local	Long term	Low	Definite	Medium
	Yes	Negative	Local	Long term	Low	Definite	Low
Extension of existing discard dump	No	Negative	Local	Long term	Low	Definite	Low
	Yes	Negative	Local	Long term	Low	Definite	Low
Dump site 1	No	Negative	Local	Long term	Low	Definite	Low
	Yes	Negative	Local	Long term	Low	Definite	Low
Dump site 2	No	Negative	Local	Long term	Moderate	Definite	Medium
	Yes	Negative	Local	Long term	Moderate	Definite	Low
Dump site 3	No	Negative	Local	Long term	Moderate	Definite	Medium
	Yes	Negative	Local	Long term	Moderate	Definite	Low

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Visual Impact on tourists during operational phase							
Conveyor Route A	No	Negative	Local	Long term	Low	Low probability	Low
	Yes	Negative	Local	Long term	Low	Low probability	Low
Conveyor Route B	No	Negative	Local	Long term	Low	Low probability	Low
	Yes	Negative	Local	Long term	Low	Low probability	Low
Extension of existing discard dump	No	Negative	Local	Long term	Low	Low probability	Low
	Yes	Negative	Local	Long term	Low	Low probability	Low
Dump site 1	No	Negative	Local	Long term	Low	Low probability	Low
	Yes	Negative	Local	Long term	Low	Low probability	Low
Dump site 2	No	Negative	Local	Long term	Moderate	Low probability	Low
	Yes	Negative	Local	Long term	Low	Low probability	Low
Dump site 3	No	Negative	Local	Long term	Low	Low probability	Low
	Yes	Negative	Local	Long term	Low	Definite	Low
Visual Impact on motorists during operational phase							
Conveyor Route A	No	Negative	Local	Long term	Moderate	Low probability	Moderate
	Yes	Negative	Local	Long term	Low	Low probability	Low
Conveyor Route B	No	Negative	Local	Long term	Low	Low probability	Low

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
	Yes	Negative	Local	Long term	Low	Low probability	Low
Extension of existing discard dump	No	Negative	Local	Long term	Low	Low probability	Low
	Yes	Negative	Local	Long term	Low	Low probability	Low
Dump site 1	No	Negative	Local	Long term	Low	Low probability	Low
	Yes	Negative	Local	Long term	Low	Low probability	Low
Dump site 2	No	Negative	Local	Long term	Moderate	Low probability	Low
	Yes	Negative	Local	Long term	Low	Low probability	Low
Dump site 3	No	Negative	Local	Long term	Moderate	Low probability	Moderate
	Yes	Negative	Local	Long term	Low	Definite	Low
Mitigation Measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• 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 should be done to restrict extended periods of exposed soil. • 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. • 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. • Locate access routes so as to limit modification to the topography and to avoid the removal of established vegetation; • 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; • Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors; • Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance; and • Screen the construction camp and lay-down yards.							

12.1.9 HYDROLOGY

Issue	Mitigation measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
CONSTRUCTION PHASE							
Siltation and/or contamination of surface water resources							
Footprint clearance will expose bare soil that could result in sheet wash into nearby watercourses during a precipitation event. In addition, dust can further be transported into watercourses or be deposited on infrastructure near watercourses thereby exacerbating the impact of siltation during rainfall events. During construction phase, the impacts associated with the development of the new discard dump at site 1, 2 and 3 were rated medium without mitigation measures and low with the implementation of the approximate mitigation measures. The option of expanding the discard dump were rated low with and without mitigation measures.							
Discard Dump Site 1,2 and 3	No	Negative	2 (Local)	1 (Immediate)	6 (Moderate)	4 (High)	36 Medium
	Yes	Negative	1 (Site)	1 (Immediate)	4 (Low)	2 (Low)	12 Low
Discard Dump extension	No	Negative	1 (Site)	1 (Immediate)	4 (Low)	4 (High)	24 Low
	Yes	Negative	1 (Site)	1 (Immediate)	2 (Minor)	2 (Low)	12 Low
Route A	No	Negative	2 (Local)	1 (Immediate)	6 (Moderate)	4 (High)	36 Medium
	Yes	Negative	1(Site)	1 (Immediate)	2 (Minor)	2 (Low)	8 Low
Route B	No	Negative	2 (Local)	1 (Immediate)	6 (Moderate)	4 (High)	36 Medium
	Yes	Negative	1 (Site)	1 (Immediate)	4 (Low)	2 (Low)	12 Low
Mitigation measures							

