INTEGRATED ENVIRONMENTAL IMPACT ASSESSMENT:

PROPOSED EXPANSION OF ASH DISPOSAL FACILITY, KRIEL POWER STATION, MPUMALANGA

ENVIRONMENTAL MANAGEMENT PROGRAMME

DEA:14/12/16/3/3/3/217

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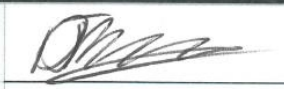
Author signature		Reviewer signature	
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GLOSSARY OF TERMS

Boiler Bottom Ash (BBA)	BBA is the larger ash particles that cannot rise and falls down into a pan below the boiler where it is quenched in water. The ash is therefore captured wet. The ash and water forming a slurry can be thickened to an optimal density before it is transported to site by means of pumping. BBA constitutes approximately 10-20% of the coal ash.
Environment	The surroundings (biophysical, social and economic) within which humans exist and that are made up of i. the land, water and atmosphere of the earth; ii. micro-organisms, plant and animal life; iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Impact Assessment (EIA)	A study of the environmental consequences of a proposed course of action.
Environmental Impact Report Assessment (EIR)	A report assessing the potential significant impacts as identified during the Scoping phase.
Environmental Impact	An environmental change caused by some human act.
Environmental Management Programme (EMPr)	A document that provides procedures for mitigating and monitoring environmental impacts, during the construction, operation and decommissioning phases.
Expansion	“Expansion” means the modification, extension, alteration or upgrading of a facility, structure or infrastructure at which an activity takes place in such a manner that the capacity of the facility or the footprint of the activity is increased.
General waste	"General waste" means waste that does not pose an immediate hazard or threat to health or to the environment, and includes: (a) domestic waste; (b) building and demolition waste; (c) business waste; (d) inert waste; or (e) any waste classified as non-hazardous waste in terms of the regulations made under section 69, and includes non-hazardous substances, materials or objects within the business, domestic, inert or building and demolition wastes.
Hazardous waste	"Hazardous waste" means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within the business waste, residue deposits and residue stockpiles.
Lagoon	“Lagoon” means the containment of waste in excavations and includes evaporation dams, earth cells, sewage treatment facilities and sludge farms
Pulverised Fuel Ash (PFA)	PFA rises with the furnace gasses and is collected by electrostatic precipitators in, or, before the stacks or chimneys of the power station. The ash is therefore captured dry and is commonly referred to as fly ash. The ash can be conditioned by adding small amounts of moisture to ease handling by mechanical means and to reduce dust before it is transported to the deposition facility usually by troughed conveyors. PFA constitutes approximately 80% to 90% of the coal ash.
Public Participation Process	A process of involving the public in order to identify needs, address concerns, in order to contribute to more informed decision making relating to a proposed project, programme or development.
Scoping	A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail.

Scoping Report	A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail. This results in a Scoping Report that is made available for public comment.
Supernatant water	Clear water that lies above a sediment or precipitate.
Waste	(a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, by the holder of the substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or (b) any substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraph (a) and (b) ceases to be a waste - (i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered; (ii) where approval is not required, once a waste is or has been re-used, recycled or recovered; (iii) where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or (iv) where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste.

ABBREVIATIONS

CRR	Comments and Responses Report
DALA	Department of Agriculture and Land Administration
DARDLA	Department of Agriculture Rural Development and Land Administration
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DEAT	Department of Environmental Affairs and Tourism
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EAPSA	Environmental Assessment Practitioner of South Africa
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EMP	Environmental Management Programme
GA	General Authorisation
GN	Government Notice
HDPE	High-density polyethylene
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IWULA	Integrated Water Use License Application
Mamsl	Meters above mean sea level
MBCP	Mpumalanga Biodiversity Conservation Plan
MBGL	Meters Below Ground Level
MBSP	Mpumalanga Biodiversity Sector Plan
Mtons	Metric tons
NEMA	National Environmental Management Act (No. 107 of 1998) (as amended)
NEMWA	National Environmental Management: Waste Act (No. 59 of 2008)
NHRA	National Heritage Resources Act (No. 25 of 1999)
NWA	National Water Act (No. 36 of 1998)
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SR	Scoping Report
ToR	Terms of Reference

1 INTRODUCTION AND BACKGROUND

1.1 Structure of the EMPr

Environmental management programmes are intended to be documents which indicate how the mitigation and management measures proposed for a project can be implemented in practice. As such they should be practical, reasonable and feasible. They must also meet the requirements of the legislation **(**Error! Reference source not found.), in articular regulation 19 (4) of the 2014 EIA regulations (GN R982).

Table 1-1 I Requirements of an EMPr as per Appendix 4 of the 2014 EIA regulations, GN R982

Content of EMPr as required by NEMA (Appendix 4)	Section
(1) An EMPr must comply with section 24N of the Act and include– a) details of– (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 1.3 & Annexure A1
b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Sections 1.4 & 3
c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Annexure B1
d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including– (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Sections 4-7
f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to — (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Sections 4-7
g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Sections 9-10
h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Sections 9-10
i) an indication of the persons who will be responsible for the implementation of the impact management actions;	Sections 4-7 & 11

Content of EMPr as required by NEMA (Appendix 4)	Section
j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Sections 4-9
k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Sections 10-11
l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 11
m) an environmental awareness plan describing the manner in which— (v) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (vi) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Sections 6.1 & 7
n) any specific information that may be required by the competent authority.	N/A
(2) Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	N/A

1.2 Relevant legislation, guidelines and other documents

This EMPr should be read in the context of the following documents:

a) Constitution of the Republic of South Africa Act (No. 108 of 1996)
b) National Environmental Management Act (No. 107 of 1998, as amended)
c) National Environmental Management: Waste Act (No. 59 of 2008)
d) National Environmental Management: Air Quality Act (No. 39 of 2004)
e) National Water Act (No. 36 of 1998)
f) National Heritage Resources Act (No. 25 of 1999)
g) Occupational Health and Safety Act (No. 85 of 1993)
h) Conservation of Agricultural Resources Act (No. 43 of 1983)
i) Hazardous Substances Act (No. 15 of 1973)
j) National Road Traffic Act (No. 93 of 1996, as amended)

NOTICE 1: **This EMPr is not intended to replace any of the above listed legislation, but rather augment them. Compliance with the EMPr does not exempt the EA holder from compliance with the legal or management requirements of any other licence or permit issued in terms of the relevant project.**

NOTICE 2: **This EMPr must be read and applied in conjunction with the Kriel Power Station's Operations and Maintenance Manual which sets out the requirements for the operation and maintenance of the ash dams with regards to:**

- **Requirements for monitoring of the ash dams and return water dams;**
- **Maintenance procedures;**
- **Rehabilitation of the ash dams;**
- **Groundwater monitoring;**
- **Environmental considerations; and**
- **Relevant legal and safety aspects.**

1.3 Details and expertise of persons preparing the EMPr

Miss **Franci Gresse**, the Project Leader, is a Senior Environmental Practitioner at Aurecon's Cape Town office with more than eight years' experience in the field. Miss Gresse has a Bachelor of Science (Honours) degree in Conservation Ecology and has been involved in a number of energy related projects in the Western and Northern Cape provinces, as well as Namibia.

Mr **Dirk Pretorius**, one of the project staff, is a Senior Environmental Practitioner at Aurecon's Cape Town office with more than six years' experience in the field. Mr Pretorius is registered as a Professional Natural Scientist at the Natural Scientific Professions Act, 2003 (Act 27 of 2003) and has a Bachelor of Science (Honours) degree in Conservation Ecology. He has been involved in a number of energy related projects in the Western, Eastern and Northern Cape provinces of South Africa as well as East Africa.

1.4 Aspects of the activity covered by the EMPr

This EMPr applies to the planning, construction, operational and rehabilitation aspects of the project. Although a brief section on closure has been included, it is recommended that a new decommissioning-specific EMPr be drawn up at that point in time based on the relevant legislation. This would allow the decommissioning EMPr to address the specific environmental issues on-site at the time of decommissioning, rather than trying to anticipate what those future issues might be.

2 ROLES AND RESPONSIBILITIES

2.1 Holder of the Environmental Authorisation

The holder of the Environmental Authorisation (EA) will be responsible for the following tasks, but not limited to:

- Ensuring that the requirements as set out in this EMPr are adhered to and implemented;
- Allocate the responsibilities assigned to the ECO to an independent suitably qualified Environmental Control Officer (ECO) individual/ECO company prior to the start of construction activities on site; and
- Provide all principal contractors working on the project with a copy of this EMPr as part of tender contract documentation to allow the contractors to cost for its requirements within their respective construction contracts.

It is important to note that Eskom, as the holder of the Environmental Authorisation, remains responsible for all aspects relating to environmental management, regardless of whether such functions and responsibilities are delegated or deferred to other parties.

2.2 Site Engineer (SE)

The SE is responsible for ensuring that the contract is carried out to completion on time, in budget and that each Contractor fulfils his obligations in terms of conditions contained in the EA and the EMPr.

2.3 Environmental Site Officer (ESO)

The Contractor shall, prior to commencement and throughout the project execution, appoint, in writing, a suitably qualified or otherwise senior and environmentally qualified member of his permanent site staff to perform the role of the ESO. The Contractor shall ensure that this appointee is provided adequate time to fulfil the requirements of the role, which will be proportional to the project scale and extent. The ESO will be required to develop a detailed understanding of the Specifications and ensure that the Contractor fulfil the requirements of the specifications and remains compliant throughout the project term, including any defects liability period. The ESO will be required to report compliance issues during monthly progress meetings and to co-operate with the official representative from the Government, ECO, Eskom and Engineering Firm on environmental management matters. The key responsibilities of the ESO include the following:

- Develop a detailed understanding of the requirements of this specification;
- Obtain confirmation in writing from Eskom that all regulatory processes, authorisation and permit requirements have been fulfilled. Copies of the permits and authorisations shall be obtained, and retained onsite, and studied by the ECO prior to the commencement of site establishment and site works. Any conditions contained in a permit or authorisation shall be deemed to form part of this Specification. Special attention must be given to any areas identified as No Go areas during the EIA study;
- Undertake routine inspections of all areas and activities under the Contractor's control, prevent potential environmental non-compliances, identify environmental non-conformances and incidents and initiate measures to remedy such issues;
- Ensuring that the Contractor's staff abide by the Specification and initiate disciplinary actions where required, with an underlying objective to prevent non-conformances;
- Report on environmental incidents and compliance matters at monthly progress meetings;
- Liaise and co-operate with any official environmental representative from the Government, ECO, Eskom and Engineering Firm regarding environmental matters associated with the project;

- Ensure that any environmental monitoring requirements are met and undertaken with precision, according to best practice sampling and monitoring methodologies (e.g. environmental control reports); and

2.4 Contractor

The Contractor must ensure that all of its sub-contractors, employees, etc., are fully aware of the environmental issues detailed in this EMPr. The Contractor shall liaise closely with the Site Engineer, ESO and the ECO and must ensure that the works on site are conducted in an environmentally sensitive manner and fully in accordance and full compliance with all applicable requirements of the EMPr, at all times. The contractor must employ a culture of avoidance towards environmental non-compliances.

2.5 Environmental Control Officer (ECO)

Eskom shall appoint a suitably qualified ECO to monitor the Contractor's and project's compliance in terms of this EMPr and the conditions contained in the EA prior to commencement of construction activities. The designation is reserved for a suitably qualified (National Diploma / Degree in Natural Science or an equivalent qualification), independent professional, with adequate environmental knowledge to understand and implement the EMPr. The duties of the ECO during construction phase will include but are not limited to:

- Liaison with Eskom, ESO, the Project Manager or Engineer and DEA;
- Monitoring of all of the Contractor's activities for compliance with the various environmental requirements contained in the construction Specification;
- Monitoring of compliance with the EA related to the construction phase as issued by DEA as well as other relevant environmental legislation;
- Reviewing and approval of the Contractor's environmental Method Statements;
- Ensuring that the requisite remedial action is implemented timeously in the event of non-compliance;
- Ensuring proactive and effective implementation and management of environmental protection measures;
- Ensuring that a register of public complaints is maintained by the Contractor and that any, and all, public comments or issues are appropriately reported and addressed;
- Routine recording and reporting of environmental activities on a weekly and monthly basis;
- Recording and reporting of environmental incidents; and
- Oversee and monitor compliance with, and implementation of, the construction phase EMPr, Rehabilitation Plan, including compliance with the relevant conditions contained in the EA.

2.6 Operation and Maintenance Teams

Kriel's ash disposal facility operations and maintenance teams are responsible for the implementation of **Kriel Power Station's Operations and Maintenance Manual.** The manual sets out the requirements for the operation and maintenance of the ash dams. It details the following:

- Requirements for monitoring of the ash dams and return water dams;
- Maintenance procedures;
- Rehabilitation of the ash dams;
- Groundwater monitoring; and
- Environmental considerations.

Legal and safety aspects relevant to the ash disposal facility are also summarised in the Operations and Maintenance Manual.

3 PROJECT DESCRIPTION

The existing Kriel Power Station Ash Disposal Facility consists of three ash dams of different sizes which will reach their capacity by the end of July 2021. All three ash dams are located adjacent to each other with Ash Dam 1 on the western border, Ash Dam 2 in the middle and Ash Dam 3 located at the eastern end of the ash dam complex (Figure 3-1). The proposed expansion of the Ash Disposal Facility would comprise a fourth Ash Disposal Facility, consisting of two ash dams (namely AD4.1 and AD4.2) as shown in Figure 3-1. These new ash dams would fulfil the ash disposal requirements for the Kriel Power Station's extended operational life.

The development of Ash Dam 4 will be sequenced to distribute large immediate capital expenditure cost. Dam 4.2 will be developed first in 2021 and will utilise a ring main system to distribute ash within the ash dam basin. Water generated on the dam will be decanted into solution trenches, running along the toe of the new dams, utilising penstocks and subsoil drains. Ash water from Dam 4.2 will be gravitated to a transfer dam from where it will be pumped to the AWR dam. From the AWR dam, ash water will be pumped back to the power station and ash dam pump-house to be reused in the placement of ash from the power station.

Deposition was split between the existing and new dams in order to reduce the height of the preliminary starter walls, as well as the final height of the new dams. It was assumed that deposition in the existing dams will continue for four years after the commissioning of AD4.2 in July 2021 after which the existing dams would either be maintained as part of the overall ash dam complex or be decommissioned, and rehabilitated. It is anticipated that AD4.1 will be commissioned in July 2023.

