

Scoping Report.

The relevant authorities required to review the proposed project and provide an Environmental Authorisation were consulted from the outset of this study, and have been engaged throughout the project process. The National Department of Environmental Affairs (DEA), is the competent authority for this Project. The Department of Water Affairs (DWA), and the Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) are noted as key commenting authorities.

### **10.5 Description of Environmental Issues Identified During Scoping**

The following impacts have been identified for additional study during the EIA phase and are deemed to be issues of potentially **medium to high significance** or those anticipated to require specific mitigation measures:

#### **Biophysical Impacts – Ash Dam:**

- **Geology**
  - Impacts related to the construction-related earthworks as well as the pollution of geological features in case of spillage/leakage of hydrocarbon and other hazardous material from storage facilities have been identified as having a medium significance.
  - Mitigation measures are required to be identified.
- **Geotechnical issues**
  - Phase 1 geotechnical study will be undertaken in the EIA phase.
- **Topography**
  - Change to drainage patterns due to construction-related earthworks and additional stormwater drainage patterns.
  - Mitigation measures are required to be identified.
- **Soil**
  - Pollution of soil due to handling, use and storage of hazardous substances during construction and operation.
  - The loss of available top soil.
  - Mitigation measures are required to be identified.
- **Land Capability**
  - Key variables that determine the land capability of the study area such as soil fertility reduced and disturbed due to the potential activities related to the ash dam.
  - The loss of viable agricultural land.
  - Mitigation measures are required to be identified.

- **Avifauna**

The greatest predicted Impact of Ash dams on avifauna are the destruction of habitat and disturbance of birds during construction. During the construction phase, habitat destruction and alteration inevitably takes place. Habitat destruction is anticipated to be the most significant impact in this study area. However, this can be minimized and mitigated should the smallest alternative be chosen. Similarly, the above mentioned construction and maintenance activities impact on bird through disturbance, particularly during bird breeding activities. Disturbance of birds is anticipated to be of lower significance than habitat destruction. Leachate from fly ash dams can contain heavy metals (Theism and Marley, 1979) which could result in contamination of surrounding water sources, used by water birds in the study area. Correct placing of the new dam, away from wetlands, dams and water bodies, will help to mitigate this impact.

In addition to the expansion of the ash dams the project will also include the expansion of the relevant infrastructure associated with the ashing system, such as pipelines, storm water trenches, seepage water collection systems, pump stations, seepage dams etc, and may also involve the relocation of certain infrastructure (e.g. power lines) depending on which alternative is chosen. The impacts of such associated infrastructure on avifauna are predicted to be minimal, so long as the infrastructure is within the proposed ash dam footprint. Infrastructure outside of the proposed footprint (i.e. outside of the 5 proposed alternatives), will be assessed in the EIA phase of the project, upon determination of the preferred site.

- **Biodiversity**

Ten impacts were identified that are of relevance to any development in a natural environment. Impacts were placed in three categories, namely:

- Direct impacts:
  - Destruction of threatened and protected flora species;
  - Direct impacts on threatened fauna species;
  - Destruction of sensitive/ pristine habitat types;
  - Direct impacts on common fauna species;
- Indirect Impacts:
  - Floristic species changes subsequent to development;
  - Faunal interactions with structures, servitudes and personnel;
  - Impacts on surrounding habitat/ species;
- Cumulative Impacts:
  - Impacts on SA's conservation obligations & targets (VEGMAP vegetation types);
  - Increase in local and regional fragmentation/ isolation of habitat; and
  - Increase in environmental degradation.

Other, more subtle impacts on biological components, such as changes in local, regional and global climate, effects of noise pollution on fauna species, increase in acid rain and ground water deterioration are impacts that cannot be quantified to an acceptable level of certainty and is mostly subjective in nature as either little literature is available on the topic or contradictory information exist.

- **Surface Water**

- Contamination of surface water from seepage and run off.
- Loss of aquatic biodiversity.
- Loss of runoff into the catchment.
- The detailed aquatic ecological impact assessment will quantify the significance of possible impacts associated with the preferred site.

- **Groundwater**

- Contamination of ground water due to hydrocarbon spillage and seepage into groundwater reserves, affecting groundwater quality.
- Mitigation measures are required to be identified.
- Further construction of infrastructure and compaction of the area will further contribute to reduced water infiltration rates to replenish groundwater aquifers. Mitigation measures are required to be identified.

- **Noise**

- Change in ambient noise levels during both construction and operation.

- **Air Quality**

- Increase in dust generating activities during construction and operation including exceedances of PM10 concentrations and exceedances of dustfall rates.
- Mitigation measures may be required to be identified if required.

### **Socio-Economic Impacts – Ash Dam:**

- Visual impacts of preferred site
- Disturbance of cultural or historical sites
- Economic benefits through employment
- Continued generation of Electricity over the long term at Hendrina Power Station
- Health risks from elevated PM10 concentrations and dust fall rates
- Loss of groundwater resource to local users (in terms of potential groundwater contamination)
- Inflow of temporary workers.
- Mitigation measures are required to be identified.

### **Potential Impacts associated with relocating the Powerlines at Alternative E**

- Visual impact of the new powerline routes and proposed tower structures;

- Loss of land capability if relocated over agricultural land and the loss of available top soil;
- Loss of aquatic habitat and contamination of surface water ecosystems due to sedimentation;
- Loss of biodiversity and habitats;
- Potential groundwater contamination due to chemical spillage during construction;
- Collisions and electrocutions of birds;
- Disruption of land use and loss of economic potential; and
- Increase in health risk to neighbouring residents due to EMF.

