FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME

PROPOSED TURNKEY BOREHOLE EXPLORATION AND DRILLING PROJECT IN THE NELSON MANDELA BAY MUNICIPALITY AREA (BEAD) – ASPEN HEIGHTS AND MALABAR

Prepared by:

Engineering Advice & Services

Prepared for:

Nelson Mandela Bay Municipality

08 May 2025

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Prepared for:
Nelson Mandela Bay Municipality
10th Floor; Lillian Diedericks Building; 191 Govan Mbeki Ave; Central; Gqeberha
Infrastructure and Engineering Directorate; P O Box 7
Tel: 041 506 2257

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Prepared by:
Engineering Advice & Services (Pty) Ltd.
73 Heugh Road, Walmer, Port Elizabeth, 6013
Tel: +27 (0)41 581 2421
Fax: +27 (0)86 683 9899

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Compiled by:

Name	Company	Email
Ms Lea Jacobs	Engineering Advice & Services (Geology and Environmental)	lea@easpe.co.za
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Assisted by:

Name	Company	Email
Mr Kurt Wicht	Engineering Advice & Services (GIS Technician)	kurtw@easpe.co.za
Ms Mongikazi Gxilishe	Engineering Advice & Services (Candidate EAP)	mongikazi@easpe.co.za

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ACRONYMS AND DEFINITIONS

DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
ECDOT	Eastern Cape Department of Transport
ECO	Environmental Control Officer
EO	Environmental Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
Environment	The surroundings within which humans exist could be made up of: the land, water and atmosphere of the earth; microorganisms, plant and animal life; any part of combinations of the aforementioned and the interrelationships among and between them as well as the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing
Environmental Impact	The change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity
Invasive Alien Vegetation	An undesirable plant growth which shall include, but not be limited to, all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (Act 43 of 1983).
MSDS	Material Safety Data Sheets
NO-GO Areas	Generally, those areas outside the designated working areas, including but not limited to: existing services and infrastructure, occupied property; grave sites; cultivated lands, wetland areas, 'Special or Sensitive Environments' as defined in the EMP
RE	Resident Engineer
SCC	Species of Conservation Concern
Topsoil	Natural soil covering, including all the vegetation and organic matter, with variable depth
Working Areas	Working areas are those areas required by the Contractor to construct the works, as approved by the Resident Engineer

1 INTRODUCTION AND SCOPE OF THE REPORT

Engineering Advice and Services (EAS) has been appointed Coega Development Corporation (CDC) on behalf of the Nelson Mandela Bay Municipality (NMBM) for the provision of environmental impact assessment services for the groundwater exploration process of potential borehole sites located at Aspen Heights, and Malabar, within the Sarah Baartman District, Eastern Cape. the proposed works require an Environmental Management Plan before the exploration phase commences. The EMPr has been compiled to ensure that the exploration phase of the project is undertaken in compliance with the requirements set out in Section 28 of the National Environmental Management Act (Act No. 107 of 1998) [NEMA] and other relevant legislation under which the Duty of Care Principle is described.

2 PROJECT BACKGROUND

In 2017, a State of Disaster was declared in Nelson Mandela Municipality in terms of Section 55 (1) of the Disaster Management Act No. 57 of 2002. Nelson Mandela Bay Municipality has suffered from periodic droughts, which are a threat to the Metro's water security. The NMBM's water supply network is predominantly reliant on surface water sources, particularly from local rivers, dams, and the Orange River/ Gariep Dam. The management of these resources is crucial for ensuring a sustainable and reliable water supply for the community. This is essential for sustaining the municipal's population and supporting local industries, for both current needs and future demands.

In an effort to increase the Metro's overall water supply, Engineering Advice and Services (EAS) has been appointed by Coega Development Corporation (CDC) on behalf of the Nelson Mandela Bay Municipality (NMBM), the applicant, to undertake a Basic Assessment application for the groundwater exploration process of potential borehole sites located at Aspen Heights, and Malabar, within the Sarah Baartman District, Eastern Cape. The proposed project will take place in two phases:

- **Phase 1:** Exploration phase – undertake the required feasibility studies which include yield and quality testing of the identified potential borehole sites and use this data to identify the locations, layouts, and infrastructure requirements for the proposed wellfields.
- **Phase 2:** Environmental Impact Assessment Phase – Undertake EIA studies including all specialist studies as well as the Water Use License Application (WULA) for the identified wellfields.

In the current phase (Exploration Phase), the primary objective is to ascertain whether or not these two areas will provide adequate groundwater in the form of yield and quality tests. Depending on the potential yield of the exploration sites, the boreholes that are deemed to be viable for groundwater abstraction will be equipped to augment the water supply to the bulk water infrastructure of NMBM. It is crucial to point out that during the exploration phase, no access roads will be constructed and no pipelines will be installed.

The contractor will provide Method statements for the borehole exploration drilling, which the ECO will review and approve. **Appendix A** provides the site layout and maps indicating environmental sensitivities.

2.1 Aspen Heights

- BETHELSDORP (RE/590) - C05900030000059000000

EXPLORATION AREA BOUNDARY COORDINATES		
LABELS	**LATITUDE (S) (DDMMSS)**	**LATITUDE (E) (DDMMSS)**
A	33° 52' 45.83" S	25° 28' 34.7" E
B	33° 53' 6.3" S	25° 29' 44.64" E
C	33° 53' 24.32" S	25° 29' 28.5" E
D	33° 53' 21.91" S	25° 29' 16.95" E
E	33° 53' 29.44" S	25° 29' 13.37" E
F	33° 53' 18.27" S	25° 28' 45.1" E
G	33° 53' 15.06" S	25° 28' 26.87" E
H	33° 53' 1.78" S	25° 28' 23.86" E