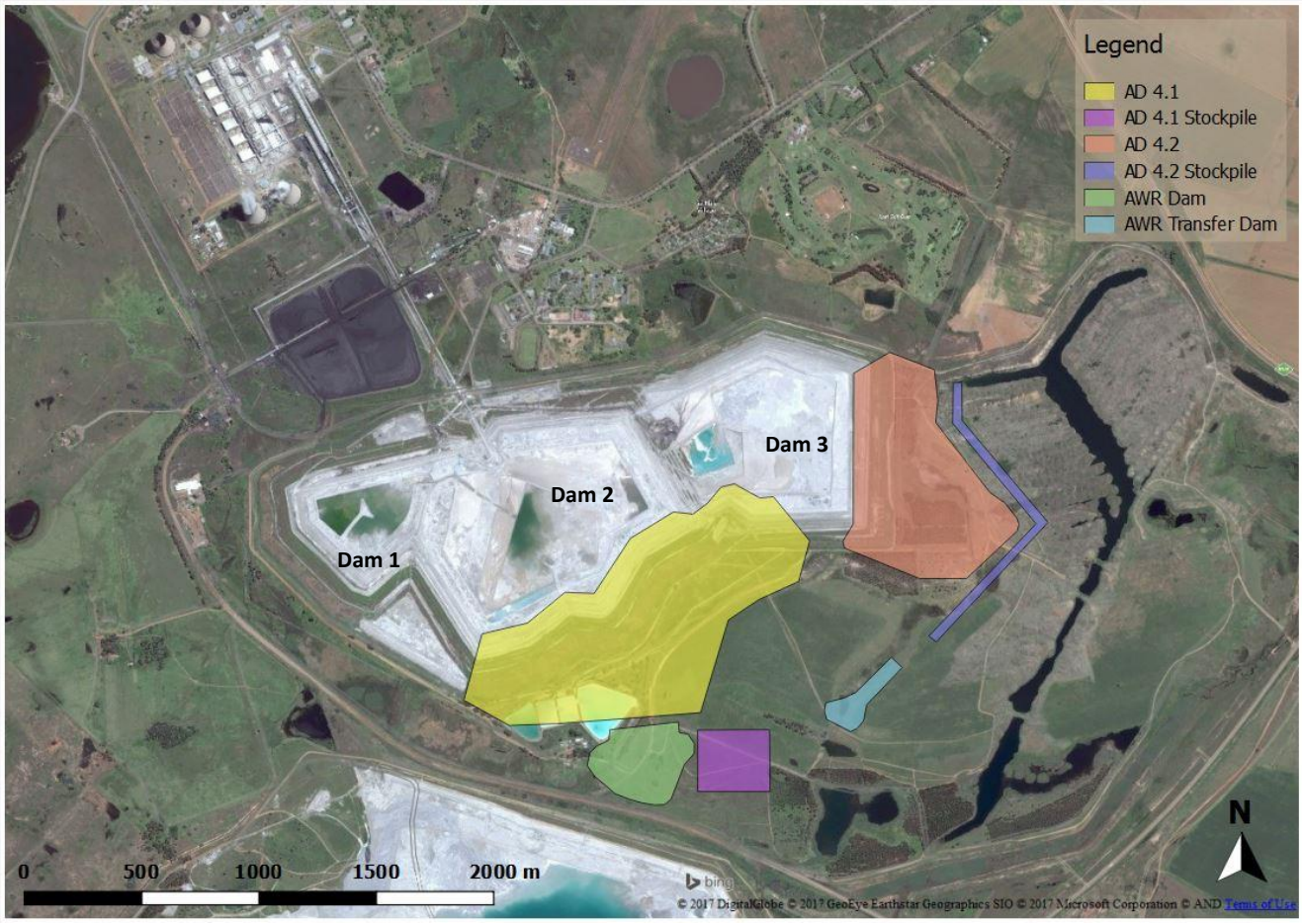
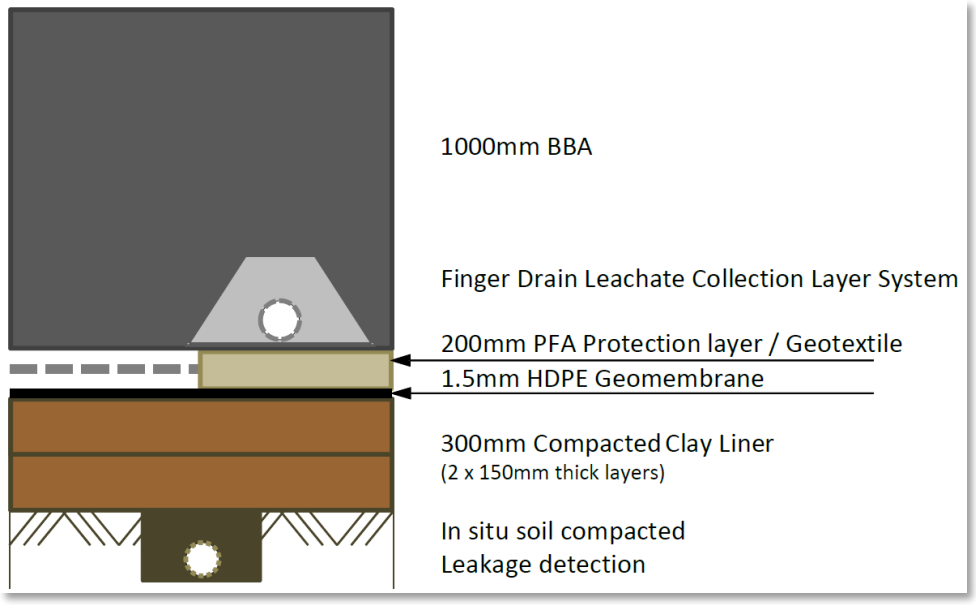


Figure 3-1 | The proposed construction of AD4.1 and AD4.2 (Phase 1 of the project and the subject of this EMPr)

The proposed project will entail the various components as summarised in Table 3-1.

Table 3-1 | Description of layout and components required for the proposed ash dams AD4.1 and AD4.2.

Aspect	Description
GENERAL	
Development phases	Deposition in the existing dams will continue for four years after which AD 4.1 and 4.2 will be commissioned as follow: ● AD4.2: July 2021 ● AD4.1: July 2013 Thereafter the existing dams would either be maintained as part of the overall ash dam complex or be decommissioned, and rehabilitated.
Decommissioning	The methods for decommissioning of the ash facilities and the current AWRD will be confirmed during detailed design, and will be in compliance with the approved EMPr for the project. It is envisaged that decommissioning activities could include: ● Re-routing ash water to the new AWR; ● Removal of sludge from the existing AWR dams and disposing thereof as provided for in the existing Kriel Operational Maintenance Manual; ● Removal of all hard surfaces i.e. concrete linings and disposing thereof in a responsible manner; ● Materials generated during decommissioning of the AWR dam will be disposed of according to the Waste Hierarchy i.e. where feasible materials will be reused, recycled and lastly disposed of; ● Materials disposed of offsite should be done at a suitably licensed facility; and ● Shaping of the terrain to ensure that it conforms to the engineering standards required for the construction of the AD 4.1 liner.
Components	The project requires the following components: ● An AWR dam from where decant and drained water will be pumped back to the power station for re-use; ● An AWR transfer dam; ● Delivery and return infrastructure, including conveyor belts and/ or pipelines, transfer houses, pump stations; ● Clean and dirty water channels; ● Powerlines; and ● Access roads.
Development footprint	The proposed ash disposal facility would have a total development footprint of approximately 171.76 ha, consisting of the following components: ● AD4.1 ● AD4.2 ● AWR dam ● AWR transfer dam ● AD4.1 stockpile ● AD 4.2 stockpile ● Access roads ● Powerlines (11kV) ● Clean and dirty water channels
DESIGN CRITERIA	
Source of ash	The ash that requires disposal at the proposed ash disposal facilities originates from the Kriel Power Station and consists of fly ash and coarse ash from the coal burning operations.
Volume of ash	The total volume of ash produced by the Kriel Power Station is 3 700 000 tonnes per year.

Aspect	Description
Ash classification	The ash from Kriel Power Station has been classified as a Type 3 waste (see Section 4.2.3 of the EIA Report for more information on the waste classification process), which requires a Class C liner in accordance with GN 636 (2013) of NEMWA.
Liner system	The regulatory liner and liner component specifications are shown below:  Note that a Class C liner would be provided on the wide horizontal bench approximately mid-height of the existing ash dam outer walls, to collect leachate from the upper slope areas. This is deemed a sufficient barrier as the side slopes are steep providing drainage towards the drain pipes at the toe and bench. This approach has also been approved by DWS.
Deposition method	The most common upstream method in South Africa for constructing a conventional wet ash dam, which is currently being operated on site, is referred to as the daywall method.
Maximum height	The maximum heights for the proposed AD4.1 and 4.2 are as follow: ● AD4.1: 64m ● AD4.2: 61m
Height and rate of rise limits	The maximum rate of rise specified was part of this project at 3m/year for stability and 3.5m/year for operability. The operability limit was applied to determine the height of starter walls and the stability limit for final heights. These limits are empirical and are based on ash dams that are effectively managed within South Africa.
PRE-DEPOSITION WORKS	
Pre-deposition works	The works required before operations can start on AD4.1 and AD4.2 includes the reshaping of the basin to allow proper drainage, construction of starter walls, lining the site and providing the necessary drainage boundaries between clean and dirty water systems.
CLEAN AND DIRTY WATER SYSTEMS	
Slurry delivery system	The ash dams would be developed as a ring dyke with the outer walls raised continuously using machine packed day walls. Deposition would take place in a planned cycle so that: ● The rate of rise of the outer wall exceeds or is at least equal to that of the basin; ● The crest of the dam remains as level as practical within freeboard requirements; ● Sufficient deposition area is available at any time; and ● The pool is always located at the penstock inlet.

Aspect	Description
	The delivery lines (deposition lines) would be similar to the current system and consist of the following: ● Permanent main line for Boiler Bottom Ash: – 1 x duty 300mm nominal diameter steel pipes. ● Deposition stations: – Every 300m; and – Open-ended deliveries. ● Permanent main line for Pulverised Fuel Ash: – 2 x duty 450mm nominal diameter HDPE pipes. ● Deposition stations: – Every 300m; and ● Open-ended deliveries.
Decant system	Storm and supernatant water are to be decanted off the basin of the dam by means of a gravity penstock. The penstock would consist of vertical stacked concrete ring towers that is raised as the dam rises and a sub-horizontal thin walled steel outlet pipe that is encased in concrete to drain decant water to the toe of the dam. At the toe of the dam, the pipe would discharge into a solution trench that drains towards the AWR dam. Access to the inlet would be provided by means of a conventional pool wall, timber catwalk and timber platform. A decant system would be required for each phase of the development to be able to decant the water. Wing walls would also need to be constructed to assist in maintaining the pool at the inlet.
Return water system	Based on the preliminary findings of the water balance a new AWR would be required to accommodate the new ash dam(s) to ensure the site does not discharge to the environment more than once in 50 years (NWA, 1998 GN.704[1]). The location next to the East Wing Dam of the existing AWR is a suitable location for the construction of a new AWR or extension of the existing dam due to the fact that the dam is: ● Situated on natural ground as opposed to backfill thereby reducing the risk of large settlements and possible cracking and failure of the water retaining embankments. ● At one of the low points on site thereby maximising gravity flow of drain, decant and dirty storm water. Note that the whole site cannot drain to this point as discussed in the next section. ● Near the existing AWR pump station allowing re-use of the facility. The following additional infrastructure would also be required as it would not be possible for the entire site to drain under gravity to the AWR dam: ● A transfer dam to collect all water from AD4.2, decant water from AD3 and a portion of seepage water from AD4.1. The transfer dam would be excavated into the Cut 1 ash fill adjacent to the original starter wall. ● The solution trench at the toe of AD4.1 west of the AWR is elevated to allow part of the storm water from AD4.1 and the decant water from Ash Dams 1 and 2 to flow under gravity into the AWR. ● The AD4.1 underdrains east of the AWR would connect to a concrete manhole that would be equipped with a pump to transfer the water to the solution trench mentioned above.

[1] The NWA regulations on the use of Water for Mining and Related Activities Aimed at the Protection of Water Resources Section 4d (d), use any area or locate any sanitary convenience, fuel depots, reservoir or depots for any substance which causes or is likely to cause pollution of a water resource within the **1:50 year flood-line** of any watercourse or estuary.

4 IMPACT ASSESSMENT SUMMARY

Various specialist assessments were undertaken to assess the impact of the proposed activity on the various aspects of the environment. The table below contains a short summary of the impacts that were assessed and their significance post mitigation. The impacts listed below are described in more detail in the EIA. For each impact assessed, mitigation measures have been proposed to reduce and/or avoid negative impacts and enhance positive impacts. The specific specialist mitigation measures are included in Section 5 of this EMPr. Also included are two maps (**Figure 4-1** and **Figure 4-2**) showing the sensitive areas that need to be avoided (biodiversity) or managed (noise). Note that sensitive areas where only identified in terms of biodiversity.

Table 4-1 | Summary of impact assessments and impact significance for the Kriel ash disposal facility.