- Ensure that clean and dirty water separation infrastructure is in place prior to the commencement of construction;
- Prevent spillage of fuel and oils by using drip trays and storing hazardous substances and vehicles in bunded areas;
- Design criteria should prevent the seepage of contaminated water to avoid lateral subsurface movement of contaminants into drainage lines;
- The conveyor belt must be constructed across drainage lines and not along drainage lines. Spanning across drainage lines is encouraged;
- Watercourses and their buffers affected by unavoidable construction activities should be rehabilitated soon after construction. Emphasis should be placed on the reinstatement of the topography to a similar profile as was present pre-construction;
- Construction activities and access tracks roads should be located outside of watercourses as far as practically possible;
- Avoid driving in watercourses during the construction phase to prevent vehicle track incision and the potential for channel initiation;
- The implementation of erosion protection measures, such as energy dissipaters, at new formalised vehicle tracks the contain pipes or culverts.

OPERATIONAL PHASE

Deterioration of surface water quality and siltation of water resources

The discard dump extension will reduce the DCM West sub-catchment areas and runoff volumes. The proposed development is not anticipated to have a large potential peak flow reduction impact on the runoff of the immediate and general areas. This impact refers to changes in water flow patterns caused by construction activities within watercourses. It is also associated with watercourse habitat loss, but focusses more on habitat modification, specifically regarding changes in water movement. Water flow changes can also occur as a result of heavy motorised vehicles driving through watercourse and the need for access tracks in watercourses that have channels. Vehicle track entrenchment commonly occur due to vehicles driving in wetlands with temporary, seasonal or permanent zones of wetness.

During operational phase, sites (1, 2, and 3) of discard dump including extension were rated medium and low without and with the implementation of mitigation measures respectively. Route A of conveyor belt were rated medium to low during operation phase. Route B were rated high without mitigation measures and medium with the mitigation measures.

Discard Dump Site 1,2 and 3	No	Negative	3	2	8	4	52 Medium
	Yes	Negative	1	2	4	2	14 Low
Discard Dump extension	No	Negative	1	2	6	4	36 Medium

	Yes	Negative	1	2	4	2	14 Low
Route A	No	Negative	2	1	4	6	42 Medium
	Yes	Negative	1	1	2	4	16 Low
Route B	No	Negative	3	1	6	8	80 High
	Yes	Negative	1	2	4	4	32 Medium

Mitigation Measures

- No furrows or drains should be made to channel water from infrastructure. Where this is unavoidable, these furrows and drains need to be closed and revegetated as soon as possible.
- Where this is unavoidable in watercourses with channels or wetlands with temporary seasonal or permanent zones of wetness, crossing structures should be in place within affected wetlands and other watercourses.
- Additional benefits of using a formal crossing structure that has engineering input to mitigate watercourse impacts based on site conditions, include the following:
    - It defines a single route alignment for vehicle travel.
    - Provides a 'wear and carry' surface over unsuitable and easily compactable wetland soils.
    - This results in a stable, durable crossing surface for vehicle access, including heavy motor vehicle traffic.
    - Halts the widening and the development of braided crossing sections, while formerly used track alignments are allowed to naturally stabilise and revegetate.