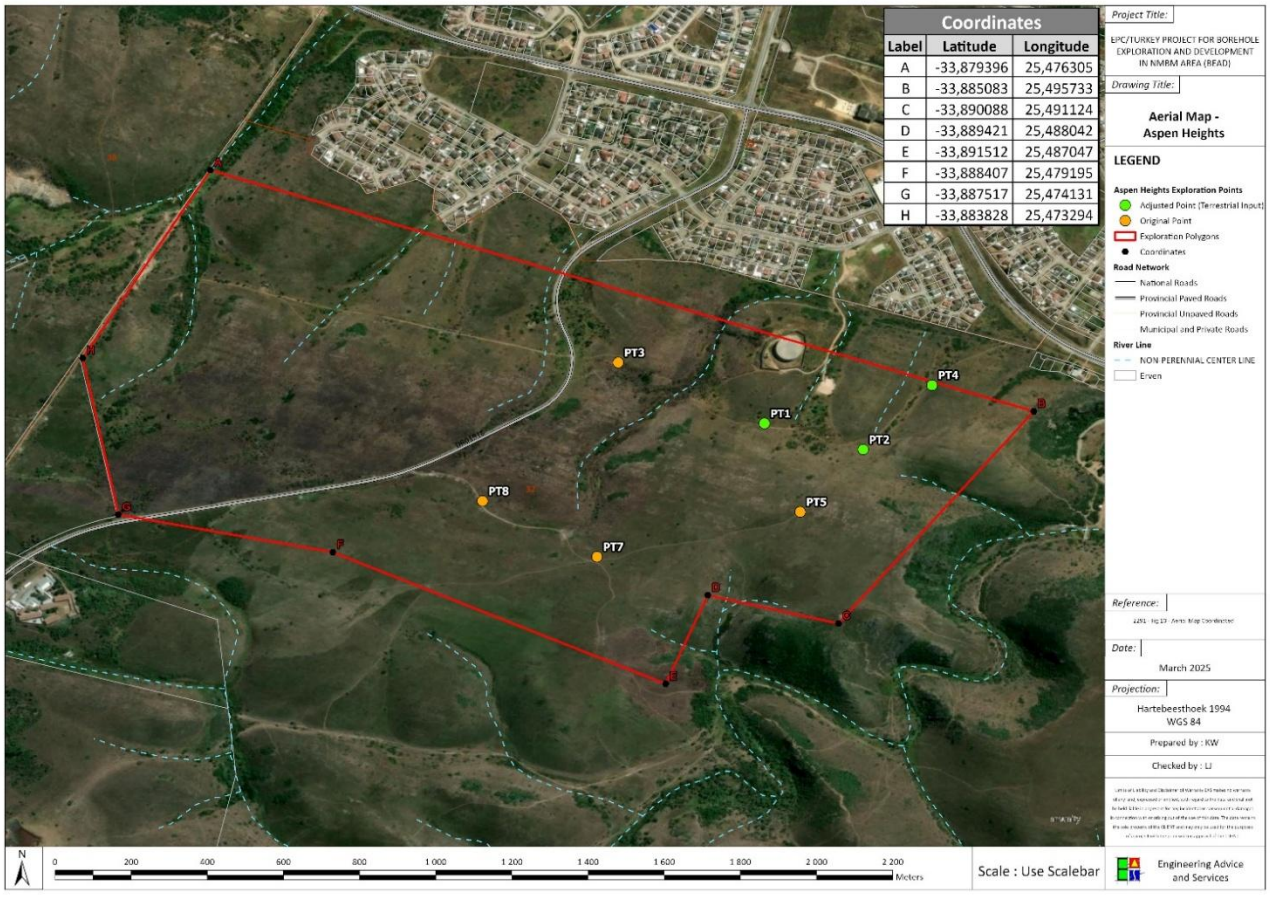

Figure 1. *Exploration points in Aspen Heights*

The number of borehole sites that will be explored at Aspen Heights is seven. As informed by the Terrestrial Impact Assessment, the drilling sites PT1, PT2, and PT4 were recommended to be located closer to the respective tracks/ dirt roads and near disturbed areas. This would help avoid the loss of listed/protected plants and trees. PT6 was excluded as an exploration point since it is located within a near pristine site containing a high number of listed and protected plant species associated with Algoa Sandstone Fynbos, and with no visible disturbances/tracks that could be used to access this site. The receiving area of PT6 is surrounded by several listed *Euphorbia, Pelargonium*, *Agathosma*, and *Bobartia* species, thus reaching the exploration sites will lead to additional degradation. The final positions of the exploration sites are given in the table below.

Points	Latitude	Longitude
PT 1 (moved slightly)	-33.8853669 S	25.4893770 E
PT 2 (moved slightly)	-33.8859834 S	25.4917044 E
PT3 (Remains the same)	-33.883931 S	25.485928 E
PT 4 (moved slightly)	-33.8844649 S	25.4933326 E
PT5 (Remains the same)	-33.887455 S	25.490220 E
PT6 Excluded		
PT7 (Remains the same)	-33.888513 S	25.485431 E
PT8 (Remains the same)	-33.887196 S	25.482725 E

To access the Aspen Heights exploration points, the most favourable access roads shown in **Figure 2** are to be used due to the high degree of disturbance that already exists on these dirt roads/paths.

Figure 2. *Proposed access routes for Aspen Heights exploration points*

2.2 Malabar

- PARSONS VLEI (1755) - C05900290000175500000

EXPLORATION AREA BOUNDARY COORDINATES		
LABELS	**LATITUDE (S) (DDMMSS)**	**LATITUDE (E) (DDMMSS)**
A	33° 55' 28.33" S	25° 30' 34.94" E
B	33° 55' 16.96" S	25° 31' 2.39" E
C	33° 55' 23.95" S	25° 31' 14.12" E
D	33° 55' 40.85" S	25° 30' 58.47" E
E	33° 55' 41.92" S	25° 30' 34.5" E

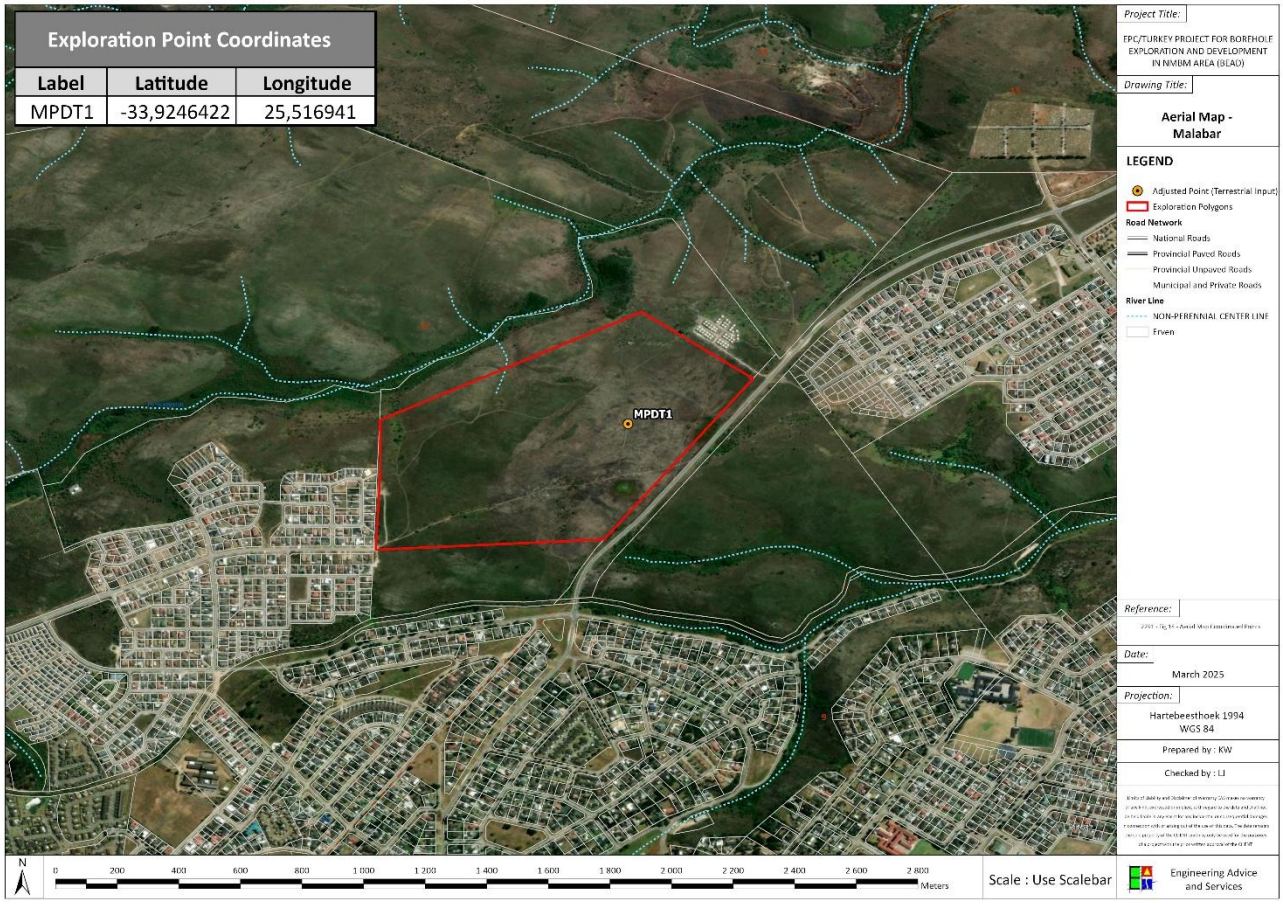

Figure 3. *Exploration points in Malabar*

Only one borehole site will be explored in Malabar. The terrestrial biodiversity specialist suggested that the Malabar exploration site be relocated 5m to the west (-33.9246422 S 25.5169408 E), and only the access road shown in **Figure 5** be used due to the high degree of disturbance that already exists. The position of the borehole site is given in the table below.