Aspect	Impact	Pre-mitigation	Post-mitigation
PRE-CONSTRUCTION			
No impacts have been identified for the pre-construction phase.			
CONSTRUCTION			
Terrestrial and Aquatic Ecology	Possible impact on surface water quality	High (-)	Low (-)
	Displacement of non-wetland associated fauna	Low (-)	Low (-)
	Possible loss Red Data Bird habitat	High (-)	Low (-)
	Destruction of vegetation and loss of habitat	Low (-)	Low (-)
Groundwater	Potential hydrocarbon pollution through spillages and handling	Very low (-)	Very low (-)
	Decanting of Pit 1	Low (-)	Low (-)
Air Quality	Degraded ambient air quality	Medium (-)	Very low (-)
Visual	Visibility of the project	Low (-)	Low (-)
	Viewer incidence and perception	Low (-)	Very low (-)
	Visual absorption capacity	Low (-)	Very low (-)
	Lighting	Low (-)	Low (-)
Heritage	Destruction of paleontologically significant material	High (-)	Low (-)
Noise	Noise disturbance	Medium (-)	Medium (-)
Agricultural land capability and economics	Loss of agricultural land	Low (-)	Low (-)
Traffic	Traffic conditions	Very low (-)	Very low (-)
OPERATION			
Terrestrial and Aquatic Ecology	Displacement of non-wetland associated fauna	Low (-)	Low (-)
	Destruction of vegetation and loss of habitat	Low (-)	Low (-)
	Possible impact on surface water quality	High (-)	Low (-)
	Possible loss Red Data Bird habitat	High (-)	Low (-)
Groundwater	Potential hydrocarbon pollution through spillages and handling	Very low (-)	Very low (-)
	Potential inorganic pollution from fly ash disposal	Medium (-)	Low (-)
	Decanting in Pit 1	Medium (-)	Low (-)
Air Quality	Degraded ambient air quality impacting on human and animal health	Medium (-)	Very low (-)
Visual	Visibility of the project	Low (-)	Low (-)
	Viewer incidence and perception	Low (-)	Very low (-)
	Visual absorption capacity	Low (-)	Very low (-)
	Lighting	Low (-)	Low (-)
Noise	Noise disturbance	Medium (-)	Medium (-)
Traffic	Traffic conditions	Low (-)	Low (-)
DECOMMISSIONING			
Groundwater	Potential hydrocarbon pollution through spillages and handling	Very low (-)	Very low (-)
	Potential inorganic pollution from fly ash disposal	Low (-)	Low (-)
	Decanting of Pit 1	Low (-)	Low (-)

Aspect	Impact	Pre-mitigation	Post-mitigation
Air Quality	Degraded ambient air quality impacting on human and animal health	Medium (-)	Very low (-)
Visual	Visibility of the project	Low (-)	Low (-)
	Viewer incidence and perception	Low (-)	Very low (-)
	Visual absorption capacity	Low (-)	Very low (-)
	Lighting	Low (-)	Low (-)

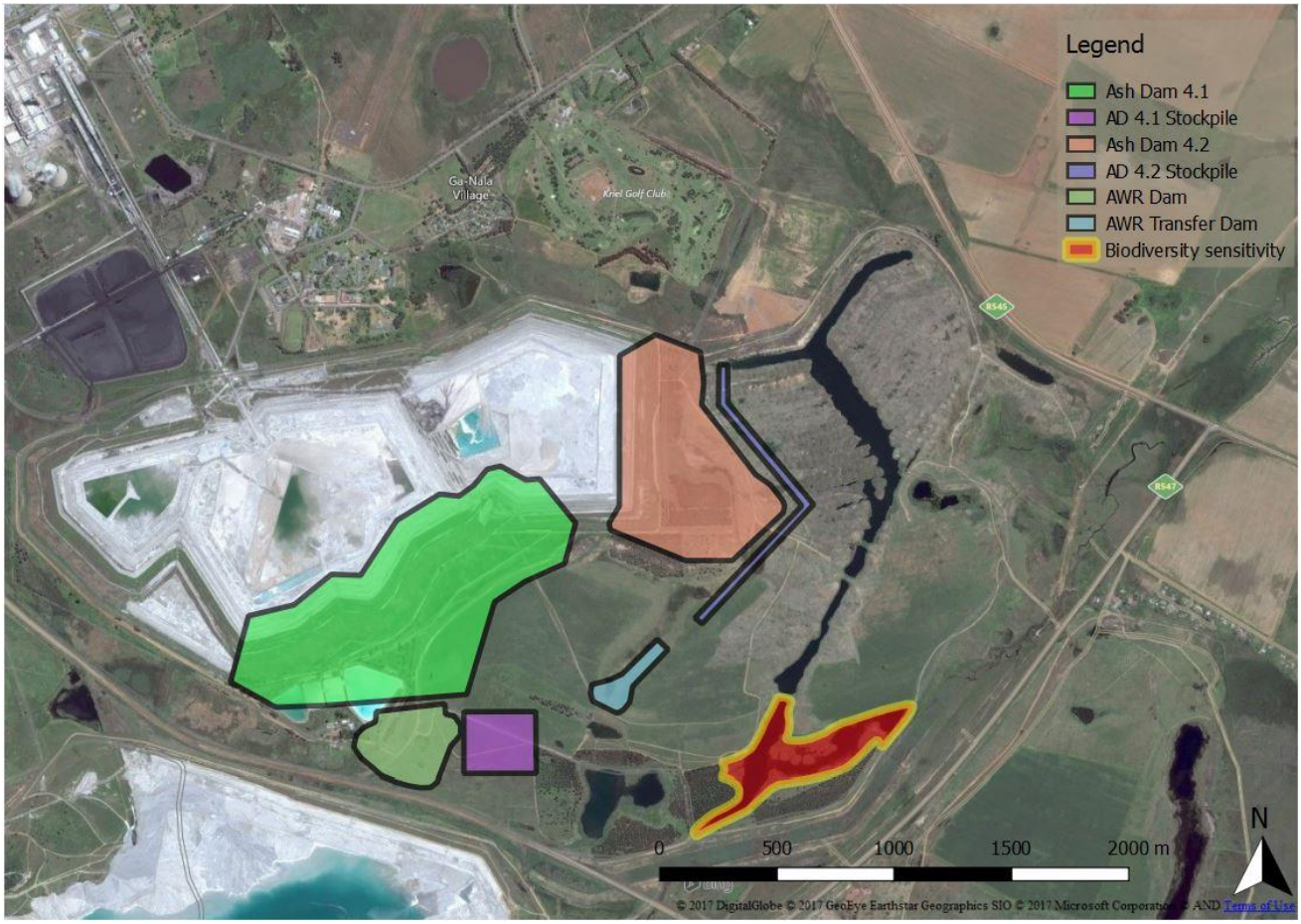


Figure 4-1 | Sensitive biodiversity areas that needs to be avoided

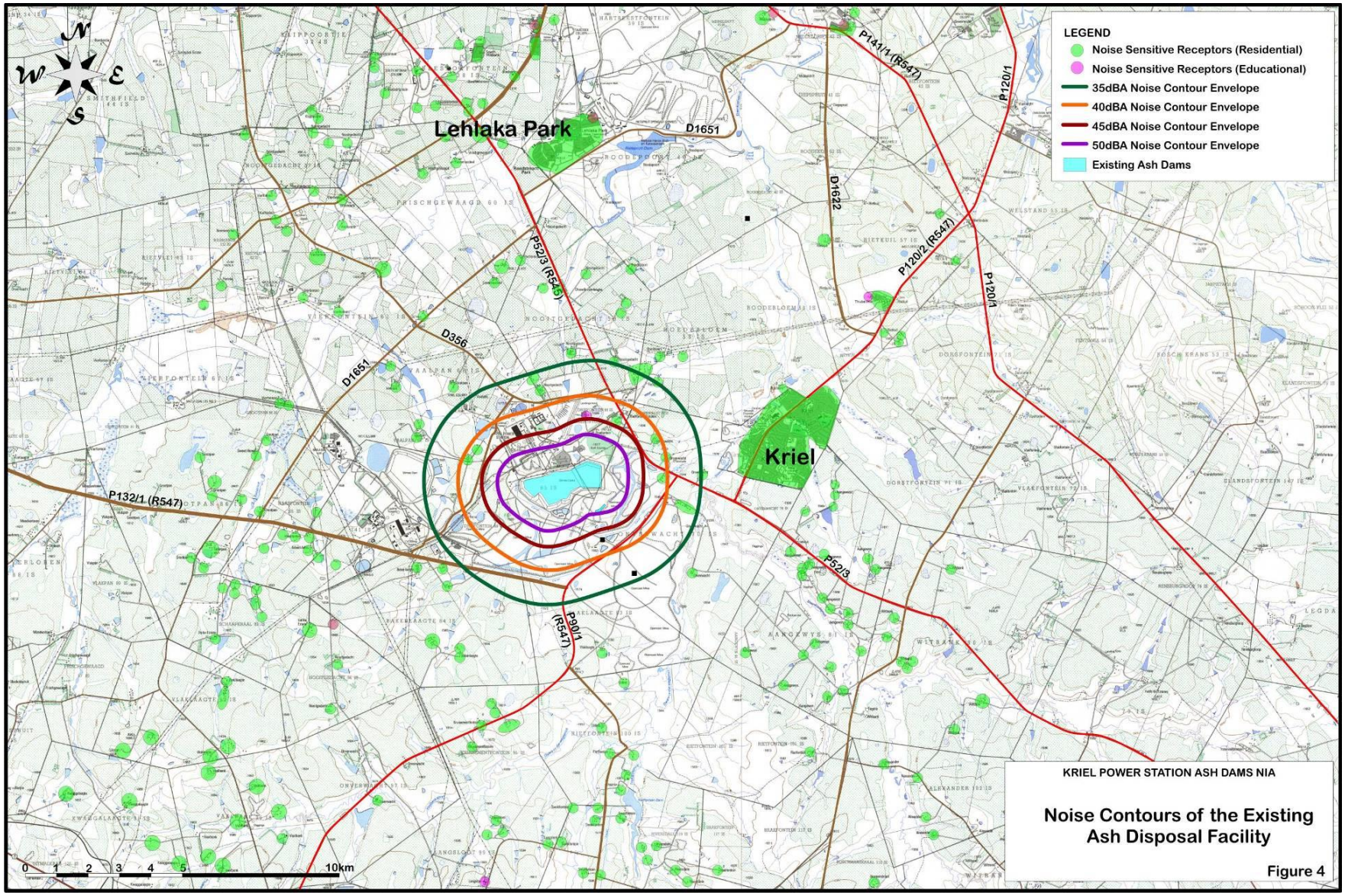


Figure 4-2 | Location of noise sensitive receptors (Jongens Keet Associates, 2017)

5 SPECIALIST SPECIFIC IMPACT MANAGEMENT AND MITIGATION MEASURES TO BE IMPLEMENTED

Mitigation measures identified by the specialists for the various project phases are set out in the table below.

Table 5-1 | Specialist mitigation measures during planning / design, construction, operation and decommissioning

Specialist Study	Mitigation Measure
PLANNING/ DESIGN	
Air Quality	a) The sidewalls of the ash dams should be vegetated as soon as possible. The vegetation cover should ensure at least 80% control efficiency. b) A water spraying system should be implemented on the surface of the ash dam covering the outer perimeter of the dam, spraying water when winds exceed 4 m/s.
Ecology	a) Design for appropriate stormwater control, installation of attenuation dams and cut-off drains. b) Implementation of Eskom's Zero Liquid Effluent Discharge (ZLED) principles. c) Do not allow the ash dam to extend its proposed eastern boundary, so that water bodies and cliff habitats can be maintained, i.e. keep the project within the approved footprint.
Geohydrology	a) Ensure that AD4.1 and AD4.2 and all supporting infrastructure are equipped with a suitable lining and seepage interception system. b) Install suitable seepage monitoring systems below the lining of AD4.1 and AD4.2 and all supporting infrastructure and procedures for correction in the event of leakage.
Heritage	a) Any changes to the existing layout of any of the proposed development footprints (i.e. site boundaries and associated infrastructure) will have to be surveyed by a suitably qualified heritage specialist.
Noise	a) Local residents should be notified of any potentially noisy field survey works or other works during the planning and design phase and these activities should be undertaken at reasonable times of the day. These works should not take place at night or on weekends. b) During this phase, consideration must be given to the noise mitigation measures required during the construction phase and which should be included in the tender document specifications and the design. c) The design of all major plant for the project is to incorporate all the necessary acoustic design aspects required in order that the overall generated noise level from the new installation does not exceed a maximum equivalent continuous day/night rating level (LRdn), namely a noise level of 70dBA (just inside the property projection plane, namely the property boundary of the power station and the boundary of the pipeline/conveyor servitude) as specified for industrial districts in SANS 10103. Notwithstanding this provision, the design is also to take into account the maximum allowable equivalent continuous day and night noise rating levels of the potentially impacted sites outside the power station property and the boundary of the pipeline/conveyor servitude. Where the noise level at such an external site is presently lower than the maximum allowed, the maximum shall not be exceeded. Where the noise level at the external site is presently at or exceeds the maximum, the existing level shall not be increased by more than indicated as acceptable in SANS 10103. d) The latest technology incorporating maximum noise mitigation measures for components of the project should be designed into the system. When ordering plant and machinery, manufacturers should be requested to provide details of the sound power level (SPL). Where possible, those with the lowest SPL (most quiet) should be selected. e) The design process is to consider the insulation of particularly noisy plant and equipment.

Specialist Study	Mitigation Measure
	f) The operational noise mitigation measures will need to be designed and/or checked by an acoustical engineer in order to optimise the design parameters and ensure that the cost/benefit of the measure is optimised. g) Once the details of the scheme is finalised and the actual sound power levels of plant and equipment are known, the position of the noise contours should be checked.
Visual	a) If technically feasible, and without the risk of compromising the facility, suitable tree species should be planted in front of the proposed ash dam embankment in order to soften the ash dam's linear profile; this mitigation measure will be effective from distances located further than 3km from the impact. b) Slopes should be vegetated using suitable indigenous grass species (or as specified in the mine's existing rehabilitation plan) as this will allow the ash dam to blend in with the existing landscape colours. c) When vegetation is cleared for servitudes and roads, the edges of the cleared area should be irregular or curvilinear if possible rather than straight and sharp. Irregular and curvilinear lines would blend in with the natural formation of the landscape and as a result minimise the visual impact. d) New ancillary structures must be built in the same design style to ensure visual continuity and may also be very effectively screened with vegetation and tree lines of indigenous species.
Traffic	a) Should the number of vehicle trips required during peak hours of the construction phase exceed 50 trips per day, a full Traffic Impact Assessment shall be completed and approval be obtained from the relevant authorities prior to the commencement of the construction phase.[2]
CONSTRUCTION	
Agricultural	a) Soil should be stripped prior to construction from the entire footprint of the development, excluding the stockpiles. b) Stripping must be done in the dry season. c) Topsoil (wherever it occurs within the development footprint) should be stripped and stockpiled. d) The topsoil stockpiles must be kept separate from any additional soil material that may also be stripped. Effective records of which stockpiles contain topsoil and which subsoil must be kept. e) Additional subsoil material that is of a suitable nature for use in rehabilitation, should also be stripped and stockpiled. f) The soil map in Annexure B2 indicates the depth to which such material should be stripped in the different soil map units. The first number in the soil map unit label, after the two-letter soil form abbreviation, indicates the depth in decimetres, to which the subsoil can be stripped. Note that this is the total depth from surface, so it must take into account the 25 cm of topsoil that has been stripped from above it. For example, soil map unit Cv 6-8 can be stripped to a total depth from surface of 6 decimetres (or 60 cm). g) Topsoil stockpiles should be protected against losses by water and wind erosion, and should therefore be vegetated. Additional erosion control measures, such as the planting of Vetiver grass hedges may be required. h) Topsoil stockpile heights shall be in compliance with applicable legislative requirements. i) During rehabilitation, the surface of all areas must be covered with a depth of approximately 25 cm of topsoil. Stockpiled subsoil must only be used as fill and additional soil depth, underneath the topsoil, not at the surface.
Air Quality	a) With regards to materials storage, handling and transfer operations, implement wet suppression where feasible on stockpiles and materials handling activities.

[2] During construction, it is expected that less than 10 additional vehicle trips will be generated.