12.1.10 NOISE

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Construction phase							
Noise impacts during the construction phase were rated low with and without mitigation.							
Site clearing and grubbing of the footprint	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Earthmoving activities	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Preparation of ground for the mining extension activities	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Construction of the access roads, return water pipeline and slurry feed line at the discard dump	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Construction of the overland conveyor and service road	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Mitigation measures							
• Implementation of the noise mitigatory measures and the noise management plan							
Noise Impacts during the construction phase							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Noise increase at the boundary of the mine footprint and at the abutting residential areas during construction phase were rated low with and without implementation of the mitigation measures.							
Overland conveyor A and Service road activities	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Overland conveyor B and Service road activities	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Discard activities at the existing discard dump	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Discard activities at Option 1	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Discard activities at Option 2	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Discard activities at Option 3	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Mining activities at the entrance to underground mine – S4L reserve	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Mitigation measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Implementation of the noise mitigatory measures and the noise management plan							
Decommissioning phase							
The noise intrusion levels during the decommissioning phase will be insignificant the different noise receptors from 1 to 14.							
Demolition of all infra-structure	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Planting of the grass on rehabilitated areas	No	Negative	2	2	4	3	24 Low
	Yes	Negative	2	2	2	3	18 Low
Mitigation Measures							
• Implementation of the noise mitigatory measures and the noise management plan							

12.2 CUMULATIVE IMPACTS

Cumulative impacts in relation to an activity, means the past, present and reasonably foreseeable future impacts of an activity, considered together with the impacts of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities (DEA, 2014 EIA Regulations). This section provides cumulative impacts ratings associated with the proposed project, which include the waste generation, traffic, socio-economic and visual impacts. Additional cumulative impacts will be assessed during the EIA phase. It also outlines the mitigation measures of each rated cumulative impacts as follows:

12.2.1 WASTE GENERATION

During the construction phase of the proposed pillar extraction, discard dump and conveyor belt, there will be a variety of waste material produced within the study area. The waste generation impact rating and the proposed mitigation measures are provided in table below as follows:

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
General Waste	No	Negative	2	3	8	5	65 - High
	Yes	Negative	1	3	4	5	40- Medium
Corrective Actions	• No waste will be buried on site or incorporated into the foundation trenches; • The work force must be encouraged to sort waste into recyclable and non-recyclable waste; • No burning of waste will be allowed on site; and • Waste must be regularly removed from site and disposed of at a registered waste disposal facility.						

12.2.2 VISUAL IMPACT

The proposed activity will change the visual character of the area particularly considering that the proposed site is located next to regional roads (R547 and R544). Given the undulating topography of the site and the proximity to these routes, the impact can be considered definite and long term. Cumulative impact will be higher than anticipated due to existing mines. The visual cumulative impacts and mitigation measures within the proposed study area are provided as follows:

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Visual	No	Negative	Local	Long term	Moderate	Definite	Medium
	Yes	Negative	Local	Long term	Moderate	Definite	Low
Corrective Actions	• 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.						

12.2.3 TRAFFIC IMPACT

During the construction phase, increased heavy vehicle traffic should be expected. Without management, such increased traffic loads may negatively impact existing traffic flow. Further unmanaged construction vehicles may decrease road safety for other road users and uncontrolled movement of construction vehicles may result in unnecessary impacts to the environment through vegetation and habitat destruction. The traffic impacts ratings and mitigation measures associated with the proposed project presented in the table below as follows.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Traffic	No	Negative	Regional	Short Term	High	Medium	Medium
	Yes	Negative	Local	Short Term	Moderate	Low	Low
Corrective Actions	• The delivery of construction material and equipment should be limited to hours outside peak traffic times (including weekends) prevailing on the surrounding roads; • Access roads must be clearly marked; and • Delivery vehicles must comply with all traffic laws and bylaws.						

12.2.4 SOIL AND LAND CAPABILITY

The surrounding areas within which the proposed mining related activities are to occur, are dominated by high potential agricultural soils (i.e. Hutton/ Lichtenburg) and good rainfall for food production. The study area is largely dominated by cultivated agricultural land use, with maize and soya bean production being the current cultivated crops. The conversion of land use from cultivated dry land agriculture to mining will raise food security concerns, as these soils are considered to contribute significantly to provincial and/or national agricultural productivity by state entities such as Department of Agricultural Forestry and Fisheries (DAFF), if used for crop cultivation and are essentially also well-

suited for other less intensive land uses such as grazing, forestry, etc. Emphasis is however directed to their agricultural crop productivity due to the scarcity of such soil resources on a national scale where they coincide with areas of good or adequate rainfall. This is largely attributed to the deep nature and good drainage of the dominant soils. For this reason, the proposed mining project is anticipated to contribute to the cumulative loss of arable land. Based on the current mining layout, the disturbance of high potential arable soils is unavoidable, and it is unlikely that the natural landscape setting will be restored post closure to its pre-mining land capability.