Points	Latitude	Longitude
MPDT1	33°55'28.71"S	25°31'0.99"E

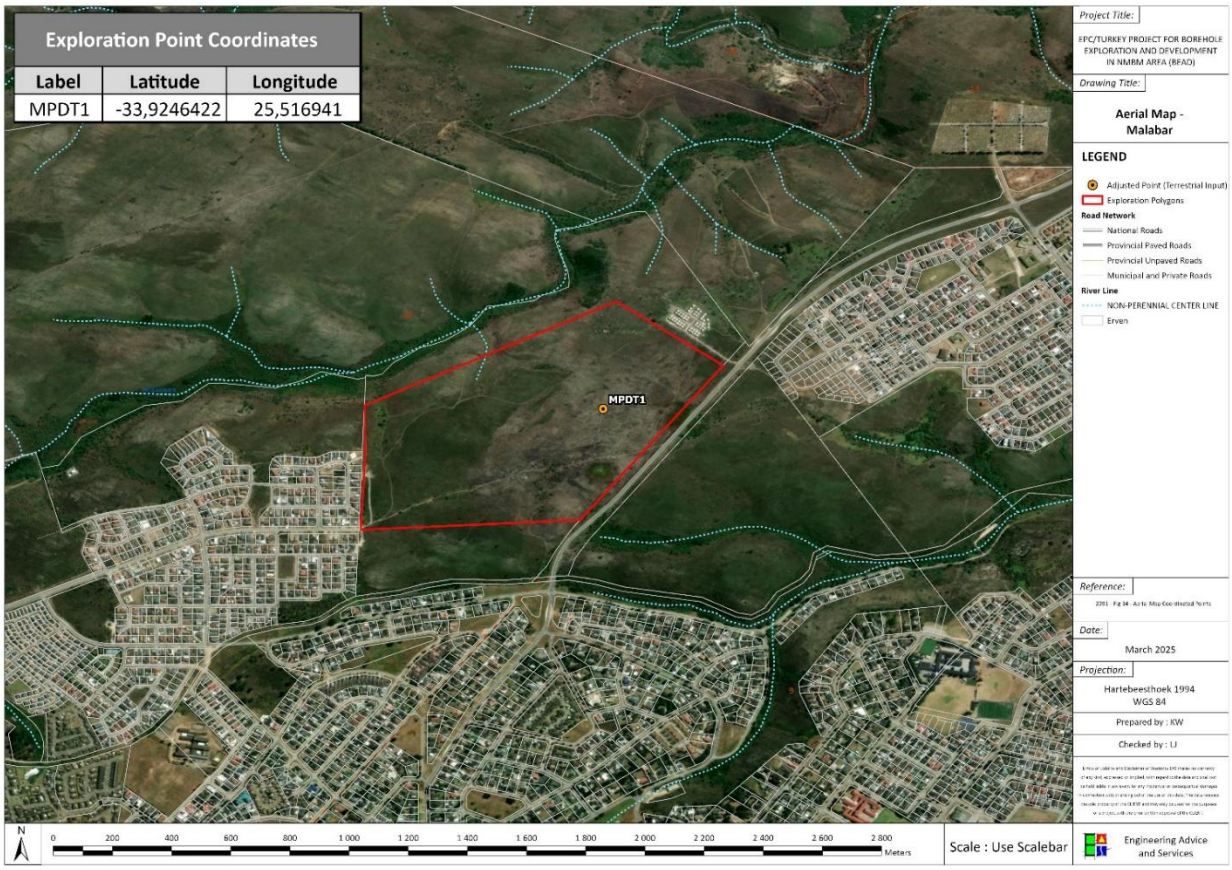

Figure 4. *Groundwater exploration points in Malabar*

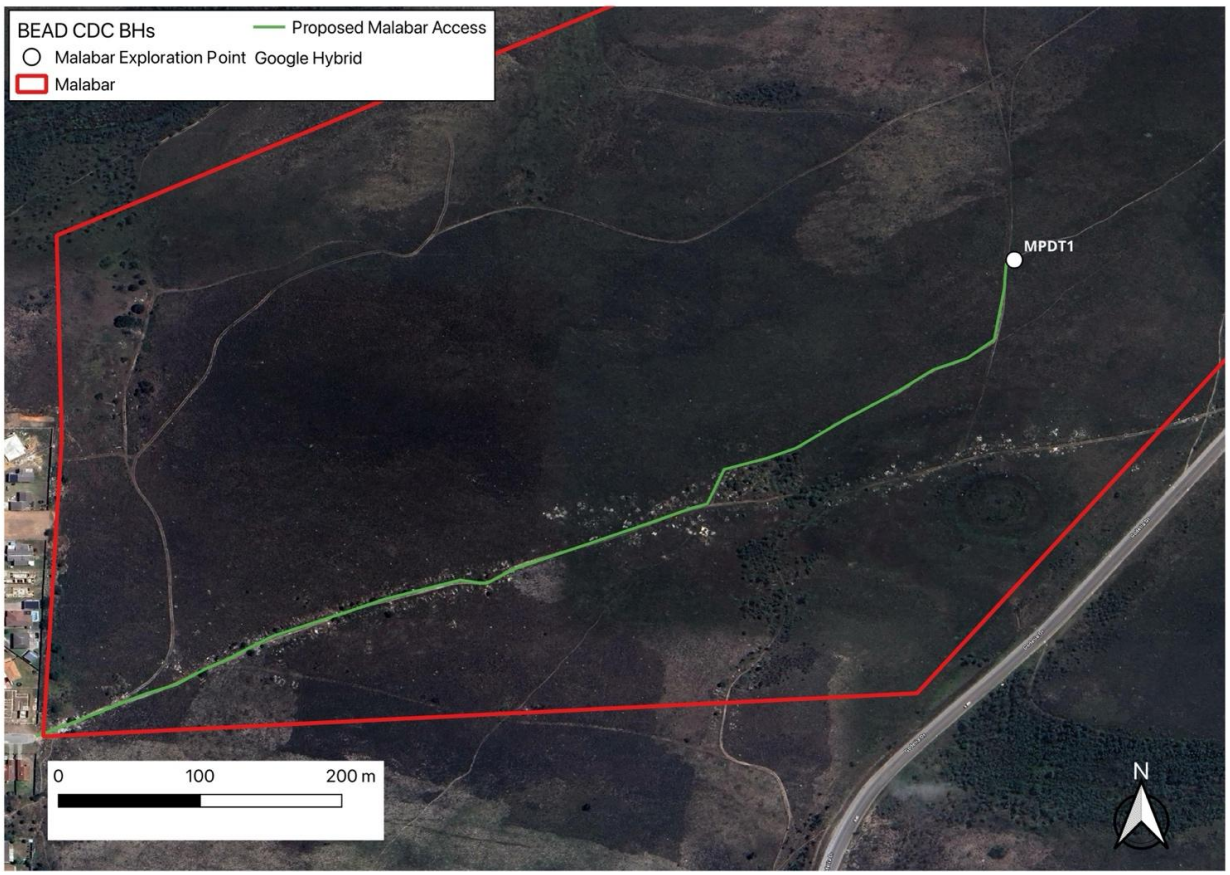

Figure 5. *Proposed access route along existing track with a high degree of disturbance (illegal solid waste disposal)*

3 LEGISLATIVE REQUIREMENTS

The Environmental Management Programme should be read in conjunction with the conditions of any environmental authorisation issued by the Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) as well as licenses issued and any permits that may be required for the proposed project. It should be noted that the authorisations and licenses and conditions attached to these are legally binding. The following list describes legislation, policies, and/or guidelines of any sphere of government that apply to the application as contemplated in the EIA regulations:

Table 1. *Legislative requirements*

Title of legislation, policy or guideline:	Administering authority:
GN R.327 LN1 (19): The infilling or depositing of any material of more than [5] 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than [5] 10 cubic metres from [—(i)] a watercourse; [(ii) the seashore; or (iii)the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or estuary, whichever distance is the greater—] but excluding where such infilling, depositing, dredging, excavation, removal or moving— a) will occur behind a development setback; b) is for maintenance purposes undertaken in accordance with a maintenance management plan; [or] c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)
<u>GNR 327: Listing Notice 1 (14)</u> The development of - (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs - (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;	Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)

Title of legislation, policy or guideline:	Administering authority:
(a) Eastern Cape ii. Inside urban areas: (aa) Areas zoned for use as public open space; (bb) Areas designated for conservation use in Spatial development frameworks adopted by the competent authority, zoned for a conservation purpose; or	
National Water Act 36 of 1998 Exploration may occur within the 32m and 100m buffers of non-perennial drainage lines and may also occur with 500m of wetlands	Department of Water and Sanitation (DWS)
National Heritage Resources Act 25 of 1999 The proposed sites for exploration activities and materials are not older than 60 years. The exploration activities involve minimal ground disturbance, primarily limited to drilling, which will have no impact on archaeological resources. An application will not need to be submitted for a permit from SAHRA. Permits may be required if archaeological resources are uncovered during construction activities.	South African Heritage Resources Agency
Eastern Cape Nature and Environmental Conservation Ordinance 19 of 1974 and Provincial Nature Conservation Ordinance 19 of 1974 ***Not applicable***	Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)
National Forests Act 84 of 1998 with Amendments *Not Applicable.* ***No NFA-protected trees will be disturbed on-site.***	Department of Forestry, Fisheries and the Environment (DFFE)
Conservation of Agricultural Resources Act 43 of 1993 ***Not applicable.***	Department of Forestry, Fisheries and the Environment (DFFE)

The Contractor is furthermore required to comply with other relevant legislation which may apply to the proposed activities. This may include, but not be limited to:

1. An environmental authorisation from the Department of Economic Development, Environmental Affairs and Tourism (DEDEAT), issued in terms of the National Environmental Management Act (NEMA), EIA Regulations for the implementation of listed activities.
2. **The Constitution of South Africa, 1996 (Act No.108 of 1996)**
   The Constitution of the Republic of South Africa, 19961 provides that, everyone has a right to an environment that is not harmful to their health or well-being. It further provides that; the environment should be protected for future generations through the implementation of reasonable legislation and other measures that prevent pollution and ecological degradation.
3. **National Environmental Management Act, 1998 (Act No.107 of 1998) as amended**
   The National Environmental Management Act, 1998 (Act No.107 of 1998) (NEMA) is a 'principles-based Act' and is an overarching statute regulating various aspects of natural resources use, integrated environmental

management, and pollution control. The Act provides for the right to an environment that is not harmful to the health and well-being of the South African people; sustainable development, environmental protection, equitable distribution of natural resources; and the formulation of environmental management frameworks. Its definition of the environment includes the land and water of the earth, microorganisms, plant and animal life, or a combination of those things, and the interrelationships among them. The Act aims to provide for cooperative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state. Section 24 Provides for the prohibition, restriction, and control of activities that are likely to have a detrimental effect on the environment.