Specialist Study	Mitigation Measure
	b) With regards to open areas (with risk of windblown emissions), minimise the extent of disturbed areas; reduce frequency of disturbance; ensure early re-vegetation; and undertake stabilisation (chemical, rock cladding or vegetative) of disturbed soil.
Ecology	a) Best practice soil conservation measures should be taken during the construction phase (also see Agriculture section above). b) Alien plant regrowth should also be monitored, and any such species should be removed during the construction phase. c) A search and rescue operation for fauna (particularly amphibians and reptiles) must be initiated prior to the commencement of any construction once the requirements are in place. d) No animals may be hunted and/or killed. Animals occurring within the disturbance footprint must be allowed to disperse naturally into the surrounding areas. e) Animals occurring outside the disturbance footprint may not be wilfully disturbed.
Geohydrology	a) Install suitable seepage monitoring systems below the lining of AD4.1 and AD4.2 and to all relevant infrastructure and procedures for correction in the event of leakage.
Heritage	a) Any changes to the existing layout of any of the proposed development footprints (i.e. site boundaries and associated infrastructure) will have to be surveyed by a suitably qualified heritage specialist. b) In the case of possible excavation into undisturbed sedimentary bedrock, Eskom: i) Must employ a qualified palaeontologist to record and remove any fossils; and ii) Must apply for a collection and destruction permit for all fossil material encountered during the process.
Noise	a) Construction site yards and other noisy fixed facilities should be located well away from noise sensitive areas adjacent to the development sites (**Figure 4-2**). b) All construction vehicles and equipment are to be kept in good repair. c) Where possible, stationary noisy equipment (for example compressors, pumps, pneumatic breakers,) should be encapsulated in acoustic covers, screens or sheds. Proper sound insulation can reduce noise by up to 20dBA. Portable acoustic shields should be used in the case where noisy equipment is not stationary (for example drills, angle grinders, chipping hammers, poker vibrators). d) Construction activities, and particularly the noisy ones, are to be contained to reasonable hours during the day and early evening. e) With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas (**Figure 4-2**), the project should liaise with local residents on how best to minimise the impact. f) Machines in intermittent use should be shut down in the intervening periods between work or throttled down to a minimum. g) In general, operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993). h) Construction staff working in areas where the 8-hour ambient noise levels exceed 75dBA should wear ear protection equipment.
Traffic	a) Drivers of heavy vehicles shall attend a specialised road safety and driving course that sensitises them to the impact that they have on driving conditions for other vehicles and Non-Motorised Transport (NMT) users on these roads.
Visual	a) The construction contract must include the stripping and stockpiling of topsoil. Topsoil would be used later on during the rehabilitation phase.

Specialist Study	Mitigation Measure
	b) Ensure effective rehabilitation of the construction camps (including temporary access roads, laydown areas and worker camps) and all other areas affected by the construction works. c) All "cut and fill" slopes and areas affected by construction work should be progressively topsoiled and re-vegetated as soon as possible. d) "Cut and fill" slopes should mimic the shapes and angles found in the adjacent area. e) The placement of construction camps, as well as a site plan of the construction camp should consider and indicate the waste areas, storage areas and placement of ablution facilities. These areas should either be screened or positioned in areas where they would be less visible from human settlements and main roads (such as the R545 or the R547). f) Dust, as a result of construction activities and haulage, should be suppressed through regular watering of surface areas or the implementation of other dust suppression techniques. g) Due to the nuisance and the visual impact associated with lighting, security and construction lighting should, as far as possible, only be focused on temporary structures and construction works. Where this is unavoidable, lighting should be as unobtrusive as possible and reflectors can be used to avoid light spillage.
OPERATION	
Air Quality	a) Dust fallout monitoring network established at the site to monitor the impacts from the proposed project activities. This should be established prior to operations to allow for assessment against the baseline dust fallout level. Refer to Section 10 for the details thereof. b) The sidewalls of the ash dams should be vegetated. The vegetation cover should be such to ensure at least 80% control efficiency. The top surface area should be adequately wet (if feasible and if wet deposition option is considered) and a water spraying system should be implemented on the surface of the ash dam covering the outer perimeter of the dam, spraying water when winds exceed 4 m/s.
Ecology	a) Best practice soil conservation measures should be taken during the operational phase, including management of alien invasive species.
Geohydrology	a) Monitor the water quality and water levels of the sampling points as mentioned in Section 10. b) Assess the groundwater water quality inside, upstream and downstream of AD4.1 and AD4.2 and infrastructure annually, and recommend mitigation measures if needed. c) Audit the suitability of monitoring network annually. d) Maintain (and update, with approval from DWS, when required) the groundwater water monitoring network. e) Address any concerns and complaints of affected parties regarding the ground water issues. f) All remedial action should be done in close liaison with the Department of Water and Sanitation. g) The liabilities and proposed preventative and remedial actions will also have to be quantified. h) Ensure that all surface water and storm water related management systems are adhered to.
Noise	a) At commissioning of the scheme, the noise footprint of each discrete element should be established by measurement in accordance with the relevant standards, namely SANS ISO 8297:1994 and SANS 10103. The character of the noise (qualitative aspect) should also be checked to ascertain whether there is any nuisance factor associated with the operations. b) All plant, equipment and vehicles are to be kept in good repair. c) Where possible, very noisy activities should not take place at night (between the hours of 20h00 to 06h00).
DECOMMISSIONING	
Agricultural	a) All soil sampling and associated chemical amelioration of the soils that will be used to cover the ash dumps after closure, should only be done to a point of usability after rehabilitation.

Specialist Study	Mitigation Measure
Air Quality	a) During closure, implement dust control for open areas which can consist of wet suppression, chemical suppressants, vegetation, wind breaks, etc., as applicable. Wet suppressants and chemical suppressants are generally applied for short storage pile durations. For long-term control measures vegetation frequently represents the most cost-effective and efficient control due to sheltering the soil surface, trapping material already eroded, water erosion control.
Visual	a) Slopes should be vegetated using suitable indigenous grass species (or as specified in the mine's rehabilitation plan) as this will allow the ash dam to blend in with the existing landscape colours.

6 PRE-CONSTRUCTION ACTIVITIES

The pre-construction activities for the proposed activities to a large degree overlaps with construction activities described in Section 7.

Below is a list of the pre-construction activities:

- Pre-construction environmental induction – refer to Section 6.1 below.
- Demarcation of work areas and no-go areas and compiling maps indicating all relevant management areas. The ECO must inspect no-go area demarcation.
- Compilation of method statements.
- Construction phasing.
- Provide relevant notifications to the DEA, relevant authorities and, if required, neighbouring landowners (as per EA conditions).
- Incorporate all relevant conditions of the EA (e.g. update this EMPr).
- Relevant permits and / or authorisations must be obtained from the DEA, DWS, SAHRA and the roads authorities[3] prior to any activities at the site and held on site by the Site Engineer.

6.1 Training

It is recommended that a pre-construction environmental induction be conducted for all project teams before commencement of construction activities. The Contractor ESO must provide evidence of environmental training (to their teams), to the ECO. The environmental induction must include, amongst others, the following:

- Explain the importance of the EMPr and its contents (e.g. specific and no-go areas) and applicability at their project activities;
- Explain that there is an EA in place, its contents and how it is carried through to the EMPr;
- Highlight specific environmental management objectives that are most relevant to the project;
- Discuss the importance of a safe working environment and the environmental dangers e.g. fire and spillage of hazardous substances;
- Address a code of behaviour for employees that would align with community values in order to reduce any social conflict, that would also include awareness of AIDS and TB as well as risks relating to alcohol and substance abuse; and
- A record must be kept of those who have completed the environmental training. People who have not had training shall not be allowed on site.

The overall purpose of the environmental induction is to make all parties (engineer, contractor, sub-contractors, employees etc.) aware of the key environmental features of the construction site and the surrounding environment. Following the induction training employees must be thoroughly aware of the environmental specifications and apply these to their work.

[3] Should the number of vehicle trips required during peak hours of the construction phase exceed 50 trips per day, a full Traffic Impact Assessment shall be completed and approval be obtained from the relevant authorities prior to the commencement of the construction phase.

7 CONSTRUCTION PHASE ACTIVITIES

7.1 Method Statements

Method statements shall be produced and submitted by the Contactors to the Engineer, in consultation with the ECO, for approval at least five working days prior to the commencement of the activities. The Contractor shall not commence the activity until the Method Statement has been approved. Approval of method statements shall not unreasonably be withheld. The Engineer may approve, reject or approve with conditions any method statement.

The Engineer or ECO may request, on an *ad hoc* and reasonable basis, that a method statement be produced for any activity or component of the works which carries significant risk. Deviations from method statements must also be approved by the Engineer, in consultation with the ECO, prior to such deviations taking effect. Any environmental risks, arising from specific method statements or deviations from existing method statements, must be approved by the Engineer, in consultation with the ECO.

The following is a list of method statements likely to be required as a minimum and additional method statements may be requested by the Engineer or ECO:

- Vegetation clearing, topsoil stripping and topsoil handling;
- Handling and storage of hazardous substances i.e. fuel etc.;
- Earthworks plan;
- Concrete works;
- Emergency procedure plan;
- Solid waste management;
- Stormwater management;
- Traffic management;
- Site rehabilitation; and
- Site establishment plan (indicating laydown areas, workshop, fences, gates, storage areas, ablutions, site office, signage etc.).

7.2 Working Hours

The contractor must adhere to normal working hours, i.e. 08h00 – 17h00 during the week and 08h00 – 13h00 on Saturdays, as far as possible. Should the contractor wish to deviate from these hours then this needs to be discussed with the engineer and project team. If deviation from normal hours is to occur, then it must be captured in the relevant meeting minutes and method statements. Any proposed deviation from the working times must be communicated to the community before execution.

Construction during the night must be limited as far as possible.

7.3 Preparation for construction

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
Pre-construction audit	Construction activities will alter the baseline environment	**Objective:** Record the pre-construction state of the site. **Mechanism:** 1) The ECO and ESO shall undertake a pre-construction audit with photographic record of the condition of vegetation, watercourses and existing impacts within the construction footprint. This will be considered as the baseline for the project. The ECO and ESO must be agreement on the pre-construction state of environment.	Audit and photos documented	ECO ESO	Prior to any activity on the site	Site Engineer
Site walk-through	Construction activities could impact animal populations on the site	**Objective:** Minimise/Prevent disruption to animal populations on the site. **Mechanism:** 1) Prior to the establishment of the contractor's camp, a walk-through or drive about of the site should be undertaken to search for animal populations. Any animal populations encountered on this walk through should not be physically disturbed but should be encouraged to disperse naturally into the surrounding area. 2) In the event that any dangerous or injured animals are encountered, then the ECO should be contacted for further instruction.	No threatening contact with animals No animals harmed	Contractor	Prior to any activity on the site	Site Engineer
Location of construction camp	Placing and layout of construction camp could have excessive visual impacts	**Objective:** Prevent excessive visual impacts from the construction camp and associated activities. **Mechanism:** 1) The placing of construction camps and the site construction camp layout should be planned by the	No complaints from sensitive receptors (i.e. surrounding community)	Contractor	Prior to any activity on the site	Site Engineer

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
		Contractor, and agreed to by the Engineer in consultation with the ECO. The site plan should ensure that waste areas, storage areas and placement of ablution facilities are either screened or positioned in areas where it is less visible from human settlements and main roads (such as the R545 or the R547). 2) Nuisance and the visual impact associated with lighting should, as far as possible, not be focused on temporary structures and construction works. Where this is unavoidable, lighting should be as unobtrusive as possible and reflectors can be used to avoid light spillage.				
Demarcate the construction camp	Without properly demarcating the site, the surrounding vegetation might be impacted on through trampling, compaction of the soil etc. Windblown litter might also become problematic.	**Objective:** Prevent construction activities from impacting on surrounding vegetation. **Mechanism:** 1) The ECO and Engineer shall be advised of the area that the Contractor intends using for the Construction Camp. 2) The Construction Camp shall be fenced off in such a manner that unlawful entry is prevented. 3) Signage shall be placed at all access points in compliance with all applicable occupational health and safety requirements.	Temporary or permanent fencing in place	Contractor	Prior to commencement of site clearance	ECO, Site Engineer

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
Storing of equipment and materials	Storing materials incorrectly (improper housekeeping) can result in water and soil contamination, dust and/or erosion	**Objective:** Ensure that all materials and equipment stored do not cause environmental pollution or degradation. **Mechanism:** 1) The Site Engineer may be advised of the areas that the Contractor intends to use for the storing of materials. 2) All construction equipment must be stored within the construction camp in demarcated areas. 3) Materials should not be delivered to the site prematurely which could result in additional areas being cleared or affected. 4) Impervious surfaces must be provided where necessary, to avoid any leaching of contaminants into the ground.	No complaints from the public No contamination from spills	Contractor	During construction phase	Site Engineer ECO
Ablution facilities, recess area	Inadequate ablution facilities and recess areas can compromise the health of site staff and result in environmental degradation	**Objective:** To minimise the potential environmental impacts associated with an influx of site staff. **Mechanism:** 1) The contractor shall establish a sufficient recess area within the construction camp. 2) The recess area should include a food preparation area with adequate washing facilities and bins. 3) The Contractor and Engineer shall ensure that the recess area and ablution facilities are positioned so as to limit visual intrusion on neighbours or the greater environment. 4) A sufficient number of chemical toilets shall be provided by the Contractor in the construction camp area and at appropriate locations approved by the Engineer.	Adequate ablution facilities are in place	Contractor	During construction phase	ECO Site Engineer

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
		5) Ablutions should be available at all times and easily accessible to personnel. 6) The ratio of ablution facilities for workers should not be less than that required by the Construction Regulations of 2003 of the Occupational Health and Safety Act. 7) Ablutions should be regularly serviced by an approved service provided and records of servicing must be kept. All temporary/portable toilets shall be secured to the ground to prevent them from toppling due to wind or any other cause.				
Demarcating the site to be cleared	Without demarcating the area to be cleared of vegetation might result in unnecessary vegetation removal. The surrounding vegetation might also be impacted on through trampling, compaction of the soil and clearing etc.	**Objective:** To keep the area to be cleared of vegetation to a minimum and avoid unnecessary impacts to surrounding vegetation. **Mechanism:** 1) The site must be clearly demarcated with fencing or orange construction tape to keep clearing activities to a minimum.	Only the area required for construction is to be cleared	Contractor ESO	Prior to construction	ECO Site Engineer
Demarcation of "No-Go" areas (identified as sensitive	Without "No-Go" areas the free movement of site staff	**Objective:** Manage on site biophysical components to ensure ecological health as well as the safety of workers.	Comprehensive record, including photographic record, of	Contractor ESO	During construction phase	Site Engineer ECO