13 PLAN OF STUDY FOR EIA

The Scoping phase is fundamental as it allows for the identification of potential impacts on the environment, as well as facilitation of the process of compiling the EIA and Environmental Management Programme (EMPr). This report incorporates information from the client, specialist studies, site visits, literature reviews as well as previous environmental studies conducted in the area; it therefore, provides a comprehensive baseline of the environment of the study area.

This Scoping Process has followed the appropriate standards and procedure for the EIA application, as set out in the NEMA and the EIA Regulations of April 2017. The study includes a description of the various alternatives and indicates those alternatives, which should be pursued as part of the detailed assessment of the EIA process. Impact significance of the proposed activity on the environment will be assessed in the EIA phase with the assistance of the various specialist studies.

The purpose of this section is to outline how the EIA for the proposed development will proceed during EIA phase. The detailed assessment phase of the EIA process entails the integration of the specialist studies for those potential impacts evaluated to be of significance. Relevant mitigation measures will be included in the EMPr. This section provides specific terms of reference and impact assessment methodology for utilisation by the specialist team and EAP. The Plan of Study for EIA is intended to provide a summary of the key findings of the Scoping Phase and to describe the activities to be undertaken during impact assessment. The Plan of Study provides the following:

- A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;
- A description of the aspects to be assessed as part of the environmental impact assessment process;
- Aspects to be assessed by specialists;
- A description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;
- A description of the proposed method of assessing duration and significance;
- An indication of the stages at which the competent authority will be consulted;
- Particulars of the public participation process that will be conducted during the EIA process;

- A description of the tasks that will be undertaken as part of the environmental impact assessment process; and
- Identification of suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

14 A DESCRIPTION OF THE ALTERNATIVES TO BE CONSIDERED AND ASSESSED WITHIN THE PREFERRED SITE, INCLUDING THE OPTION OF NOT PROCEEDING WITH THE ACTIVITY

The scoping phase assessed site, route and structural alternatives of the discard dump and conveyor belt. These alternatives will be assessed further during the EIA. The preferred site and route alternatives will be the alternative with the least environmental impacts as well as providing most benefits to the socio-economy.

14.1 CONVEYOR BELT ROUTE ALTERNATIVES

The scoping phase assessed three route alternatives i.e., the two conveyor route options, the haul road and the no go option. The proposed haul road is considered not viable from a sensitivity perspective; therefore it will not be assessed further. The EIA phase will assess the two conveyor belt Routes A and B as well as the No-Go Alternative.

14.2 DISCARD DUMP SITE ALTERNATIVES

Four site alternatives for the discard dump have been assessed in the scoping report. Site Alternatives 1, 2 and 3 are considered not viable, therefore will not be assessed further during the EIA phase. The sites are dismissed on the following basis:

- The pose a relatively higher risk on the identified sensitive environments;
- ALL sites are located directly above the area earmarked for pillar extraction i.e., the area is prone to subsidence.

Subsequently, the proposed expansion of the discard dump would be assessed during the EIA phase as well as the No go option.

15 A DESCRIPTION OF THE ASPECTS TO BE ASSESSED AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The following are aspects that have been identified and briefly describes as part of the Scoping Report. Further detailed assessment will be undertaken during the EIA phase:

- Biodiversity (flora and fauna);
- Soil, land use and land capability

- Heritage;
- Wetland;
- Hydropedology;
- Hydrology;
- Traffic;
- Air quality;
- Socio-economic;
- Visual impacts; and
- Climate Change.