4. **Environmental Impact Assessment Regulation, 2014 as Amended**

   The Environmental Impact Assessment (EIA) Regulations promulgated under NEMA in 2014 provide a list of activities that are subject to an Environmental Authorisation (EA) process prior to construction or implementation. In accordance with the 2014 EIA Regulations, (as amended) an EIA process is required owing to the applicability of the activities listed in Table 2. According to the NEMA Regulations, these activities may not commence without environmental authorization from the competent authority which requires the investigation, assessment, and statement of potential impact of activities and must follow the procedure as described in the EIA Regulations.

5. **National Environmental Management Biodiversity Act (Act No. 10 of 2004)**

   The National Environmental Management: Biodiversity Act (NEM: BA) makes provisions for achieving the objectives of the United Nation's Convention on Biological Diversity, to which South Africa is a signatory. The Bill promotes management, conservation and sustainable use of indigenous biological resources, and provides for:

   - the management and conservation of biological diversity;
   - the use of indigenous biological resources in a sustainable manner; and
   - the fair and equitable sharing of benefits arising from the commercialization through bio-prospecting of traditional uses and knowledge of generic resources.

The Bill gives effect to international agreements relating to biodiversity which are binding on the Republic and provides for co-operative governance in biodiversity management and conservation, and provides for a National Biodiversity Institute to assist in achieving the above objectives. The Act gives wide powers to the National Biodiversity Institute to inter alia protect flora and fauna in appropriate enclosures, the collection of information, undertaking, and promotion of research on indigenous biodiversity and the sustainable use of indigenous biological resources, the prevention, control or eradication of listed invasive species, biodiversity planning and other functions. This act lists all critically endangered, vulnerable, and protected species. The potential occurrence of any such species will be investigated in the BA process.

6. National Water Act (Act No. 36 of 1998)

In terms of chapter 3 section 12-20, water resources are to be protected, used, developed, conserved, managed and controlled. This Act recognizes that water is a scarce resource; it is a natural resource that belongs to all of South Africa's people. The National Department of Water and Sanitation is responsible for the nation's water resource and also the Minister of the Department of Water and Sanitation ensures that the water resource is "protected, used, developed, conserved, managed and controlled" through the implementation of this Act (National Water Act 36 of 1998). This Act makes provisions for the protection of surface water and groundwater resources and their sustainable management for the prevention and remediation of the effects of pollution, and for the control of emergency occurrences. Section 21 of the National Water Act (NWA) lists water uses for which a Water Use Licence will be required.

7. National Environmental Management: Air Quality Act, 2004 (Act No.39 of 2004)

The main objective of the Air Quality Act (NEMAQA) is the protection of the environment and human health in a sustainable (economic, social, and ecological) development framework, through reasonable measures of air pollution control.

8. Occupational Health and Safety Act, 1993 (Act No.85 of 1993)

The Occupational Health and Safety Act make provisions in regulations Section 8 for the general duties of employers to their employees. The act provides for the health and safety of people at work utilising machinery and the protection of others against health and safety risks associated with activities on site/work. General Administrative Regulations (2003) describe the administration of the various OHS Regulations, including the designation of health and safety committees, the reporting and recording of incidents and occupational diseases. This Act is applicable to all contractors during the planning, construction and operational phases of the project.

To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work.

9. Hazardous Substance Act (No15 of 1973).

Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.

10. National Environmental Management: Waste Act, 2008 (Act No.59 of 2008).

During construction waste will be produced, in either liquid, solid and/or hazardous state, and this waste will be required to be adequately and appropriately disposed of. There are several Regulations or Acts that are applicable to the proposed development in terms of waste management. To reform 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; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to

provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.

This EMPr process also takes consideration the following legislation

- South African National Standard SANS 10103:2008 (The Measurement and Rating of Environmental Noise with Respect to Annoyance and Speech Communication).
- National Noise Control Regulations (1998).

4 IMPACT MANAGEMENT

This section outlines the aspects and impacts together with the mitigation measures for the exploration phase of the project. How the aspects and impacts, identified, will be achieved is specified in this section.

Table 2. *Mitigation and management measures for the drilling phase*

Aspect	Impact	Mitigation measure	Frequency	Responsible Party

Loss of vegetation and species/habitats listed as Critically Endangered and or Vulnerable	**Aspen Heights**
	
	During the drilling activities, vegetation disturbance will be required. This could then result, although on a small scale in a loss of important habitats/vegetation units. Based on the sensitivity assessment of the 8 drilling sites, PT3, PT7, and PT8 are found acceptable without any changes due to the proximity to access tracks/ roads and are located within disturbed areas / alien vegetation. The remaining 5 sites may result in some form of loss of these habitats without mitigation
	
	Malabar
	
	During the drilling activities, vegetation disturbance will be required. This could then result, although on small scale in a loss of important habitats / vegetation units. Based on the sensitivity assessment of the drilling site, was found acceptable with mitigation listed below
		• With specific Reference to **Aspen Heights**:
		  ○ Drilling site PT6 should be excluded as it is located within a near natural area of Algoa Sandstone Fynbos, with no disturbance and no existing access. The surrounding area is also surrounded by several listed *Euphorbia, Pelargonium, Agathosma,* and *Bobartia species*; thus, reaching the site will lead to additional degradation (Aspen Heights).
		  ○ Drilling sites PT1, PT2, and PT4 must be located closer to the respective tracks and near disturbed areas. This would then avoid the loss of listed/protected plants and trees.
		• With specific Reference to **Malabar:**
		  ○ Drilling should be shifted 5m west to 33.9246422 S 25.5169408 E. This would then avoid loss of listed/protected plants and trees (Malabar).
		• All temporary works areas (laydowns and camps) can only be placed in previously disturbed areas within the site, and this includes any temporary access roads or storage areas.
		• All drilling fluids and pump test water, especially with fines/sediment, must be contained and not allowed to spill into the general area. If this does happen, then these soils must be removed and rehabilitated.
		• Alien vegetation management must be initiated at the beginning of the exploration period and must extend into any remaining areas into the operation phase at the exploration points.
		• Several listed and protected plant species are still found directly adjacent to the tracks and roads that can be used, and these should be pegged so that they can be avoided.
		• It is recommended as best practice to conduct a search and rescue programme for any listed or protected plant species, although this consideration was not used to reduce the potential impact ratings.
		• No nursery will be implemented during search and rescue. The species translocated / removed during the search and rescue will be replanted
			Once-off	Contractor

Aspect	Impact	Mitigation measure	Frequency	Responsible Party
		directly into areas of similar habitat nearby (outside any future development/drilling areas). This is because practically, replanting protected species into a nursery for later use in rehabilitation causes further stress to the plants and reduces the survival rates of the plants. • Rehabilitation of all the drilling sites and disturbed areas once drilling has been completed and machinery has been removed will include intensive alien invasive clearing and replanting of indigenous species sourced from a commercial nursery into the areas / tracks disturbed. The species to be obtained and replanted include, but are not limited to; *Proteas and Leucospermum, Ericas (heaths), Restios (grass-like plants), and Asteraceae (daisy family)* usually found within the vegetation unit of Algoa Sandstone Fynbos. • The revegetation of any temporary sites as well as any previously degraded areas must begin from the onset of the project, with the involvement of a botanist to assist with the revegetation specifications. • Regeneration of alien vegetation must be monitored once all areas have been disturbed, forming part of a long-term alien vegetation management plan. • Following drilling activities at each location (Aspen Heights & Malabar), the Contractor/Applicant will need to implement an intensive rehabilitation plan within 1 month following completion of drilling activities at each site that is deemed to be unviable for further development of permanent boreholes.		