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
environments by the ecologist, Figure 4-1)	could result in impacts to the sensitive areas	**Mechanism:** 1) All areas outside of the designated construction footprint shall be declared a "No-Go" area. 2) No equipment shall be allowed outside the site and defined access routes, or within "No-Go" areas, unless expressly permitted by the Site Engineer. 3) The ESO and Site Engineer must establish a penalty system to manage any non-compliance. 4) The ECO and ESO must keep record of any non-compliance.	compliance available			
Topsoil stripping and stockpile management	Loss of topsoil required for rehabilitation could occur if not stripped and stockpiled	**Objective**: To manage topsoil stripping and stockpiling to reduce loss of topsoil and retain for rehabilitation. **Mechanism:** 1) To improve management, it is recommended that topsoil stripping be undertaken during dry season. 2) Areas to be cleared must have topsoil removed first which should be set aside and used for covering disturbed areas during restoration activities. Topsoil should be stockpiled with seedbanks intact as far as possible. 3) Strip and stockpile topsoil from all areas where construction will take place. 4) Topsoil (wherever it occurs) should be stripped to an approximate depth of 25 cm and stockpiled. 5) The topsoil stockpiles must be kept separate from any additional soil material that may also be stripped. Effective records of which stockpiles contain topsoil and which subsoil must be kept.	Topsoil stripped and retained Records of stockpiles kept	Contractor ESO	Commencement of construction phase	Site Engineer ECO

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
		6) Additional subsoil material that is of a suitable nature for use in rehabilitation, should also be stripped and stockpiled. 7) The soil map in Annexure B2 indicates the depth to which such material should be stripped in the different soil map units. The first number in the soil map unit label, after the two-letter soil form abbreviation, indicates the depth in decimetres, to which the subsoil can be stripped. Note that this is the total depth from surface, so it must take into account the (approximate) 25 cm of topsoil that has been stripped from above it. For example, soil map unit Cv 6-8 can be stripped to a total depth from surface of 6 decimetres (or 60 cm).				
Number of vehicle trips	Safety of road users may be negatively impacted	**Objective:** To minimise safety risks to road users associated with construction vehicles. **Mechanism:** 1) Confirm the number of daily trips during peak hours that would be required during the construction phase. 2) Should the number of daily trips required during peak hours exceed 50 trips, a Traffic Impact Assessment will be required, as well as approval from the appropriate authorities.	Report confirming number of daily trips required during peak hours	Contractor ESO	During construction phase	ECO Site Engineer

7.4 General construction activities

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
Changes to site demarcations	Impacts on heritage resources	**Objective:** To avoid unnecessary impacts to heritage resources as a result of change in site layout and demarcated areas. **Mechanism:** 1) Any changes to the existing layout of any of the proposed development footprints (i.e. site boundaries and associated infrastructure) will have to be surveyed by a suitably qualified heritage specialist.	A heritage specialist must survey any areas outside the original demarcations if the layout is changed.	Contractor ESO	During construction phase	Site Engineer ECO
Stockpile management	Loss of topsoil	**Objective:** Manage stockpiles to reduce loss of topsoil. **Mechanism:** 1) The topsoil stockpiles need to be protected against erosion, contamination and the establishment of alien vegetation. To protect against losses by water and wind erosion, they should be vegetated. Additional erosion control measures, such as the planting of Vetiver grass hedges may be required. 2) The topsoil stockpiles must be kept separate from any additional soil material that may also be stripped (eg sub-soil). Effective records of which stockpiles contain topsoil and which subsoil must be kept. 3) Topsoil stockpiles should be protected against losses by water and wind erosion, and should therefore be vegetated. 4) Topsoil shall be stored in areas demarcated by the ECO and Site Engineer and stockpiles shall be in compliance with legislated requirements. 5) After cessation of construction the topsoil must be used for rehabilitation.	No topsoil is contaminated Records are up to date setting out location of topsoil stockpiles	Contractor ESO	During construction phase	ECO Site Engineer

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
		6) Do not mix topsoil with sub-soil. 7) The stockpiled topsoil shall be used for rehabilitation purposes.				
Excavations	Excavations can result in impacts to heritage resources which are unknown	**Objective:** To avoid unnecessary impacts to heritage resources as a result of excavations. **Mechanism:** 1) If excavating fresh sedimentary bedrock, the proponent must employ a qualified palaeontologist to record and remove any fossils should any be found. 2) If excavating undisturbed sedimentary bedrock, the proponent must apply for a collection and destruction permit for all fossil material should they be encountered during the excavations.	No damage unknown heritage resources Necessary permits obtained	Contractor ESO	During construction	ECO Site Engineer
Storage and handling of materials	Incorrect storage and handling of materials poses a risk of environmental contamination and could jeopardise the safety of public/site staff	**Objective:** To ensure that materials are handled and stored in a manner that environmental contamination and safety hazards are limited. **Mechanism:** 1) Secure materials during transport. 2) Identify appropriate storage areas for stockpiling of materials, storage of hydrocarbons and storage of hazardous substances and ensure that these areas are appropriately prepared for their purpose. 3) Storage of materials must take into consideration the prevailing wind directions to reduce windblown dust. 4) Prevent and limit spillage of hazardous substances or substances with the potential to cause contamination of the environment.	Correct handling, use and storage of materials, including hazardous materials No incidents of environmental contamination No accidents or incidents related to the handling of materials No complaints from the public	Contractor ESO	During construction phase	ECO Site Engineer

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
		5) Develop emergency protocols for dealing with spillages particularly where these pose a pollution risk or involve hazardous substances. 6) All oil changes must take place within a designated area on an impervious surface such as a concrete slab. 7) The Contractor shall prevent the discharge of water contaminated with any pollutants, such as soaps, detergent, cements, concrete, lime, chemicals, glues, solvents, paints and fuels into the natural environment. 8) No washing of equipment and plant may take place on bare soil. A wash bay should be constructed with an impermeable floor and a sump to separate hydrocarbons from water. No grey water may be released from the sump into the environment. 9) Containers that contain toxic or harmful materials shall **not** be rinsed and re-used, and clearly marked. 10) Such containers shall not be stored or disposed on site. These containers can be deformed to prevent re-use, but must be disposed in accordance with the manufacturer's instructions or at a permitted hazardous waste disposal facility. 11) Proper storage facilities which are bunded for the storage of oils, paints, grease, fuels, chemicals, and any hazardous materials to be used must be provided to prevent the soil and groundwater contamination. 12) The wall of the bunded area can be of earth or concrete, and shall be designed to be liquid tight and to withstand a full hydrostatic head of water. The volumetric capacity of the bunded area will be a minimum of 110% of the volume of the largest tank. Should more than one tank				

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
		be enclosed in the bunded area, then the capacity should be calculated on the volume of all the tanks stored within the bunded area. 13) All fuel storage area must be roofed to avoid creation of dirty stormwater. 14) Refuelling shall only occur within the designated construction camp, at a designated area. 15) Storage areas containing hazardous substances / materials must be clearly sign posted. 16) Windblown litter, construction debris and spoil shall be collected daily and removed for disposal via the construction camp. 17) An integrated waste management approach in accordance with the Waste Management Hierarchy must be implemented on site. This should aim to avoid, reduce, reuse, recycle, recover and treat waste where possible, where disposal is the last resort. 18) Construction contractors must provide specific detailed waste management plans to deal with all waste streams. 19) Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap) and contaminated waste. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage and vermin control. 20) Where possible, construction and general waste on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation and storage of waste streams (such as wood, metals, general refuse				

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
		etc.). Supply waste collection bins at construction equipment and construction camps.				
Cement and concrete batching	The incorrect storage and handling of cement poses a risk of environmental contamination	**Objective:** To ensure that cement and concrete are handled and stored in a manner that environmental contamination is limited. **Mechanism:** 1) Concrete mixing must only take place within designated areas. 2) Cement powder has a high pH. Spillage of cement powder and concrete slurry can therefore affect both soil and water pH significantly. The Contractor shall take all reasonable measures to prevent the spillage of cement/ concrete during batching and construction operations. No batching shall occur directly on unprotected ground. 3) Spilled cement or concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site. Appropriate investigations must be done to confirm complete clean-up of soil and that remaining soil is not contaminated. 4) All wastewater resulting from batching of concrete shall be taken back to the construction camp and disposed of appropriately. 5) Empty cement bags, and other litter, shall not be permitted to be blown around the site, and must be disposed of at an authorised landfill site. 6) Where "readymix" concrete is used, the Contractor shall ensure that the delivery vehicles do not wash their chutes on site and allow grey water to flow on bare soil. Any spillage resulting from "readymix" delivery shall be immediately cleared and disposed of via the solid waste	Correct handling, use and storage of cement to concrete. No incidents of environmental contamination. No accidents or incidents related to the handling of cement or concrete. No public complaints.	Contractor monitored by the ECO	During construction phase	ECO, Engineer, Contractor.

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
		management system. Readymix trucks shall not be permitted to dump drum wash on site, unless into a contaminated water pond within the construction camp, which must be fully rehabilitated at completion and the sediment collected for disposal.				
Removal of vegetation; and earthworks	Removal of vegetation and excavations exposes the soil, reduces infiltration and changes the hydrology so that stormwater run-off is intensified	**Objective:** To prevent erosion as a result of activities and control associated stormwater run-off. **Mechanism:** 1) Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise exposure impacts when rainfall or wind occur. 2) The spread of alien invasive plant species should be limited 3) Disturbed areas, runoff and erosion shall be monitored on an on-going basis. 7) Where required (such as areas where water may accumulate), implement an effective system of stormwater run-off control using berms (raised, low walls of soil) and ditches. 8) The system must effectively collect and safely disseminate any run-off water from all hardened surfaces and must prevent any potential down slope erosion. 9) Site inspection must assess the effectiveness of the run-off control system and specifically record the occurrence (or not) of any erosion on site or downstream.	No evidence of erosion on site or downstream.	Contractor ESO	During construction phase	ECO Site Engineer
Dust from removal of vegetation	Removal of vegetation exposes topsoil	**Objective:** To avoid unnecessary dust pollution from removal of vegetation and associated windblown emissions.	No complaints from the public	Contractor ESO	During construction phase	ECO Site Engineer

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
	increasing the chance of dust emissions	**Mechanism:** 1) Implement wet suppression where feasible on stockpiles and materials handling activities. 2) Minimise the extent of disturbed areas. 3) Reduce frequency of disturbance. 4) Ensure early revegetation. 5) The spread of alien invasive plant species should be limited. 6) Undertake stabilisation of disturbed soil (chemical, rock cladding or vegetation)				
Materials storage, handling and transfer operations	Handling of materials has the potential to create dust emissions	**Objective:** To reduce dust pollution from materials storage, handling and transfer operations. **Mechanism:** 1) As far as possible, stockpile dusty materials away from areas where dust will be a nuisance or hazard. 2) Ensure that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. 3) Limit earthworks in sandy areas during windy conditions (i.e. winds above 40km/h). 4) Dust generation must be visually monitored on a daily basis and control measures must be implemented when excessive dust generation occurs. 5) Control dust as per standard construction site measures which may include damping down with water or other appropriate and effective dust control measures. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site. 6) Windblown dust during construction should be monitored by the ESO. Should excessive dust be	Visual evidence of windblown dust No complaints from the public	Contractor ESO	During construction phase	ECO, Site Engineer

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
		generated from the movement of vehicles on the roads such that the dust becomes visible to the immediate surrounds, dust-retardant measures should be implemented under authorisation of the ECO.				
Safety risks associated with pipeline construction	Pipeline construction involves trenching which has the potential for safety risks	**Objective:** To minimise safety risks associated with pipeline construction that involves trenching. **Mechanism:** 1) Trenching for pipeline construction must ideally only commence once all the required construction material is available in order to minimise the duration of open trenches for safety purposes. 2) The alignment of the pipeline must be marked prior to commencement of trenching. 3) Diggings must ideally be placed on one side of the trench or temporarily be stored at the designated stockpile site. 4) Trenches must be clearly demarcated and fenced to prohibit any unauthorised entry. The trenches must also be monitored regularly. 5) Trenches must have ramps inside to exit the trench should someone fall in or struggle to exit the trench. 6) Trenches must be stepped as indicated by the engineer and according to safety standards.	No accidents reported by contractor staff or the public	Contractor ESO	During construction phase	ECO Site Engineer
Fire prevention	Fires are a risk to safety and can result in the damage or loss of property	**Objective:** To reduce the risk to contractor staff and public, and damage or loss of property as a result of fires. **Mechanism:** 1) No fires may be lit on site. Any fires that occur shall be reported to the Engineer immediately. 2) A demarcated smoking area shall be identified. Smoking shall not be permitted in those areas where it is a fire	No fire incidents reported	Contractor ESO	During construction phase	ECO Site Engineer

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
		hazard. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to make liable the rapid spread of an initial flame. 3) In terms of the Atmospheric Pollution Prevention Act (No. 45 of 1965), burning is not permitted as a disposal method. 4) The Contractor shall ensure that there is basic fire-fighting equipment available on site at all times. 5) The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it. The Contractor shall ensure that his employees are aware of the procedure to be followed in the event of a fire. The Contractor shall provide adequate fire protection measures at each work area and the site establishment area to deal with the type and nature of fire that may arise.				
Noise management	To reduce the impact of noise disturbances on noise sensitive receptors	**Objective:** To reduce the risk of noise pollution to contractor, staff and public. **Mechanism:** 1) Construction site yards and other noisy fixed facilities shall be located well away from noise sensitive areas adjacent to the development sites (see **Figure 4-2**). 2) All construction vehicles and equipment are to be kept in good repair. 3) Where possible, stationary noisy equipment (for example compressors, pumps, pneumatic breakers,) shall be encapsulated in acoustic covers, screens or sheds. Proper sound insulation can reduce noise by up to 20dBA. Portable acoustic shields should be used in the	No noise complaints	Contractor ESO	During construction phase	ECO Site Engineer

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
		case where noisy equipment is not stationary (for example drills, angle grinders, chipping hammers, poker vibrators). 4) Construction activities, and particularly the noisy ones, are to be contained to reasonable hours during the day and early evening. 5) With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas (**Figure 4-2**), the power station shall liaise with local residents on how best to minimise the impact. 6) Machines in intermittent use shall be shut down in the intervening periods between work or throttled down to a minimum. 7) In general, operations shall meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993). 8) Construction staff working in areas where the 8-hour ambient noise levels exceed 75dBA shall wear ear protection equipment.				

7.5 Rehabilitation

The following rehabilitation activities shall be applied in conjunction with the requirements of Section 6 of the Kriel Power Station's Operations and Maintenance Manual.