15.1 ASPECTS TO BE ASSESSED BY THE SPECIALISTS

During the draft scoping phase, ten (10) specialist studies were undertaken and these are listed in section 9.3.2 above. The specialist reports are attached herein as Appendix C. The studies undertaken during the scoping phase assessed all the alternatives and will continue during the EIA phase. Additional studies that may become necessary during the EIA phase include the following:

- Climate Change Impact Assessment.
- Aquatic
- Geohydrology
- Closure and Rehabilitation Plan

15.2 A DESCRIPTION OF THE PROPOSED METHOD OF ASSESSING THE ENVIRONMENTAL IMPACTS

The description of the proposed method of assessing the duration and significance is included in **Table 18** above.

15.3 AN INDICATION OF THE STAGES AT WHICH THE COMPETENT AUTHORITY WILL BE CONSULTED

Figure 17: The different stages at which the Competent Authority will be consulted.

15.4 SCOPING PHASE

The draft Scoping Report together with the Application will be submitted to DMR for review and comment. The EAP will consider the comments and prepare responses. In addition, the report will be sent to all stakeholders to review and comment for a period of 30 days, of which any comments or issues raised will be addressed appropriately. The final Scoping Report will be submitted to the DMR for consideration.

15.5 ENVIRONMENTAL IMPACT ASSESSMENT PHASE

The draft Environmental Impact Report (EIR) will be prepared and distributed for public review and comments. Further, copies of the draft EIR will be submitted to the DMR and stakeholders for comment. The final EIR which includes all comments received, specialist reports and recommendations will be submitted to DMR for decision making.

The database of stakeholders developed during the scoping process will be used as a basis to ensure that those stakeholders involved in the Scoping Phase also participate in the EIA phase. The database will also be expanded to include I&APs that wish to be involved in the process. Registered I&APs will be informed of the availability of the draft EIR for review and will be given 30 days to provide their comments. The comments received will be incorporated into an updated Comments & Response Report (CRR).

Additional public consultation will take place in the form of public meetings and focus group meetings as appropriate. The purpose of the public meetings would be to present the findings of the draft EIR as well as the alternatives considered to the relevant stakeholders, registered I&APs and the affected landowners. The EAP will use this forum to provide more information about the proposed development including the specialist input, and to provide the stakeholders with the opportunity to further comment on the proposed development. In the event that the comments and issues raised highlight information that changes or influences the impact evaluation provided in the draft EIR, the necessary amendments will be made to the report. The Final EIR will be submitted to the DMR, subsequent to the second phase of public consultation.

15.6 PARTICULARS OF THE PUBLIC PARTICIPATION PROCESS THAT WILL BE CONDUCTED DURING THE ENVIRONMENTAL IIMPACT ASSESSMENT PROCESS

The database of stakeholders developed during the scoping process will be used as a basis to ensure that those stakeholders involved in the Scoping Phase also participate in the EIA phase. The database will also be expanded to include I&APs that wish to be involved in the process. Registered I&APs will be informed of the availability of the draft EIR for review and will be given 30 days to provide their comment. The comments received during the review period will be incorporated into an updated Comments & Response Report.

Further public consultation will take place in the form of public meetings and focus group meetings as appropriate. The purpose of the public meetings would be to present the findings of the draft EIA Report as well as the alternatives considered to the relevant stakeholders, registered I&APs and the affected landowners. Nsovo will use this forum to provide more information about the proposed development including the specialist input, and also to provide the stakeholders with the opportunity to further comment on the proposed development. In the event that the comments and issues raised highlight information that changes or influences the impact evaluation provided in the draft EIA Report, the necessary amendments will be made, and the final EIA Report will be compiled and submitted to the DMR.