Loss of habitat containing protected species or SCC	**Aspen Heights**
	
	Based on the observations made, it was evident that several protected and listed species do occur and these can be avoided with the inclusion of the proposed no-go areas.
	
	During the drilling activities, vegetation disturbance will be required. This could then result, although on a small scale in a loss of listed and protected species. Most of the listed plant species observed are considered Near Threatened or Vulnerable and are endemic to NMBM. Based on the sensitivity assessment of the 8 drilling sites, PT3, PT7,
		• With specific Reference to **Aspen Heights**:
		  ○ Drilling site PT6 should be excluded as it is located within a near natural area of Algoa Sandstone Fynbos, with no disturbance and no existing access. The surrounding area is also surrounded by several listed *Euphorbia, Pelargonium, Agathosma,* and *Bobartia species*, thus, reaching the site will lead to additional degradation.
		  ○ Drilling sites PT1, PT2, and PT4 must be located closer to the respective tracks and near disturbed areas. This would then avoid the loss of listed/protected plants and trees.
		• With specific Reference to **Malabar:**
			Once-off	Contractor

Aspect	Impact	Mitigation measure	Frequency	Responsible Party
	and PT8 are found acceptable without any changes due to the proximity to access tracks/ roads and are located within disturbed areas or areas with alien vegetation. **<u>Malabar</u>** Based on previous on the observations made, it was evident that several protected and listed species do occur and these can be avoided with the inclusion of the proposed no-go areas. During the drilling activities, vegetation disturbance will be required. This could then result, although on a small scale in a loss of listed and protected species. Most of the listed plant species observed are considered Near Threatened or Vulnerable and are endemic to NMBM.	○ Drilling should be shifted 5m west to 33.9246422 S 25.5169408 E. This would then avoid loss of listed/protected plants and trees. • All temporary works areas (laydowns and camps) can only be placed in previously disturbed areas within the site, and this includes any temporary access roads or storage areas. • All drilling fluids and pump test water, especially with fines/sediment must be contained and not allowed to spill into the general area. If this does happen then these soils must be removed and rehabilitated. • Alien vegetation management must be initiated at the beginning of the exploration period and must extend into any remaining areas into the operation phase on the exploration points. • Several listed and protected plant species are still found directly adjacent to the tracks and roads that can be used, and these should be pegged so that these can be avoided. • It is recommended as best practice to conduct a search and rescue programme for any listed or protected plant species, although this consideration was not used to reduce the potential impact ratings. • No nursery will be implemented during search and rescue. The species translocated / removed during the search and rescue will be replanted directly into areas of similar habitat nearby (outside any future development/drilling areas). This is because practically, replanting protected species into a nursery for later use in rehabilitation causes further stress to the plants and reduces the survival rates of the plants. • Rehabilitation of all the drilling sites and disturbed areas once drilling has been completed and machinery has been removed will include intensive alien invasive clearing and replanting of indigenous species sourced from a commercial nursery into the areas / tracks disturbed. The species to be obtained and replanted include, but are not limited to; *Proteas and Leucospermum, Ericas (heaths), Restios (grass-like plants), and Asteraceae (daisy family)* usually found within the vegetation unit of Algoa Sandstone Fynbos. • The revegetation of any temporary sites as well as any previously degraded areas must begin from the onset of the project, with the involvement of a botanist to assist with the revegetation specifications.		

Aspect	Impact	Mitigation measure	Frequency	Responsible Party
		• Regeneration of alien vegetation must be monitored once all areas have been disturbed, forming part of a long-term alien vegetation management plan. • Following drilling activities at each location (Aspen Heights & Malabar), the Contractor/Applicant will need to implement an intensive rehabilitation plan within 1 month following completion of drilling activities at each site that is deemed to be unviable for further development of permanent boreholes.		

Loss of any critical corridors and connect habitats that are linked to any future conservation plans or protected areas expansion	**Aspen Heights**
	No terrestrial Critical Biodiversity Areas and or Ecological Support areas will be affected, however, the drilling sites are located within a National Protected Area Expansion Strategy area (NPAES). However, due to the scale of the exploration phase, this impact would seem to be negligible and will be assessed in more detail once the project proceeds and the final borehole sites have been identified.
	
	Malabar
	No terrestrial Critical Biodiversity Areas and or Ecological Support areas will be affected. Further due to scale of the exploration phase, this impact would seem to be negligible and will be assessed in more detail once the project proceeds and the final boreholes sites have been identified
		• With specific Reference to **Aspen Heights:**
		  ○ Drilling site PT6 should be excluded as it is located within a near natural area of Algoa Sandstone Fynbos, with no disturbance and no existing access. The surrounding area is also surrounded by several listed *Euphorbia, Pelargonium, Agathosma*, and *Bobartia* species; thus, reaching the site will lead to additional degradation.
		  ○ Drilling sites PT1, PT2, and PT4 must be located closer to the respective tracks and near disturbed areas. This would then avoid the loss of listed/protected plants and trees.
		• All temporary works areas (laydowns and camps) can only be placed in previously disturbed areas within the site, and this includes any temporary access roads or storage areas.
		• All drilling fluids and pump test water, especially with fines/sediment, must be contained and not allowed to spill into the general area. If this does happen then these soils must be removed and rehabilitated.
		• Alien vegetation management must be initiated at the beginning of the exploration period and must extend into any remaining areas into the operation phase on the exploration points.
		• Several listed and protected plant species are still found directly adjacent to the tracks and roads that can be used, and these should be pegged so that these can be avoided.
		• It is recommended as best practice to conduct a search and rescue programme for any listed or protected plant species, although this consideration was not used to reduce the potential impact ratings.
		• No nursery will be implemented during search and rescue. The species translocated / removed during the search and rescue will be replanted
			Once-off	Contractor

Aspect	Impact	Mitigation measure	Frequency	Responsible Party
		directly into areas of similar habitat nearby (outside any future development/drilling areas). This is because practically, replanting protected species into a nursery for later use in rehabilitation causes further stress to the plants and reduces the survival rates of the plants. • Rehabilitation of all the drilling sites and disturbed areas once drilling has been completed and machinery has been removed will include intensive alien invasive clearing and replanting of indigenous species sourced from a commercial nursery into the areas / tracks disturbed. The species to be obtained and replanted include, but are not limited to; *Proteas and Leucospermum, Ericas (heaths), Restios (grass-like plants), and Asteraceae (daisy family)* usually found within the vegetation unit of Algoa Sandstone Fynbos. • The revegetation of any temporary sites, as well as any previously degraded areas, must begin from the onset of the project, with the involvement of a botanist to assist with the revegetation specifications. • Regeneration of alien vegetation must be monitored once all areas have been disturbed, forming part of a long-term alien vegetation management plan. • Following drilling activities at each location (Aspen Heights & Malabar), the Contractor/Applicant will need to implement an intensive rehabilitation plan within 1 month following completion of drilling activities at each site that is deemed to be unviable for further development of permanent boreholes.		
The potential spread of alien vegetation	During the exploration phase, vegetation disturbance (not clearing) for exploration purposes will be required. This disturbance then allows for the alien species to colonise the soils, if left unmanaged. Several Alien Invasive Species were found present on the site, including the following species *Acacia mearnsii, Acacia longifolia* *Acacia cyclops, Eucalyptus spp* *Agave sisalana* These species in particular have the ability to alter vegetation units and drive down habitat complexity and species diversity.	• All temporary works areas (laydowns and camps) can only be placed in previously disturbed areas within the site, and this includes any temporary access roads or storage areas. • Alien vegetation management must be initiated at the beginning of the exploration period and must extend into any remaining areas into the construction and operation phase on the borehole site. • The revegetation of any temporary sites, as well as any previously degraded areas, must begin from the onset of the project, with the involvement of a botanist to assist with the revegetation specifications. • Regeneration of alien vegetation must be monitored once all areas have been disturbed, forming part of a long-term alien vegetation management plan.	Once-off	Contractor