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
Removal of construction equipment, waste and materials	Rehabilitation is only possible once the site is cleared of construction equipment , waste and materials	**Objective:** To remove any unnecessary equipment, waste and materials. **Mechanism:** 1) Upon completion of construction activities, all areas that are no longer required during the operational phase must be cleared prior to rehabilitation. 2) The area must be cleared of all excess construction materials. All contaminated soil and waste should be disposed of at a registered hazardous waste site. Proof of such disposal must be kept on file by the Project Manager. 3) The site must be cleared of litter and all general waste should be disposed of at a registered municipal landfill site.	No remaining construction equipment, materials or waste	Contractor ESO	Before operation phase	ECO Site Engineer
Landscaping and revegetation	Without revegetation, disturbed areas will be prone to erosion and will result in a lasting visual impact	**Objective:** To rehabilitate the disturbed areas to reduce visual impact and protect against erosion. **Mechanism:** 1) The area to be rehabilitated shall first be landscaped to match the topography of the surrounding area as it was prior to construction, or as necessary and deemed acceptable, where practically possible. 2) Compacted areas, such as roads, stockpile areas and construction platforms shall be ripped or scarified to a depth of ~300mm. 3) The topsoil that was stockpiled during the construction phase is to be used as topsoil cover during the rehabilitation process. 4) All cut and fill slopes and areas affected by construction work should be progressively topsoiled and re-vegetated as soon as possible.	No remaining excavated holes or trenches 80% basal cover of vegetation has been attained	Contractor ESO	During construction phase before operation phase	ECO Site Engineer

ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	SCHEDULE	VERIFICATION
		5) The surface of all areas must be covered with a depth of approximately 25 cm of topsoil. Stockpiled subsoil must only be used as fill and additional soil depth, underneath the topsoil, not at the surface. 6) Cut and fill slopes should mimic the shapes and angles found in the adjacent area. 7) Suitable tree species may be planted in front of the proposed ash dam embankment in order to soften the ash dam's linear profile, where necessary. 8) Reasonable measures should be taken to prevent soil erosion of the rehabilitated areas. 9) The spread of alien invasive plant species should be limited.				

8 OPERATIONAL PHASE ACTIVITIES

An Operations and Maintenance Manual currently exists for the existing Kriel Power Station and Ash Dams. This Manual should be updated to include the infrastructure associated with the proposed new ash dams, if approved. The following operational mitigation measures have been stipulated in the Specialist Assessments and are to be included in the Operations and Maintenance Manual. This section of the EMPr may be transferred to the station's Environmental Management System (ISO 14001 EMS).

8.1 Ecology

Appropriate stormwater control shall be implemented, i.e. installation of attenuation dams and cut-off drains should be put in place.

8.2 Air Quality

Control measures shall be implemented throughout the life of the operations at the proposed ash dams and dust management planning and monitoring shall be undertaken as described in Section 9.

8.3 Geohydrology

1. Monitor water quality at sampling points.
2. Assess the groundwater water quality inside, upstream and downstream.
3. Audit the suitability of monitoring network annually (groundwater monitoring).
4. Maintain the groundwater water monitoring network.
5. Address the concerns and complaints of affected parties regarding the ground water issues.
6. All remedial action should be done in close liaison with the Department of Water and Sanitation.
7. Ensure that all surface water and storm water related EMP's are adhered to.

8.4 Traffic

The drivers of all heavy vehicles shall be required to attend a specialised road safety and driving course that sensitises them to the impact that they have on driving conditions for other vehicles on these roads. Due consideration shall also be given to road safety with regards to the current road network.

8.5 Visual

Where possible trees should be planted around ancillary structures which will be visible from human settlements and main roads (such as the R545 and R547). When vegetation is cleared for servitudes and roads, the edges of the cleared vegetation (not the road edge) should preferably be irregular rather than straight and sharp.

8.6 Noise

At commissioning of the scheme, the noise footprint of each discrete element should be established by measurement in accordance with the relevant standards, namely SANS ISO 8297:1994 and SANS 10103. The character of the noise (qualitative aspect) should also be checked to ascertain whether there is any nuisance factor associated with the operations. Where possible, very noisy activities should not take place at night (between the hours of 20h00 to 06h00).

All plant, equipment and vehicles are to be kept in good repair.

9 DUST MANAGEMENT PLAN

An air quality impact assessment was conducted for the proposed project operations. The main objective of this study was to determine the significance of the predicted impacts from the proposed operations on the surrounding environment and on human health. Note that this section has been copied from the Air Quality Impact Assessment (Airshed Planning Professionals, 2017).

9.1 Site Specific Management Objectives

The main objective of Air Quality Management measures is to ensure that all operations are within ambient air quality criteria. In order to define site specific management objectives, the main sources of pollution needed to be identified. Sources can be ranked based on source strengths (emissions) and impacts. Once the main sources have been identified, target control efficiencies for each source can be defined to ensure acceptable cumulative ground level concentrations.

Particulates have been identified as the main pollutant of concern from the project operations. The ranking of sources serves to confirm or, where necessary revise, the current understanding of the significance of specific sources, and to evaluate the emission reduction potentials required for each. Sources of emissions for the proposed project may be ranked based on:

- Emissions - based on the comprehensive emissions inventory established for the operations, and,
- Impacts - based on the predicted dustfall levels and ambient inhalable and respirable particulate concentrations.

The ranking of sources serves to confirm or, where necessary revise, the current understanding of the significance of specific sources. The main source of emission and impact due to the Kriel ash facility extension is due to windblown dust from the ash facility.

9.2 Project-specific Management Measures

Air quality management measures should be implemented to ensure the lowest possible impacts on the surrounding environment from proposed operations. This can be achieved through a combination of mitigation measures and ambient monitoring.

A potentially significant impacting source may be wind erosion from the ash facility during periods of high winds (>9m/s). It is recommended that the sidewalls of the ash facility be vegetated. The vegetation cover should be such to ensure at least 80% control efficiency. The top surface area should have 40% wet beach area (if feasible and if wet deposition option is considered) and a water spraying system should be implemented on the surface of the ash facility covering the outer perimeter of the facility, spraying water when winds exceed 4 m/s.

9.3 Performance Indicators

9.3.1 Specification of Source Based Performance Indicators

Source based performance indicators for proposed routine operations would include the following:

- Dustfall immediately downwind of the proposed ash facility to be <1200 mg/m²/day and dustfall at sensitive receptors to be <600 mg/m²/day.
- The absence of visible dust plume at the proposed ash facility.

9.3.2 Receptor based Performance Indicators

A dust fallout network provides management with an indication of what the increase in fugitive dust levels are. In addition, a dust fallout network can serve to meet various objectives, such as:

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

The proposed dust fallout monitoring network is shown in **Figure 9-1**, but the station may optimise this network for efficient collection of monitoring data. The dust fallout network shall be established prior to operations. The measured data shall be used in assessing the baseline dust fallout levels. Once operations commence the dust fallout levels at these locations will provide an indication of the activities contribution to the overall measured dust fallout levels.

Dust bucket placements shall be as follows (**Figure 9-1**):

- Bucket 1 – placed south of the ash facility operations and will be useful in measuring the impact from this windblown dust sources;
- Bucket 2 – placed upwind of the ash facility operations;
- Bucket 3 – placed at the hostels just north of the ash facility operations; and
- Bucket 4 – placed at the closest sensitive receptor of Kriel.

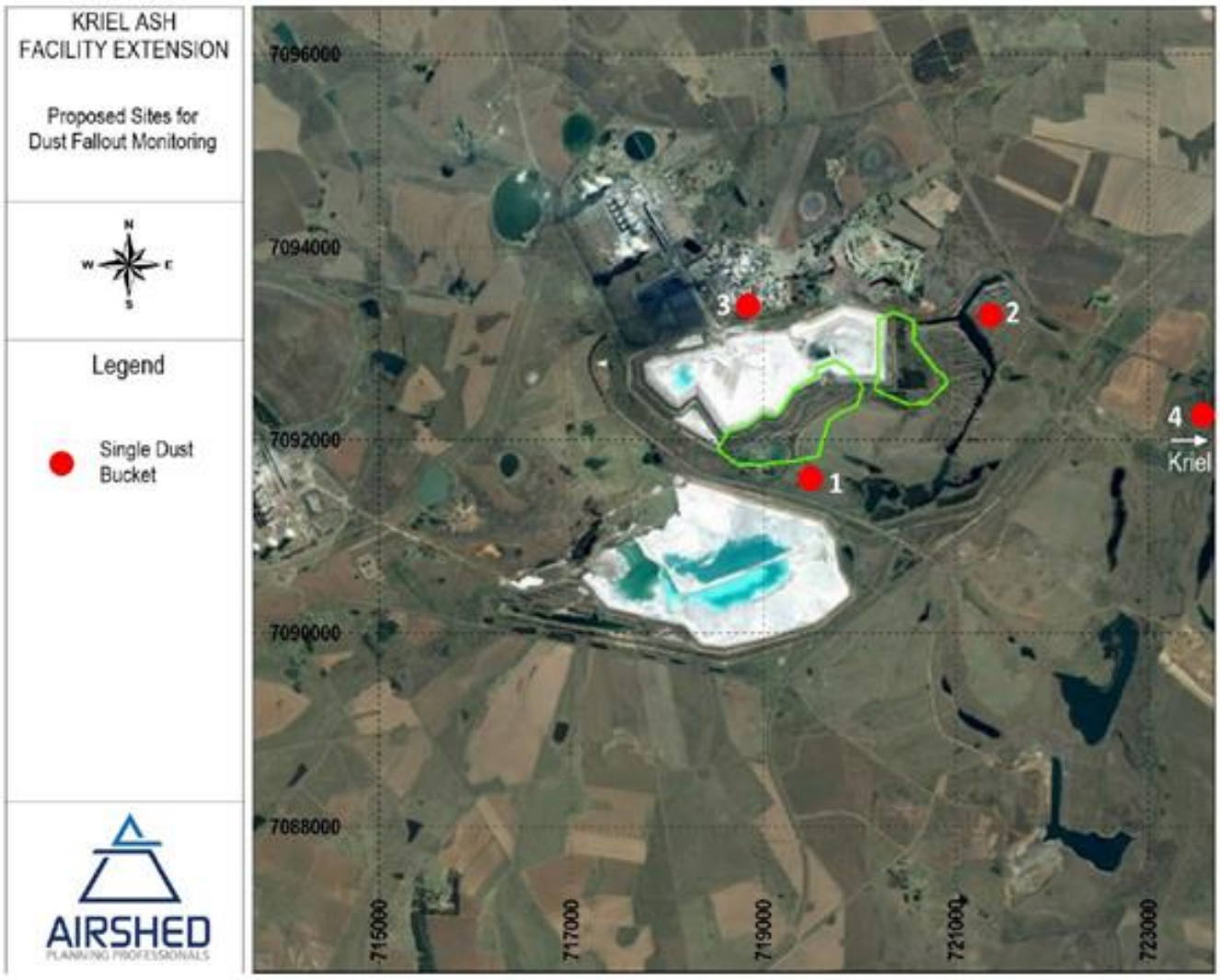


Figure 9-1 | The proposed location of fallout buckets (Airshed Planning Professionals. 2017).

The recommended performance assessment and reporting programme for dustfall monitoring is given in **Table 9-1**.

Table 9-1 | Specialist mitigation measures during planning / design, construction, operation and decommissioning

Monitoring Strategy Criteria	Dustfall Monitoring
Monitoring objectives	• Assessment of compliance with dustfall limits within the main impact zone of the operation. • Facilitate the measurement of progress against environmental targets within the main impact zone of the operation. • Temporal trend analysis to determine the potential for nuisance impacts within the main impact zone of the operation. • Tracking of progress due to pollution control measure implementation within the main impact zone of the operation. • Present to the public the extent of localised dust nuisance impacts occurring in the vicinity of the mine operations by means of the proposed community liaison forum (see Section 9.4.2).
Monitoring location(s)	• As proposed in **Figure 9.1** (this may be optimised by the station)
Sampling techniques	**Single Bucket Dust Fallout Monitors** • Dust fallout sampling measures the fallout of windblown settle able dust. Single bucket fallout monitors to be deployed following the American Society for Testing and Materials standard method for collection and analysis of dustfall (ASTM D1739). This method employs a simple device consisting of a cylindrical container exposed for one calendar month (30 days, ±2 days). If this methodology is different from the one used by the Kriel Power Station, the station may continue using the current system as long as it is compliant with the applicable specifications of the National Dust Control Regulations (GN R827 of 2013).
Accuracy of sampling technique	• Margin of accuracy given as ±200 mg/m2/day.
Sampling frequency and duration	• On-going, continuous monitoring to be implemented facilitating data collection over 1-month averaging period. If this methodology is different from the one used by the Kriel Power Station, the station may continue using the current system as long as it is compliant with the applicable specifications of the National Dust Control Regulations (GN R827 of 2013).
Commitment to QA/QC protocol	• Comprehensive QA/QC protocol implemented.
Interim environmental targets (i.e. receptor-based performance indicator)	• Maximum total daily dustfall (calculated from total monthly dustfall) of not greater than 600 mg/m2/day for residential areas. Maximum total daily dustfall to be less than 1 200 mg/m2/day on-site (non-residential areas).
Frequency of reviewing environmental targets	• Annually or as required by the National Dust Control Regulations (GN R827 of 2013).
Action to be taken if targets are not met	• Source contribution quantification. • Review of current control measures for significant sources (implementation of contingency measures where applicable).
Procedure to be followed in reviewing environmental targets and other elements of the monitoring strategy (e.g. sampling technique, duration, procedure)	• Procedure to be drafted in liaison with I&APs through the proposed community liaison forum. Points to be taken into account will include, for example: i. trends in local and international ambient particulate guidelines and standards and/or compliance monitoring requirements, ii. best practice with regard to monitoring methods, iii. current trends in local air quality, i.e. is there an improvement or deterioration, iv. future development plans within the airshed (etc.)
Progress reporting	• At least annually to the necessary authorities and community forum.

9.4 Record-keeping, Environmental Reporting and Community Liaison

9.4.1 Periodic Inspections and Audits

Periodic inspections and external audits are essential for progress measurement, evaluation and reporting purposes. It is recommended that site inspections and progress reporting be undertaken at regular intervals (at least quarterly) during rehabilitation, with annual environmental audits being conducted. Annual environmental audits should be continued at least until closure. Results from site inspections and monitoring efforts should be combined to determine progress against source- and receptor-based performance indicators. Progress should be reported to all interested and affected parties, including authorities and persons affected by pollution.

The criteria to be taken into account in the inspections and audits must be made transparent by way of minimum requirement checklists included in the Environmental Management Plan.

Corrective action or the implementation of contingency measures must be proposed to the stakeholder forum in the event that progress towards targets is indicated by the quarterly/annual reviews to be unsatisfactory.