15.6.1 ADVERTISING

The commencement of the EIA process i.e. the Scoping Phase was advertised in a local newspaper in English and isiZulu. The proposed project was further announced publicly through the following forms of information sharing:

- Newspaper adverts providing a description of the proposed development and location, as well as contact details of where more information can be obtained and announcing the availability of the draft Report for review and comment;
- A2 and A3 notices in English and IsiZulu were placed at conspicuous locations along the study area. Notices were also placed at the route alternative sites as well as at the Local Municipalities offices within the proposed study area;
- A5 notices were distributed in the immediate vicinity of the development; and
- Letters were submitted to key stakeholders.

Further advertising will take place during the EIA phase and will relate to the availability of the reports for public review and announcement of public meetings that will be held at strategically located sites, which will allow for maximum attendance.

15.6.2 INTERACTION WITH DMR AND PROVINCIAL DEPARTMENTS

Interaction with DMR and other provincial authorities with jurisdiction on the proposed development undertaken during the Scoping Phase will continue into the EIA Phase of the project. Further interaction will occur in the following manner:

- Submission of the final Scoping Report to DMR;
- A consultation meeting with various stakeholders and I&APs as appropriate, to discuss the findings of the Draft EIR;
- Submission of the Draft EIRs following a public review period; and
- Notification of registered I&APs of the EA once it is issued.

The draft EIR will be reviewed by I&AP's, authorities and key stakeholders. Furthermore, the report will also be published and the made available on Nsovo (EAP) website for public review. The **Table** below shows some of the key stakeholders to be consulted:

Table 20 : I&AP's, authorities and key stakeholders to review draft EIR.

- Mpumalanga Department of Agriculture and Rural Development and Land Administration
- Mpumalanga Department of Water and Sanitation;
- Mpumalanga Department of Transport and Public Works;
- Mpumalanga Heritage Resources Agency;
- South African Heritage Resource Agency;
- Wildlife and Environmental Society of South Africa;
- Emalahleni Local Municipality;
- Eskom SOC Limited – Transmission

15.6.3 DEVELOPING A STRATEGY AND RESOLVING KEY ISSUES

A strategy for addressing and resolving key issues is to be developed and will include:

- Details on all assessments and investigations carried out;
- Use of the public participation meetings to present the findings of the reports and test the acceptability of priority issues and mitigations;
- Openly and honestly relating both positive and negative impacts of the proposed development during the public meetings; and
- Allowing the public to understand the consequences of the proposed development on the area and their livelihoods.

15.7 A DESCRIPTION OF THE TASKS THAT WILL BE UNDERTAKEN AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The section below indicates the tasks that will be undertaken as part of the EIA process.

15.7.1 PREPARATION OF THE DRAFT EIR AND EMPR

The draft EIR and EMPr will be prepared as per Appendices 3 and 4 of the 2014 EIA Regulations and will include input from the specialist studies as indicated in **Section 9.3.2** above. **Contents of the draft EIR (Appendix 3) will include the following:**

- Details and expertise of the EAP;

- Location of the activity;
- A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale;
- A description of the scope of the proposed activity;
- A description of the policy and legislative context within which the proposed development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;
- A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;
- A motivation for the preferred development footprint within the approved site;
- A full description of the process followed to reach the proposed development footprint within the approved site;
- A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity;
- An assessment of each identified potentially significant impact and risk including (i) and (vii) as per the Regulations;
- A summary of the findings and recommendations of specialist reports;
- Environmental Impact Statement inclusive of (i) to (iii) as per the Regulations;
- Recommendations from the specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;
- The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;
- Aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;
- A description of any assumption, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;
- A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
- The period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised;
- The undertaking under oath by the EAP in relation to (i) and (iv) as per the regulations;

An indication of any deviation from the approved Scoping Report, including the Plan of Study including (i) and (ii) as per the Regulations;

Contents of the EMPr (Appendix 4) will include the following:

- An EMPr must comply with Section 24N of the Act and include - details of the EAP who prepared the EMPr; and the expertise of that EAP to prepare an EMPr, including a curriculum vitae;
- A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;
- 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 any areas that should be avoided, including buffers;
- A description of the impact management objectives, 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) to (v) of the 2014 EIA Regulations as amended;
- A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated above will be achieved, and must, where applicable, include actions as indicated on (i) to (iv) of the EIA 2014 Regulations as amended.
- The method of monitoring the implementation of the impact management actions contemplated above;
- The frequency of monitoring the implementation of the impact management actions contemplated above;
- An indication of the persons who will be responsible for the implementation of the impact management actions;
- The time periods within which the impact management actions contemplated above must be implemented;
- The mechanism for monitoring compliance with the impact management actions contemplated above;
- A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;
- 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
- Any specific information that may be required by the competent authority.