Aspect	Impact	Mitigation measure	Frequency	Responsible Party
		• Following drilling activities at each location (Aspen Heights & Malabar), the Contractor/Applicant will need to implement an intensive rehabilitation plan within 1 month following completion of drilling activities at each site that is deemed to be unviable for further development of permanent boreholes.		
Impacts on existing infrastructure and property	Existing infrastructure including electrical lines, municipal water, sewer, and stormwater infrastructure as well as adjacent private property may be disturbed through drilling exploration activities: • Drilling activities may temporarily limit access to roads or properties near exploration sites, affecting residents and businesses. • Increased traffic from drilling equipment and personnel could strain local roads and infrastructure.	• Ensure that all existing services and infrastructure such as electric lines, are known, mapped, and marked to prevent potential damage. • Avoid damage to existing infrastructure and property. • Clear communication and signage can help mitigate disruptions.	Once-off	Contractor
Potential for damage to indigenous vegetation, increased erosion, and spread of alien invasive species through disturbed areas.	• Working areas may involve disturbing vegetation (not clearing) which would amount to 10m² for each exploration point. The impact will also include soil disturbance, which can disrupt local ecosystems and wildlife habitats. • Habitat destruction as a result of alien invader plants and the spread of weeds.	• Avoid unnecessary impacts on natural vegetation. The disturbance must be within the 10m² surface area for each exploration point. • Do not translocate soil stockpiles from areas with alien plants. • Areas outside the groundwater exploration footprint are considered no-go areas for this project. • Develop an Alien Vegetation Management Plan to mitigate the establishment and spread of undesirable alien plant species during the exploration phase. • Removal must occur through appropriate methods such as hand pulling, application of chemicals, cutting, etc., as in accordance with the NEMBA: Alien Invasive Species Regulations. • Existing paths must be used where possible. High-clearance vehicles will be used to drive over vegetation. • Watercourses and steep gradients must be avoided as far as practical. • Where it is necessary to create new access routes to the drill sites, high-clearance vehicles will be used to drive over vegetation where possible, and access routes set out in consultation with the ECO, so as to minimise damage to protected plant species. Water courses and steep gradients must be avoided as far as practical.;	Daily	Contractor Site Manager

Aspect	Impact	Mitigation measure	Frequency	Responsible Party
		• Where existing paths are not sufficient for drilling equipment to pass, a route shall be devised where the minimum number of bushes or trees are felled. Note that trimming or felling of protected trees will require a permit from the Department of Fisheries and Forestry and the ECO must be consulted prior to any trimming/felling, and disturbance of protected vegetation will require a permit from DEDEAT; • No wildlife (including snakes) may be harmed or disturbed due to the drilling activities. If required, a suitable specialist must be appointed to safely remove and relocate any wildlife from the site; • No hunting or fishing shall be permitted by workers on or around the site; • Depending on the condition of the road, wet weather access will be restricted so as to prevent damage; • Areas of high aquatic importance must be avoided and if disturbance is required, it must be undertaken in accordance with legislation; and • Where required exploration sites are to have berms situated on the downslope to prevent any materials washing into the watercourses.		
Increased land disturbance through previously undisturbed areas.	• Drilling activities may involve disturbing vegetation (not clearing), and soil disturbance, which can disrupt local ecosystems and wildlife habitats.	• Vehicles and/ or plant and personnel shall only be permitted within the agreed drilling areas, or on existing roads and/ or designated access routes between agreed areas; • Areas disturbed as a result of drilling activities and are deemed unviable or infeasible for water abstraction, must be rehabilitated as soon as possible. The ECO will monitor rehabilitation activities. These shall include: o Re-instating of topsoil (containing cleared vegetation and seeds) to cleared areas; o Watering of the topsoil where necessary to encourage vegetation regrowth; o Monitoring and removal of alien invasive vegetation from all disturbed areas prior to seed bearing; o Revegetation with indigenous species in accordance with the surrounding vegetation if necessary o The aftercare period should be between three to six months. • Run-off from drilling related activities shall be directed onto vegetated land in order to prevent erosion channels forming. No sediment laden water is to be discharged to a water resource;	Daily	Contractor Site Manager

Aspect	Impact	Mitigation measure	Frequency	Responsible Party
		• Natural drainage lines must not be impeded or interfered with; • Sediment and erosion controls must be designed to prevent runoff from the exploration site into rivers, streams and wetlands; and		

Vegetation disturbance	• Site preparation is needed for exploration activities, and limited vegetation disturbance may occur. This would typically involve removing only what is necessary to facilitate testing without extensive land alteration.	• No clearing of vegetation, storage of materials, or other drilling related activities, shall be permitted outside of the agreed working areas (10m² for each exploration point). Drilling areas shall include:
		  ○ Site camp area;
		  ○ Work areas; and
		  ○ Areas for the storage of equipment and materials;
		• Existing paths must be used. No new roads will be built in this phase. High-clearance vehicles will be used.
		• No nursery will be implemented during search and rescue. The species translocated / removed during the search and rescue will be replanted directly into areas of similar habitat nearby (outside any future development/drilling areas). This is because practically, replanting protected species into a nursery for later use in rehabilitation causes further stress to the plants and reduces the survival rates of the plants.
		• Rehabilitation of all the drilling sites and disturbed areas once drilling has been completed and machinery has been removed will include intensive alien invasive clearing and replanting of indigenous species sourced from a commercial nursery into the areas / tracks disturbed. The species to be obtained and replanted include, but are not limited to; *Proteas and Leucospermum, Ericas (heaths), Restios (grass-like plants), and Asteraceae (daisy family)* usually found within the vegetation unit of Algoa Sandstone Fynbos
		• Following drilling activities at each location (Aspen Heights & Malabar), the Contractor/Applicant will need to implement an intensive rehabilitation plan within 1 month following completion of drilling activities at each site that is deemed to be unviable for further development of permanent boreholes.
		• No wildlife (including snakes) may be harmed or disturbed due to the drilling activities. If required, a suitable specialist must be appointed to safely remove and relocate any wildlife from the site;
			Daily	Contractor Site Manager

Aspect	Impact	Mitigation measure	Frequency	Responsible Party
		• No hunting or fishing shall be permitted by workers on or around the site; • Depending on the condition of the gravel roads, wet weather access will be restricted so as to prevent damage; • Areas of high aquatic importance must be avoided and if disturbance is required, it must be undertaken in accordance with legislation; and • Where required exploration sites are to have berms situated on the downslope to prevent any materials from washing into the watercourses.		
Contamination of watercourses	• Disturbance of flora leaves the soil susceptible to soil erosion should high rainfall/ wind occur after/ during drilling. The drilling activities may increase runoff and sedimentation in nearby water bodies, potentially affecting water quality. • When a borehole is dug into the soil, a channel of vulnerability is formed, increasing the risk of groundwater resource contamination and deterioration. Hydraulic connections between tainted surface water and pure underground water can be made by drilling into the subsurface. When surface pollutants infiltrate deeper (cleaner) aquifers, this process is known as cross-contamination, and these linkages become preferred channels for it.	• Soil from the drilled areas should not be stockpiled for long periods. • Bare soils must be revegetated and a suitable crop planted one exploration is completed. • No spillages or disposal of foreign material is allowed in rivers and their riparian zones (river). Where accidental contamination of any form occurs, the necessary and practical emergency actions must be implemented instantly • Should any watercourses be disturbed, these should be returned/reinstated following the natural ground levels, i.e. no new embankments that can alter or disturb the flow. Due care to prevent accidental leakage of pollutants, e.g., oil, fuel, and cement, must be the utmost priority. • Drilling activities should remain outside of the delineated freshwater feature footprints as per the Aspen Heights and Malabar Aquatic Compliance Statements.	Daily	Contractor Site Manager
Noise and vibration through excavation and drilling activities	Noise and vibrations from drilling equipment can disturb nearby residents and property owners, potentially affecting quality of life.	• Select exploration machinery and equipment with lower noise emissions and utilise noise-reducing technologies such as mufflers, sound enclosures, and vibration dampers, to mitigate noise at the source. • Schedule exploration activities during periods of lower sensitivity, such as weekdays during daytime hours, and avoid or minimise noisy activities during evenings, weekends, and holidays to reduce disturbance to nearby farmers. • Erect temporary noise barriers and enclosures around noisy equipment and exploration areas to contain and attenuate noise propagation. Use sound-	Daily	Contractor Site Manager