9.4.2 Liaison Strategy for Communication with Interested and Affected Parties (I&APs)

Stakeholder forums provide possibly the most effective mechanisms for information dissemination and consultation. The updated Operations and Maintenance Manual shall stipulate specific intervals at which forums will be held, and provide information on how people will be notified of such meetings. For operations for which un-rehabilitated or party rehabilitated impoundments are located in close proximity (within 3 km) from residential areas, it is recommended that such meetings be scheduled and held at defined reasonable frequency. The station's stakeholder communication processes may be used, if available and optimal, and their frequency may be followed.

9.4.3 Financial Provision (Budget)

The budget shall provide a clear indication of the capital and annual maintenance costs associated with dust control measures and dust monitoring plans. It may be necessary to make assumptions about the duration of aftercare prior to obtaining closure. This assumption must be made explicit so that the financial plan can be assessed within this framework. Costs related to inspections, audits, environmental reporting and I&AP liaison shall also be indicated where applicable. Provision shall also be made for capital and running costs associated with dust control contingency measures and for security measures.

10 MONITORING

10.1 Construction Phase Environmental Monitoring

Environmental monitoring of the construction phase must be done by the ECO, with support of a photographic record. The ECO must also monitor compliance with the conditions of the EMPr and EA and report on this in the required audit reports (see section 12 below). Rehabilitation activities must also be monitored by the ECO.

It is recommended that the ECO conduct monthly ECO inspections during the construction phase and submit monthly Environmental Control Reports – please note that this is a recommendation and can be changed (depending on conditions of EA). The ECO, in consultation with the site engineer, may change the frequency of ECO inspections, but appropriate approval processes shall be undertaken if necessary and if the frequency is to be reduced to less than required in terms of the EA.

The ECO must submit environmental control reports to the environmental authority, proponent, site engineer, contractor, health and safety officer and any other party who may be relevant.

10.2 Ongoing groundwater monitoring

A groundwater monitoring network has been developed incorporating boreholes identified during the hydrocensus and all newly drilled boreholes. The boreholes to be incorporated into the monitoring network are listed in **Table 10-1** and coordinates of the boreholes listed in **Table 10-2**. It is important to note that a groundwater-monitoring network should be dynamic. This means that the network may be amended to ensure it achieves the objective and should be extended over time to accommodate any migration of contaminants through the aquifer as well as the expansion of infrastructure and/or addition of possible pollution sources.

Table 10-1 | Proposed monitoring boreholes

BH nr.	Pit 1 Area	BH nr.	Ashing Area
KB12S	East of Pit 1 edge of spoils next to the gravel road	KB05D	Between the existing ash disposal facility and AWR Dams
KB67	East of Pit 1 edge of spoils next to the gravel road	KB05S	Between the existing ash disposal facility and AWR Dams
KB68	East of Pit 1 edge of spoils next to the gravel road	KB06D	Next to the entrance of the Ash Office
KB16	South of Pit 1 near haulage road	KB06S	Next to the entrance of the Ash Office
KB18D	East of Pit 1 between spoils and Onverwacht Spruit	KB63	Southeast of the existing ash disposal facility
KB18S	East of Pit 1 between spoils and Onverwacht Spruit	KB64	Southeast of the existing ash disposal facility
KB19	Between Cut1 and Cut2 inside spoils	KB08D	Southern side of Ash Dam Extension
KB20	Between Cut1 and Cut2 inside spoils	KB08S	Southern side of Ash Dam Extension
KB28	West of Pit 1 between Pit 1 and RWD	KB61	Eastern side of Ash Dam Extension
KB29	East of Pit 1 between spoils and Onverwacht Spruit	KB62	Eastern side of Ash Dam Extension
KB30	South of Pit 1 near haulage road	KB10D	Next to dam KP16 in game reserve
KB69	East of Cut2 on edge of spoils	KB10S	Next to dam KP16 in game reserve
KB70	East of Cut2 on edge of spoils	KB65	South west of the existing ash disposal facility
KB38	East of Cut2 inside spoils	KB35	South of the existing ash disposal facility
KB39	South of Cut 2 next to the spoils		
KB40	East of Cut2 inside spoils		

BH nr.	Pit 1 Area	BH nr.	Ashing Area
KB41	Into Cut 1 filled with ash		
KB42	West of Cut 1 inside spoils		

Table 10-2 | Coordinates (WGS84) of the proposed monitoring boreholes

BH nr	Longitude (Decimal degrees)	Latitude (Decimal degrees)	BH nr	Longitude (Decimal degrees)	Latitude (Decimal degrees)
KB05	29.19194	-26.27582	KB39	29.21365	-26.28114
KB06	29.19116	-26.27917	KB40	29.21660	-26.27187
KB08	29.20328	-26.27138	KB41	29.20475	-26.27570
KB10	29.19810	-26.26208	KB42	29.20257	-26.27410
KB12	29.21666	-26.27690	KB61	29.18590	-26.26384
KB16	29.20299	-26.28380	KB62	29.20543	-26.26930
KB18	29.22175	-26.27352	KB63	29.20545	-26.29340
KB19	29.20675	-26.27628	KB64	29.19613	-26.27287
KB20	29.20997	-26.27573	KB65	29.18045	-26.27332
KB28	29.19406	-26.27962	KB67	29.18733	-26.25520
KB29	29.22226	-26.27321	KB68	29.21942	-26.27591
KB30	29.20042	-26.28287	KB69	29.21640	-26.27787
KB35	29.18413	-26.27602	KB70	29.21643	-26.27791
KB38	29.21797	-26.27522			

Water samples must be taken from all the monitoring boreholes by using approved sampling techniques and adhering to recognised sampling procedures. Samples should be analysed for both organic as well as inorganic pollutants, as vehicle activities often lead to hydrocarbon spills in the form of diesel and oil. These results should be recorded on a data sheet. It is proposed that the data should be entered into an appropriate database and reported annually to, or as required by, the DWS.

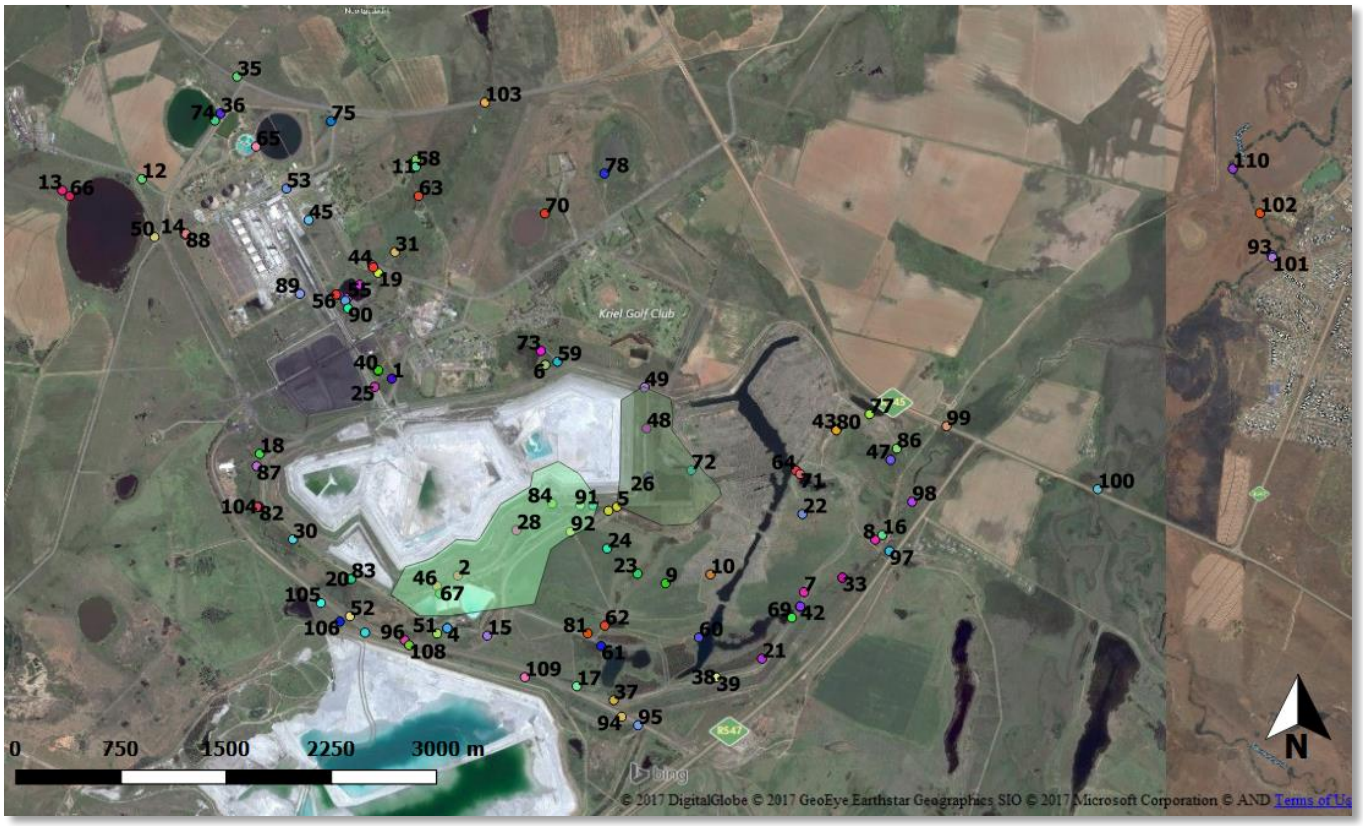


Figure 10-1 | Existing monitoring boreholes around the Kriel Ash Disposal Facility.

The table below presents the parameters and frequency that should form part of the groundwater monitoring programme. Note that these may need to be changed based on the conditions of the EA.

Table 10-3 | Monitoring requirements.

Class	Parameter	Frequency	Motivation
Physical	Static groundwater levels	Monthly	Time dependant data is required for transient calibration of numerical flow models. Changes in static water levels may give early warning of dewatering in the area.
	Rainfall	Daily	Recharge to the saturated zone is an important parameter in assessing groundwater vulnerability. Time dependant data is required for transient calibration of numerical flow models.
	Groundwater abstraction rates if present	Monthly	Response of groundwater levels to abstraction rates can be used to calculate aquifer storativity – important for groundwater management.
Chemical	Major chemical parameters: • Ca, Mg, Na, K, NO3, SO4, Cl, Fe, Alkalinity, pH, EC • TPH (Total Petroleum Hydrocarbons)	Quarterly	Background information is crucial to assess impacts during operation and thereafter. Changes in chemical composition may indicate areas of groundwater contamination and be used as an early warning system to implement management/remedial actions. Legal requirement. Groundwater chemistry forms an integral part of the development of conceptual models.
	Minor chemical constituents Full scan of trace metals	Quarterly	Changes in chemical composition may indicate areas of groundwater contamination and be used as an early warning system to implement management/remedial actions.

Class	Parameter	Frequency	Motivation
			Legal requirement.
	Other Stable isotopes	Ad hoc basis	The monitoring program should allow for research and refinement of the conceptual geohydrological model. This may, from time to time, require special analyses like stable isotopes.

11 ENVIRONMENTAL AUDITS

The holder of the EA must ensure compliance with the conditions of the EA and EMPr and appoint a suitably qualified external person/EAP to conduct environmental audits.The external environmental audit must:

- Be compiled by an independent suitably qualified practitioner;
- Must provide recommendations for environmental improvement where required;
- Findings must be measured against the conditions and requirements of the EA and EMPr;
- It is recommended that the following external environmental audit reports be submitted to the competent authority:
    i. Post construction audit inspection and report – upon project completion meeting.
    ii. Post rehabilitation audit inspection and report – upon completion of rehabilitation activities.
    iii. 3 Months post-rehabilitation audit inspection and report – 3 months after rehabilitation activities have been completed to monitor possible erosion and provide mitigation measures where required.
    iv. Lastly, it is recommended that an annual environmental audit inspection and report be completed for the Kriel ash disposal facility in order to ensure adequate environmental management of the facility and compliance with the relevant environmental authorisations.

These audit reports must be compliant with the requirements contained in GN R.982 (as amended) as shown in **Annexure C**.

12 IMPORTANT CONTACTS

Authority / Entity	Contact Number
Kriel Power Station Emergency Services	
Emergency Services (Control Room)	017 615 2555
Proto Team	017 615 2555
Clinic/ Doctor/ Ambulance	017 615 2368
External Emergency Services	
SAPS (South African Police Service)	10111 / 017 648 2252 / 017 648 2266 / 017 648 2267
Fire Department	013 690 6222
Ambulance	082 124
Kriel Clinic	017 648 6203
Municipal Emergencies	013 690 6222/333/444
Authorities	
Department of Environmental Affairs	086 111 2468 (call centre)
South African Heritage Resources Agency (SAHRA)	021 462 4502
Emalahleni Local Municipality	013 690 6911
Emalahleni Local Municipality (Kriel)	017 648 6200
Other	
Kriel Power Station: Environmental Management	Mr Khuliso Rasimphi Tel : 017 615 2634/076 250 2002 / E-mail: khuliso.rasimphi@eskom.co.za
Site Engineer	TBC
Contractor	TBC
Environmental Site Officer (ESO)	TBC
Environmental Control Officer (ECO)	TBC

13 REFERENCES

13.1 General references

Airshed Planning Professionals. 2017. Air Quality Impact Assessment for the Proposed Expansion of the Ash Disposal Facility at the Kriel Power Station. Report No.: 16AUR04.

Aurecon South Africa. 2010. Baseline Geohydrology for the EIA – Kriel Ash Dam Extension. Report No.: 105719-V1.1-2010.

Buchan, I.F., Baars, L.F. and Northcote, C.S. 1980. Opencast coal mining at Kriel Colliery. Journal of the South African Institute of Mining and Metallurgy.

DEA&DP. 2009. Draft Guideline on Alternatives, NEMA EIA Regulations Guideline and Information Document Series. Western Cape Department of Environmental Affairs& Development Planning. Unpublished.

DEA&DP. 2009. Draft Guideline on Public Participation, NEMA EIA Regulations Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning. Unpublished.

DEA&DP. 2009. Draft Guideline on Need and Desirability, NEMA EIA Regulations Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning. Unpublished.

DEA&DP. 2010. Guideline on Alternatives, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning (DEA&DP), Cape Town.

DEAT. 2002. Integrated Environmental Information Management, Information Series 2: Scoping. DEAT, Pretoria.

DEAT. 2002. Integrated Environmental Information Management, Information Series 3: Stakeholder Engagement. DEAT, Pretoria.

DEAT. 2002. Integrated Environmental Information Management, Information Series 4: Specialist Studies. DEAT, Pretoria.

DEAT. 2004. Integrated Environmental Management, Information Series 11: Criteria for determining Alternatives in EIA.DEAT, Pretoria.

DEAT. 2004. Integrated Environmental Information Management, Information Series 12: Environmental Management Plans. DEAT, Pretoria.