15.7.2 PUBLIC PARTICIPATION PROCESS

The public participation process will be undertaken as indicated on Section 9 above.

15.7.3 PREPARATION OF THE FINAL EIA REPORT AND EMPR

The final EIR and EMPr will be prepared as per Appendices 3 and 4 of the 2014 EIA Regulations as amended, further, it will be submitted to DMR in hard copy and electronic version (CD) and will include the following:

15.7.4 IDENTIFY SUITABLE MEASURES TO AVOID, REVERSE, MITIGATE OR MANAGE IDENTIFIED IMPACTS AND TO DETERMINE THE EXTENT OF THE RESIDUAL RISKS THAT NEED TO BE MANAGED AND MONITORED

The aspects that will be assessed have been identified and their potential impacts and mitigation measures are indicated on Sections 9.1 and will be elaborated further in the EMPr. The proposed method of assessing environmental aspects are included on Table 18 above.

16 UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP

In undertaking the draft and final Scoping phases of the project the EAP has taken into consideration the requirements stipulated in the EIA 2014 Regulation as amended, as well as other relevant Acts and Regulations. The EAP hereby confirm that with the information available at the time of preparing the Scoping Report and the reports prepared by the specialists, the following has been considered in preparing this report:

- The correctness of the information provided in the report;
- The inclusion of comments and inputs from stakeholders and interested and affected parties; and
- Any information provided by the EAP to the interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.

Refer to **Appendix E** for the Declaration of the EAP.

16.1 AN UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP IN RELATION TO THE LEVEL OF AGREEMENT BETWEEN THE EAP AND INTERESTED AND AFFECTED PARTIES ON THE PLAN OF STUDY FOR UNDERTAKING THE ENVIRONMENTAL IMPACT ASSESSMENT

The draft Plan of Study for EIA is part of the draft Scoping Report which will be made available to I&APs and Organs of State for a 30 days review and comment period. Comments/issues raised will be addressed and included in the Issues and Response Report (**Appendix D4**). No agreement between the EAP and I&APs is in place.

16.2 WHERE APPLICABLE, ANY SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No specific information required by the authority; should it be required it will be included accordingly.

16.3 ANY OTHER MATTER REQUIRED IN TERMS OF SECTION 24(4) (A) AND (B) OF THE ACT.

This Report has been prepared in terms of NEMA, its respective 2014 EIA Regulations as well as other various Acts. Information that is required by the NEMA has been included in the Draft Scoping Report and will also be included in the EIA phase.

17 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND KNOWLEDGE GAPS

17.1 ASSUMPTIONS AND LIMITATIONS

It is assumed that technical data supplied by the client was correct and valid at the time of compilation of specialist studies and the Draft Scoping Report. Furthermore, it is assumed that the alternatives presented by the client are feasible.

17.1.1 PUBLIC PARTICIPATION PROCESS

Given the magnitude of the project and the various extent and portions of farms in the area of which some are private and not easily accessible, it is likely that some I&APs were not reached. However, effort was made as part of the process to advertise on local media as well as placing of notices at noticeable places within the communities.

17.1.2 LITERATURE REVIEWS IS VIEWED AS CORRECT

The compilation of the reports was based on various literature reviews and specialist input which were viewed as correct at the time. However, it is acknowledged that there might be some gaps in knowledge with regards to the literature reviewed although conceited efforts were made to attain as much information as possible.

17.1.3 HERITAGE STUDY

It is possible that the Phase 1 HIA may have missed heritage resources in the project area, as some heritage structures may lie below the surface and may only be exposed once development commence.