Aspect	Impact	Mitigation measure	Frequency	Responsible Party
		absorbing materials such as acoustic panels or barriers to reduce noise transmission.		
Accumulation of construction waste on-site	Improper disposal of waste on-site can lead to soil and water contamination. Accumulation of waste can harm local wildlife and vegetation. Litter and waste can detract from the area's natural beauty, potentially affecting ecological value.	Compilation of a waste management plan. The contractor must consider the: o Provision of waste bins for general and hazardous waste o Development of a waste disposal register to serve as proof of safe disposal of waste generated from drilling activities o Promote recycling activities through the provision of waste bins for recyclables, which may be dominant waste types such as metal, plastics, etc. o Train personnel on best practices for waste management and environmental protection.	Daily	Contractor
Hazardous material	Leaks and spills of environmentally hazardous materials (e.g. cement, oils and fuels) has the potential to impact on surface and/ or groundwater resources if not correctly managed.	• No spillages or disposal of foreign material is allowed in rivers and their riparian zones (river). • Where accidental contamination of any form occurs, the necessary and practical emergency actions will be implemented instantly. • The site staff should avoid going to the nearby watercourse. • Barricading the watercourse edge and indicating it as a no-go area. • Construction materials should not be stored in close proximity to the watercourse. • Stockpiles should be protected from the wind by covering them. • Material stockpiles must be located 110m away from any watercourse, and they must be monitored for erosion and alien vegetation infestation. • Rehabilitation of natural vegetation immediately after exploration has finished. • Runoff from the site must be controlled through a separator tank or attenuation dam. • The area designated for construction waste must be sited on an impermeable area or lined underneath with impermeable polyester material.	Daily	Contractor
Dust generation	Drilling activities will impact air quality in neighbouring residential areas. The use of machinery and equipment during drilling can lead to the emission of pollutants which can contribute to poor air quality.	• Implement dust suppression measures as required. • Vehicle speed should be kept at minimal reduced dust pollution.	Daily	Contractor

Aspect	Impact	Mitigation measure	Frequency	Responsible Party
	Construction vehicles will be travelling within the site areas transporting materials that may lead to dust generation. The bare soil will be prone to wind erosion with the associated generation of dust and windblown sand during high wind velocities.	• Construction plant, equipment, machinery, and vehicles should be well maintained and services regularly to minimise exhausted fumes and air pollution.		
Management of ablution facilities on-site	Mismanagement and/or unavailability of appropriate and adequate provision of ablution facilities will affect the site personnel. This may indirectly impact the surrounding area and disturbance of wildlife.	• The Contractor shall provide ablution facilities to the construction staff. The ablution-to-staff ratio should be 1:10. Ablutions are provided in accordance with the requirements of the Occupational Health and Safety Act (OHSA,1993). • The Contractor shall be responsible for ensuring that all ablution facilities are maintained in a clean and sanitary condition to the satisfaction of the Project Engineer. • Evidence of appropriate management (in the form of service receipts/waybills) must be maintained and presented to the ECO during audits.	Daily	Contractor
Rehabilitation	Vegetated areas that are cleared or disturbed due to the drilling activities will require rehabilitation to prevent and manage further impacts such as erosion and invasion by alien invasive vegetation, as well as visual scarring of the landscape and generation of dust.	• Minimise erosion and invasion by alien invasive vegetation through re-establishing vegetation as soon as possible after drilling activities. • Rehabilitation of all the drilling sites and disturbed areas once drilling has been completed and machinery has been removed will include intensive alien invasive clearing and replanting of indigenous species sourced from a commercial nursery into the areas / tracks disturbed. The species to be obtained and replanted include, but are not limited to; *Proteas and Leucospermum, Ericas (heaths), Restios (grass-like plants), and Asteraceae (daisy family)* usually found within the vegetation unit of Algoa Sandstone Fynbos • Following drilling activities at each location (Aspen Heights & Malabar), the Contractor/Applicant will need to implement an intensive rehabilitation plan within 1 month following completion of drilling activities at each site that is deemed to be unviable for further development of permanent boreholes.	Once-off	Contractor

5 REHABILITATION PLAN

5.1 Aim of Rehabilitation Plan

The aim of the rehabilitation plan is to:

- Return the disturbed areas to an acceptable post-exploration state;
    - The measurable goal to be achieved is 60% ground cover with appropriate species composition.
- Ensure all areas are stable, and there is no risk of erosion;
- Prevent alien plant invasion on the exploration sites until the site is in a stable state; and
- Ensure that all areas are free-draining and non-polluting.

5.2 Rehabilitation Objectives

The overall rehabilitation objectives will be the following:

- Visual impacts of rehabilitated areas should be minimised by recreating natural landforms and ensuring that reshaped areas are visually suited to the surrounding landscapes.
- Natural landforms such as drainage lines, undulating areas, and ridges, which have been damaged during activities, must be restored.
- Soil integrity is the most important aspect of rehabilitation as it forms the base from which rehabilitation proceeds. If soils are not correctly prepared, suitable conditions for re-vegetation will not be achieved.
- Alien floral invasion poses a threat both during and post-rehabilitation activities. Adequate alien and invasive species control measures will contribute to an effective rehabilitation effort.
- Infrastructure will be removed and the area restored to as much of the natural state as it was before the exploration activities.

5.3 Rehabilitation/landscaping of disturbed areas

Following drilling activities at each location (Aspen Heights & Malabar), the Contractor/Applicant will need to implement an intensive rehabilitation plan within 1 month following completion of drilling activities at each site that is deemed to be unviable for further development of permanent boreholes.

Rehabilitation of all the drilling sites and disturbed areas once drilling has been completed and machinery has been removed will include intensive alien invasive clearing and replanting of indigenous species sourced from a commercial nursery into the areas/tracks disturbed. The species to be obtained and replanted include, but are not limited to:

- *Proteas*,
- *Leucospermum,*
- *Ericas (heaths),*
- *Restios* (grass-like plants), and

- *Asteraceae* (daisy family), usually found within the vegetation unit of Algoa Sandstone Fynbos

The outcome of rehabilitation must return the disturbed areas to an acceptable post-exploration state of at least 60% ground cover with appropriate species composition, with no alien invasive species within or near the exploration positions

5.4 Alien Management Control

Invasive alien plants are species introduced (either deliberately/accidentally) into a natural environment where they are not normally found and have a serious negative impact on the receiving environment by not only outcompeting indigenous species, but also impacting on water resources, health of the ecosystem, and posing a fire hazard. Invasive species especially, become prominent after disturbance and exploration-related activities and pose a serious threat to natural endemic vegetation. Therefore, proper action must be place to ensure invasive species do not become prominent due to the development of the proposed project. The purpose of alien management control around the proposed site will be to:

- to ensure that alien plants do not become established on site following exploration (by removing alien species regularly);
- to ensure that alien plant species do not become dominant in all or parts of the landscape; and
- to implement a monitoring programme to detect the presence of alien plant species as well as to monitor the success of the alien management plan.

TYPES OF ALIEN VEGETATION

According to the National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004) the following categories of invasive plants exist:

- Category 1a: Invasive species requiring compulsory control and removal. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. No permits will be issued.
- Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits for riparian zones.
- Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Cat 3 plants to exist in riparian zones.

ALIEN CONTROL MUST OCCUR THROUGH

Rehabilitation must involve control of invasive species. Alien species on site must be identified, categorized and removed, using one or a combination of methods. Invasive alien plant species are difficult to control. Methods should be used that are appropriate for the species concerned, as well as to the ecosystem in which they occur. When controlling invaders, damage to the environment must be limited to a minimum. There are three basic methods by which encroachers or weeds are controlled:

Physical (mechanical):

- Uprooting (hand pulling);
- Cutting back;
- Chopping, slashing and felling;

6 MONITORING REPORTING AND AUDITING

In order to ensure that the EMPr is effectively implemented, it is important that monthly external audits of the EMPr are conducted. An Environmental Control Officer (ECO) will be appointed by the Client to undertake these audits. Site inspections by an ECO must be conducted prior to any drilling activities at each exploration site to ensure compliance with the conditions of the measures stipulated in the approved EMPr. The Resident Engineer (RE) shall arrange that these external audits do take place and that a system for addressing any problems identified during these audits is formulated. The relevant documentation shall be kept and shall be available to the public.

7 ROLES AND RESPONSIBILITIES

7.1 Responsibilities of the developer

The Project Developer is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority. An independent ECO must be contracted by the developer to objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of environmental authorization (EA). The developer is further responsible for providing and giving mandate to enable the ECO to perform responsibilities, and he must ensure that the ECO is integrated as part of the project team while remaining independent.