DEAT. 2005. Integrated Environmental Management Guideline Series, Guideline 3: General Guide to the Environmental Impact Assessment Regulations. Unpublished.

DEAT. 2005. Integrated Environmental Management Guideline Series, Guideline 4: Public Participation, in support of the EIA Regulations. Unpublished.

DEAT. 2007. Integrated Environmental Management Guideline Series, Guideline 7: Detailed Guide to Implementation of the Environmental Impact Assessment Regulations. Unpublished.

Emalahleni LM. 2009. Emalahleni Local Municipality Integrated Development Plan for 2009/10.

Emalahleni LM. 2009. Emalahleni Local Municipality Spatial Development Framework.

Eskom, Primary Energy Division: Water. 2010. Kriel Power Station Integrated Water Use Licence Application.

Eskom. 2016. Annual Waste Report 2015-2016. Kriel Power Station. Reporting period April 2015 – March 2016

Eskom. 2016 (A). Kriel Power Station Operations and Maintenance Manual. ECsoft (Pty) Ltd

Ferrar A.A. and Lötter, M.C. 2007. Mpumalanga Biodiversity Conservation Plan Handbook. Mpumalanga Tourism & Parks Agency, Nelspruit.

Jones and Wagener Consulting Civil Engineers. 2004. Kriel Power Station: Ash Dam 4 Interim Geotechnical Report.

Jones and Wagener Consulting Civil Engineers. 2006. Kriel Power Station: Ash Dam Feasibility Investigation.

Jones and Wagener Consulting Civil Engineers. 2010. Kriel Ash Dam Environmental Impact assessment: Site Selection Inputs. Report No.: JW71/10/A407 – Rev B.

Jones and Wagener Consulting Civil Engineers. 2016. Kriel Power Station Ash Dam 4 - Site 10 Concept Design Update. Report No.: JW164/13/D379 – Rev 0

Jones and Wagener Consulting Civil Engineers. 2016. Kriel Power Station Ash Dam 4 - Site 10 Concept Design Update. Report No.: JW044/16/E821 – Rev 0

Jongens Keet Associates. 2017. Noise Impact Assessment for the Planned Kriel Power Station Ash Disposal Facility. First Draft. Report No.: JKA740r003

Mucina, L. and Rutherford, M.C. (eds). 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Nkangala District Municipality. 2009. IDP 2009/10

Professional Grave Solutions. 2010. Heritage Desktop Study on Three Possible Sites for the Proposed Ash Dam Facility at the Kriel Power Station. Report No.: AUR-KAD-HDS-1.

Roschcon (Pty) Ltd. 2008. Kriel Power Station: Ash Dam Complex Remaining and Extended Capacity of Ash Dams.

Scherman Colloty & Associates cc. 2010. Eskom Kriel Power Station Aquatic and Terrestrial Ecological Assessment: Desktop Site Description. Draft Report V2.

Strydom, H.A. and King, N.D. (eds.). 2009. Environmental Management in South Africa (2nd Edition). Juta, Cape Town.

Zitholele Consulting. 2016. Motivation for the application for exemption of waste management activity licences for specific uses of pulverised coal fired boiler ash in terms of GN R.634. Doc Ref. No. 16005-41-Rep-001-Eskom Ash GN R 634 Applcation-Rev2

13.2 Electronic resources

Eskom - Kriel Power Station: http://www.eskom.co.za/live/content.php?Item_ID=177 (accessed 16/03/2010)

Mpumalanga Provincial Government Department of Agriculture and Land Administration (DALA): http://www.mpu.agric.za/Web/index.htm (accessed 21/04/2010)

South African National Botanical Institute BGIS: http://bgis.sanbi.org/index.asp?screenwidth=1280 (accessed 21/04/2010)

http://www.thefreedictionary.com/supernatant(accessed in November 2010)

http://www.steinmuller.co.za/index.php/sm/company/company_history(accessed in November 2010)

Annexure A

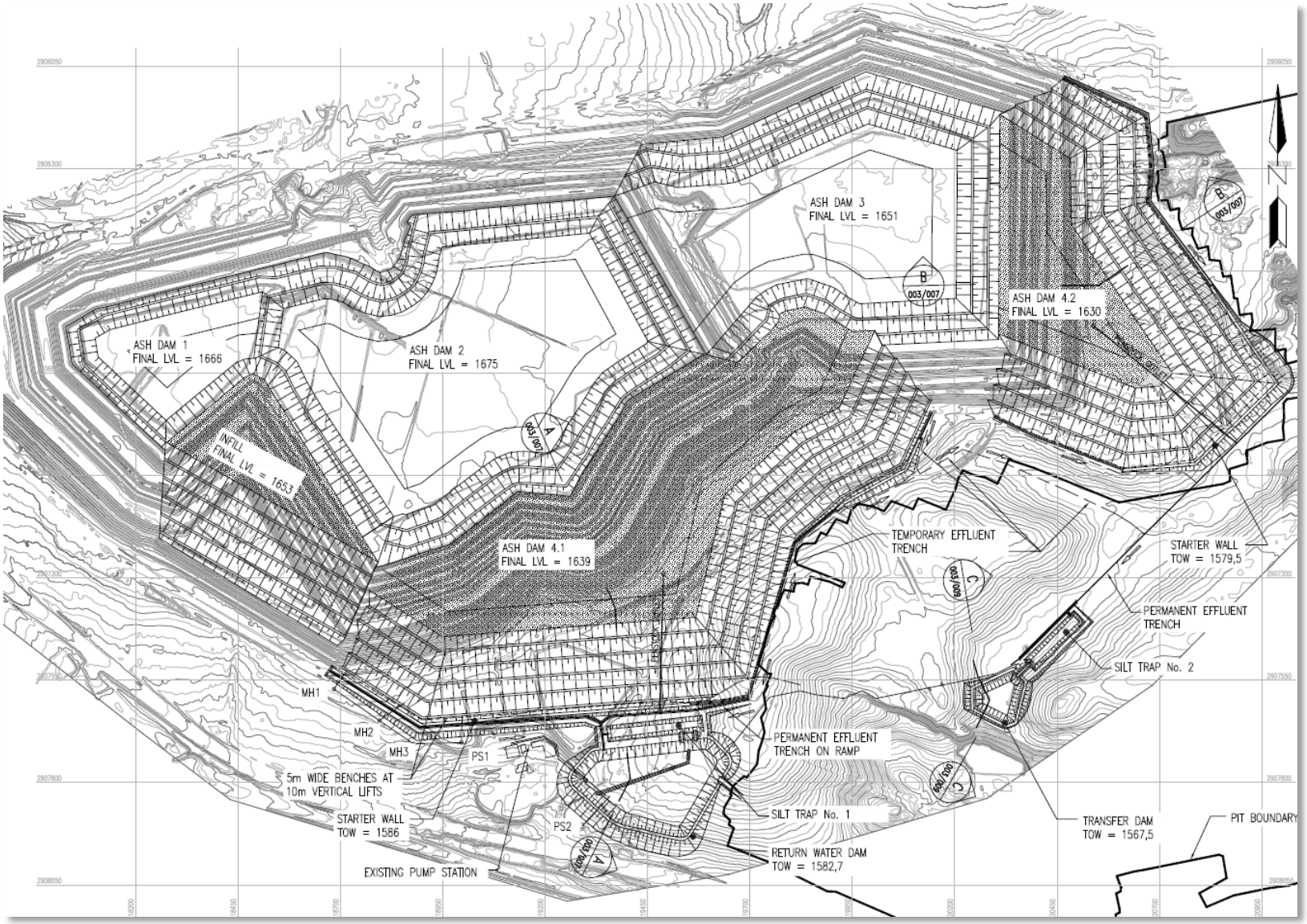
Annexure A.1: Details of the expertise of the EAP, including a curriculum vitae

Annexure A.2: Environmental Authorisation

To be inserted upon receipt.

Annexure B

Annexure B.1: Ash Dam 4 Concept 2017


ASH DAM 1
FINAL LVL = 1666
ASH DAM 2
FINAL LVL = 1675
ASH DAM 3
FINAL LVL = 1651
ASH DAM 4.2
FINAL LVL = 1630
INFILL
FINAL LVL = 1653
ASH DAM 4.1
FINAL LVL = 1639
TEMPORARY EFFLUENT
TRENCH
STARTER WALL
TOW = 1579,5
PERMANENT EFFLUENT
TRENCH
SILT TRAP No. 2
MH1
MH2
MH3
PS1
PS2
PERMANENT EFFLUENT
TRENCH ON RAMP
5m WIDE BENCHES AT
10m VERTICAL LIFTS
STARTER WALL
TOW = 1586
SILT TRAP No. 1
TRANSFER DAM
TOW = 1567,5
PIT BOUNDARY
RETURN WATER DAM
TOW = 1582,7
EXISTING PUMP STATION
N

Annexure B.2: Soil Map (Nepid Consutants cc, 2012, in Lanz, 2017)

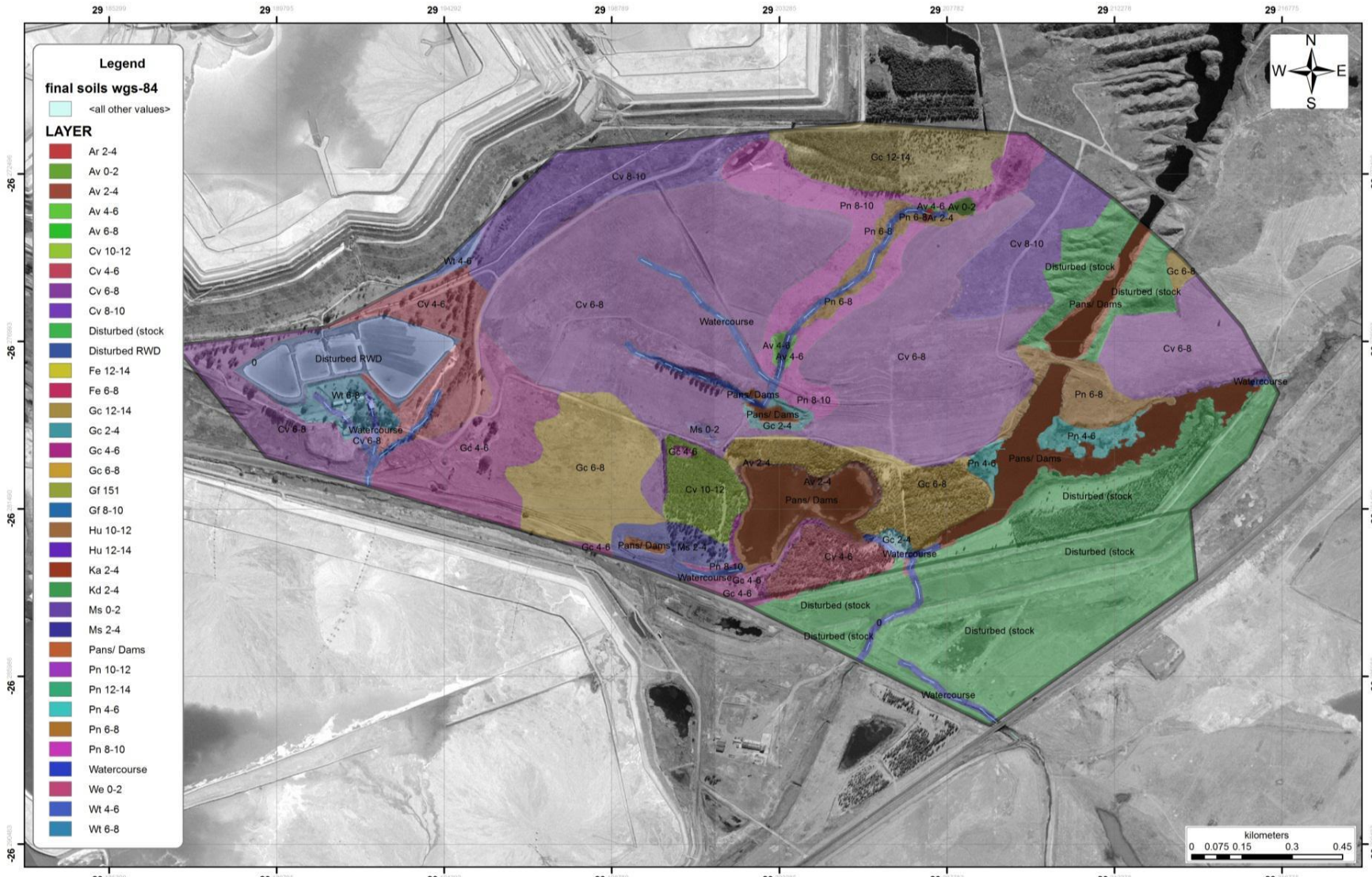


Figure 3.2: Soil Polygon Plan

Location:...\WR2005\data\
gis maps\wr2005 maps\
Figure 0 Base Map_2005.mxd
Date: April 2008

Annexure C

EIA Regulations Pertaining to Environmental Audit Reports

The following requirements for audit reports as contained in GN R.982 (as amended) are applicable:

Appendix 7

Environmental audit report

1. *The environmental audit report must provide for recommendations regarding the need to amend the EMPr, and where applicable, the closure plan.*

Objective of the environmental audit report

2. *The objective of the environmental audit report is to—*

(a) report on—

(i) the level of compliance with the conditions of the environmental authorisation and the EMPr, and where applicable, the closure plan; and

(ii) the extent to which the avoidance, management and mitigation measures provided for in the EMPr, and where applicable, the closure plan achieve the objectives and outcomes of the EMPr, and closure plan;

(b) identify and assess any new impacts and risks as a result of undertaking the activity;

(c) evaluate the effectiveness of the EMPr, and where applicable, the closure plan;

(d) identify shortcomings in the EMPr, and where applicable, the closure plan; and

(e) identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMPr, and where applicable, the closure plan.

Content of environmental audit reports

3. *(1) An environmental audit report prepared in terms of these Regulations must contain—*

(a) details of the—

(i) independent person who prepared the environmental audit report; and

(ii) expertise of the independent person that compiled the environmental audit report;

(b) a declaration that the independent auditor is independent in a form as may be specified by the competent authority;

(c) an indication of the scope of, and the purpose for which, the environmental audit report was prepared;

(d) a description of the methodology adopted in preparing the environmental audit report;

(e) an indication of the ability of the EMPr, and where applicable, the closure plan to—

(i) sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an on-going basis;

(ii) sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and

(iii) ensure compliance with the provisions of environmental authorisation, EMPr, and where applicable, the closure plan;

(f) a description of any assumptions made, and any uncertainties or gaps in knowledge;

(g) a description of any consultation process that was undertaken during the course of carrying out the environmental audit report;

(h) a summary and copies of any comments that were received during any consultation process; and

(i) any other information requested by the competent authority

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