17.1.4 VEGETATION ASSESSMENT

There is a key difference between the approach of the ecological consultant and that of the ecological researcher. In consultancy, judgements must be made and advice provided that is based on the best available evidence, combined with collective experience and professional opinion. The available evidence may not be especially good, potentially leading to over-simplification of ecological systems and responses, and do contain a considerable deal of uncertainty.

17.1.5 HYDROPEDOLOGY STUDY

Hydropedological science and research is rapidly evolving and there are currently no standard methods to assess and/or model the recharge capacity of soils, as a result, the findings of this assessment are therefore a mix of qualitative and quantitative results and based on the specialist's training, opinion and experience with the hydrological properties of the identified soil types.

Hydropedological investigations are limited in the degree to which hydropedological losses can be quantified, with no standard method of approach to quantify the impact significance of various activities on the hydropedological drivers of wetland systems. For the purpose of the assessment, a model was developed using basic hydrological principles in efforts to quantify the percentage loss of hydrological drivers due to the proposed activities. Although the model outcomes correlate with expected results and results obtained using other methods, the model used remains untested.

The wetlands presented in this document was sourced from a wetland assessment undertaken by WaterMakers in March 2019, as provided by the proponent. Verification of soil characteristics at selected points was undertaken during a field assessment by the hydropedological consultants. It should however be noted that not all the boundaries of the wetlands were confirmed, thus the specialist assumes that the soil data provided is accurate. This approach was deemed sufficient to provide the relevant data to appropriately describe the wetland recharge mechanisms of the region.

Sampling by definition means that not all areas are assessed, and therefore some aspects of soil and hydropedological characteristics may have been overlooked in this assessment. However, it is the opinion of the professional study team that this assessment was carried out with sufficient sampling and in sufficient detail to enable the proponent, the Environmental

18 FATAL FLAWS

No fatal flaws or highly significant impacts were identified during the scoping phase that would necessitate substantial redesign or termination of the project. Potential negative impacts have been identified and where the impacts were detrimental to the environment, alternatives were proposed together with mitigation measures. The three new sites considered for the discard dump have been assessed by specialist and the preference rated accordingly; however, the main risk for this sites is their location on an area earmarked for pillar extraction which implies a definite high risk of subsidence, of which mitigation measures may not ameliorate. Therefore, these options are dismissed and will not be assessed further.

The main impacts are outlined below, and recommended mitigation measures and a summary of site suitability and residual impacts will further be assessed in detail during the EIA phase. Such potential impacts include the following:

- Impacts on flora and fauna;
- Impacts on Wetlands;
- Impacts on water resources (Hydrology);
- Impacts on Hydropedology
- Impacts on soil and land capability

- Impacts on heritage and archaeology;
- Visual impact to neighbouring communities, road users and tourist
- Impacts on the topography as a result of pillar extraction;
- Impact on air quality due to the discard and the associated roads
- Impact on noise;
- Impact on the geology of the area
- Climate change impact; and
- Traffic impact;

The subsequent EIA phase will provide a detailed assessment of the identified aspect, rate the significance accordingly and propose mitigation measures as applicable. Based on all the findings and assessment of impacts by the EAP, Routes A and B are not suitable from a biodiversity and a wetland point of view, and a third alternative route (Route C) was proposed from an ecological point of view and this was considered not feasible too. All alternatives, together with the no-go option will therefore be assessed further in the EIA phase, taking into consideration the specialist studies that have been recommended as part of the PPP; following which the preferred corridor will be selected.

19 CONCLUSION

The Draft Scoping study was undertaken in accordance with the requirements of the NEMA and the EIA Regulations as well as associated Legislations. The discard dump, conveyor belt and service road alternative options have been proposed and the primary objective was to assess the suitability of each options or route for the intended use as well as to assess the impacts of the proposed pillar extraction, discard dump and conveyor belt. This report has comprehensively addressed the baseline environment which will form the backdrop of the impact assessment. Information provided has been supported by specialist studies that were undertaken and attached hereto.

20 REFERENCES

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