Responsibilities

- Be fully conversant with the conditions of the EA;
- Ensure that all stipulations within the EMPr are communicated and adhered to by the developer and its Contractor(s);
- Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings. Overall management of the project and EMPr implementation; and
- Ensure that periodic environmental performance audits are undertaken on the project implementation

7.2 Responsibilities of the Resident Engineer

Specific to environmental management, the role of the Resident Engineer (RE) will be to ensure enforcement of the Environmental Management Programme, approved EMPr and supplementary recommendations made by the ECO; review and approve the Method Statements submitted by the Contractor; and liaise with the Contractor, the ECO, and DEDEAT on environmental matters as necessary.

Responsibilities of the RE will include, but not be limited to:

- communicating the advice of the ECO and/or contents of the ECO's reports;
- issuing site instructions where applicable;
- communicating to the ECO any new/amended construction activities;
- informing the ECO of any infringements/accidents or incidents that have occurred on/off site;
- implementing any Temporary Work Stoppages where serious environmental infringements and non-compliances have occurred;
- issuing penalties as and when necessary; and
- maintaining a record of complaints and communicating these to the Contractor and ECO.

Should the RE believe that the environmental management measures are not being adhered to, and that the appropriate corrective action is not being implemented, the RE, advised by the ECO, will be at liberty to instruct the Contractor to cease the related operations until the Contractor complies with the relevant requirements. The Contractor will not be entitled to any extension of time for such stoppages.

7.3 Responsibilities of the Environmental Control Officer (ECO)

The role of the ECO will be to independently monitor, review, and verify the implementation of the EMPr and liaise with the RE and/or Client, and DEDEAT to confirm the level of compliance achieved and make appropriate recommendations on improvements/actions required.

The responsibilities of the ECO will include, as a minimum:

- The responsibility of the pre-commencement audit of the conditions of the EA, which must be submitted prior to the notice of commencement,
- advising the RE on the interpretation and enforcement of the Environmental Specifications;
- assisting with the review of Method Statements;
- ECO is to attend monthly progress meetings in order to report on the outcomes of the audits;
- demarcating particularly sensitive areas;
- monitoring any basic physical changes to the environment as a consequence of the construction works - e.g. evidence of erosion, dust generation, and littering;
- undertaking monthly site inspections on the level of compliance to the EMPr demonstrated by the Contractor and submitting reports to the Client, Consulting Engineer, Contractor and to the relevant government departments;

- undertaking any damage assessments with the RE where incidents, accidents and/or serious infringements have occurred on/off site, and advising on remedial actions required; and
- appropriate and communicating these changes to the Resident Engineer and Contractor.

7.4 Responsibilities of the Contractor

The Contractor will be contractually required to undertake his activities in an environmentally responsible manner. The role of the Contractor will include the following, at a minimum:

- to implement the Environmental Management Programme (and any subsequent revisions) and any environmental authorisations and permits (and any subsequent revisions) for the duration of the construction related activities;
- to appoint an Environmental Officer for the daily implementation and monitoring of activities and liaison with ECO;
- to provide reasonable resources for the effective control and management of environmental risks associated with the construction related activities, as per the EMP;
- to assign tasks to personnel as necessary and ensure appropriate accountability and responsibility is assigned to enable the carrying out of these duties;
- to maintain incident training and other relevant administrative records; and
- to ensure all personnel, sub-contractors and other workers appointed by the Contractor are aware of the environmental responsibilities on site.

These roles will, at a minimum, translate into the following environmental responsibilities:

- be familiar with the contents of all the respective environmental authorizations and permits, as well as the approved EMPr and to comply with the EMP;
- submit the necessary Method Statements and plans to the RE for approval;
- review the ECO Reports and undertake corrective actions for non-compliance and take cognisance of the information/recommendations made;
- notify the RE immediately in the event of any accidental infringements of the Environmental Management Programme and ensure appropriate remedial action is taken;
- Identify the need and be responsible for the implementation of an environmental awareness training programme for the construction staff;
- notify the RE in advance of any amendments/changes to the proposed work activities to enable environmental impacts to be confirmed and mitigation measures to be identified; and
- ensure that any problems identified during environmental audits or inspections, are addressed and rectified as soon as reasonably possible; and
- maintain records - e.g. photographic records, complaints records, training records and incident records.

8 NON-COMPLIANCE

The contractors must act immediately when notice of non-compliance is received and take corrective action. Complaints received regarding activities on the drilling site pertaining to the environment must be recorded in a dedicated register and the response noted with the date and action taken. The ECO should be made aware of any complaints.

- Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Failure to redress the cause must be reported to the relevant authority for them to deal with the transgression, as it deems fit.
- The Contractor is deemed not to have complied with the EMPr if, inter alia:
- There is evidence of a contravention of the EMPr specifications within the boundaries of the construction site, site extensions and roads;
- There is contravention of the EMPr specifications which relates to activities outside the boundaries of the construction site.
- Environmental damage ensues due to negligence;
- Construction activities take place outside the defined boundaries of the site; and/or
- The Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time period.

8.1 Penalties

The imposition of penalties will be at the discretion of the Client. The value of any penalty imposed shall be determined in light of the consequential damage caused and the costs required to rehabilitate the damaged area. Payment of any penalty in terms of the Contract shall not absolve the Contractor from being liable from prosecution in terms of the any appropriate law. Fines may also be imposed by the relevant authority (DEDEAT or DMR) in terms of NEMA if the Contractor is found to have unlawfully and intentionally or negligently committed any act or omission which causes significant pollution or degradation of the environment. The following list of fines should be used as a guideline for non-compliances:

Table 3. *Penalties*

RECOMMENDED FINES FOR TRANSGRESSION OR RESULTANT ENVIRONMENTAL DAMAGE	**MIN. FEE**	**MAX. FEE**
Failure to report environmental damage or transgressions to the ECO or RE.	R 1 000	R 2 000
Failure to carry out instructions of the ECO or RE regarding the environment	R 2 000	R 4 000
Failure to comply with prescriptions for the storage of imported materials within a designated contractors yard	R 500	R 1 000
Failure to comply with prescribed administration, storage or handling of hazardous substances	R 500	R 1 000
Failure to comply with fuel storage, refuelling, or clean-up prescriptions	R 500	R 1 000
Failure to comply with prescriptions for the use of ablution facilities	R 500	R 1 000

RECOMMENDED FINES FOR TRANSGRESSION OR RESULTANT ENVIRONMENTAL DAMAGE	MIN. FEE	MAX. FEE
Failure to comply with prescriptions for the use of designated eating areas, heating sources for cooking or presence of fire extinguishers	R 500	R 1 000
Failure to comply with prescriptions regarding water provision	R 500	R 1 000
Failure to comply with prescriptions regarding fire control	R 500	R 1 000
Failure to comply with prescriptions for solid waste management (incl. paint chips, cement and concrete)	R 500	R 1 000
Failure to comply with prescriptions to prevent water pollution	R 500	R 1 000
Failure to comply with prescriptions regarding workshop equipment maintenance and storage	R 500	R 1 000
Failure to comply with prescriptions regarding lighting and aesthetics	R 500	R 1 000
Failure to comply with prescriptions regarding silt, debris and other obstruction removal	R 500	R 1 000
Failure to comply with prescriptions regarding water diversion and drainage	R 500	R 1 000
Failure to comply with prescriptions regarding erosion and scour protection	R 500	R 1 000
Failure to comply with prescriptions regarding tree and vegetation removal/damage and permit application	R 5 000	R 20 000
Failure to comply with prescriptions regarding method statements	R 500	R 5 000
Failure to comply with prescriptions regarding environmental awareness training	R 500	R 5 000
Failure to comply with prescriptions regarding appointment of an Environmental Officer and monitoring of compliance	R 500	R 1 000
Failure to comply with prescriptions regarding site demarcation and erection of fences	R 500	R 5 000
Failure to comply with prescriptions regarding information posters	R 500	R 1 000
Failure to comply with prescriptions regarding procedures for emergencies and spills	R 1 000	R 5 000
Failure to comply with prescriptions regarding protection of natural features	R 500	R 5 000
Failure to comply with prescriptions regarding erosion and sedimentation control	R 500	R 5 000
Note: The maximum fine for any environmental damage will never be less than the cost of applicable environmental rehabilitation. For each subsequent similar offence committed by the same individual, the fine shall be doubled in value to a maximum value of R50 000.		

9 APPENDICES

Appendix A: Site layout and map indicating environmental sensitivities