The above mentioned impacts will be investigated in more detail during the EIA phase of the project.

## **10.6 Impact Assessment Phase**

### **10.6.1 Introduction**

The purpose of the Impact Assessment Phase of an EIA is as follows:

- Address issues that have been raised during the Scoping Phase;
- Assess alternatives to the proposed activity in a comparative manner;
- Assess all identified impacts and determine the significance of each impact; and
- Formulate mitigation measures.

Numerous acceptable approaches and methodologies exist by which the above purpose can be achieved. The legislation in South Africa, including the guideline documents published in support thereof, does not provide a specific methodology for the assessment of impacts. Rather, an assessment framework is provided within which environmental assessment practitioners are expected to structure a project-specific assessment methodology. This assessment framework recognises that there are different methodologies available for assessing the impact of a development but that the specific methodology selected must provide for the following:

- A clear process for impact identification, prediction and evaluation;
- The specification of impact identification techniques;
- Criteria for evaluating the significance of impacts;
- The design of mitigation measures to address impacts;
- Defining types of impacts (direct, indirect or cumulative); and
- Specification of uncertainties.

This section of the Final Plan of Study for EIA serves to describe the manner in which Lidwala EPS intends undertaking the Impact Assessment Phase of the EIA.

### 10.6.2 Decision-Making Framework

A number of authorisations, permits and other development approvals are required to be obtained by Eskom Holdings Limited. **Table 10.6** provides a summary of the development approvals required and the current status of the applications for these approvals.

**Table 10.6:** Development approvals, Authorisations and Permits required for the Proposed Project

Approval Required	Document	Department Responsible for Issuing Approval	Status of Application
Environmental Authorisation in of the National Environmental Management Act (Act 107 of 1998)		National Department of Environmental Affairs (DEA)	An integrated application was submitted and an integrated authorisation will be provided to Eskom at the end of the process.
Waste Management Licence in terms of the National Environmental Management: Waste Act No 59 of 2008		National Department of Environmental Affairs (DEA)	

### 10.6.3 Impact Assessment Methodology

The objective of the assessment of impacts is to identify and assess all the significant impacts that may arise as a result of the proposed new ash dam and the relocation of the power lines. The process of assessing the impacts of the project encompasses the following four activities:

- Identification and assessment of potential impacts;
- Prediction of the nature, magnitude, extent and duration of potentially significant impacts;
- Identification of mitigation measures that could be implemented to reduce the severity or significance of the impacts of the activity; and
- Evaluation of the significance of the impact after the mitigation measures have been implemented i.e. the significance of the residual impact.

The possible impacts associated with the project were primarily identified in the Scoping Phase through on-site and desktop study and public consultation. In the Impact Assessment Phase, additional impacts will be identified through the more in-depth specialist investigations to be undertaken and through the ongoing consultation process with interested and affected parties.

In accordance with Government Notice R.543, promulgated in terms of section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998), specialists will be required to assess the significance of potential impacts in terms of the following criteria:

- Cumulative impacts;
- Nature of the impact;
- Extent of the impact;
- Intensity of the impact;
- Duration of the impact;
- Probability of the impact occurring;
- Impact non-reversibility;
- Impact on irreplaceable resources; and
- Confidence level.

Issues are assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected and how it will be affected;
- The physical **extent**, wherein it is indicated whether:
  - \* 1 - the impact will be limited to the site;
  - \* 2 - the impact will be limited to the local area;
  - \* 3 - the impact will be limited to the region;
  - \* 4 - the impact will be national; or
  - \* 5 - the impact will be international;
- The **duration**, wherein it is indicated whether the lifetime of the impact will be:
  - \* 1 - of a very short duration (0–1 years);
  - \* 2 - of a short duration (2-5 years);
  - \* 3 - medium-term (5–15 years);
  - \* 4 - long term (> 15 years); or
  - \* 5 - permanent;
- The **magnitude of impact on ecological processes**, quantified on a scale from 0-10, where a score is assigned:
  - \* 0 - small and will have no effect on the environment;
  - \* 2 - minor and will not result in an impact on processes;
  - \* 4 - low and will cause a slight impact on processes;
  - \* 6 - moderate and will result in processes continuing but in a modified way;
  - \* 8 - high (processes are altered to the extent that they temporarily cease); or
  - \* 10 - very high and results in complete destruction of patterns and permanent cessation of processes;
- The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale where:
  - \* 1 - very improbable (probably will not happen);
  - \* 2 - improbable (some possibility, but low likelihood);
  - \* 3 - probable (distinct possibility);
  - \* 4 - highly probable (most likely); or
  - \* 5 - definite (impact will occur regardless of any prevention measures);
- the **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- the **status**, which is described as either positive, negative or neutral;

- the degree to which the impact can be reversed;
- the degree to which the impact may cause irreplaceable loss of resources; and
- the degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

$S = (E+D+M)*P$ ; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- **31-60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- **> 60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area).

#### **10.6.4 Public Participation Process (PPP)**

PPP during the impact assessment phase revolves around the review and findings of the EIA, which will be presented in the Draft Environmental Impact Report (EIR). All I&APs will be notified of the progress to date and availability of the Draft EIR, via mail, email and advertisements in local newspapers. A legislated period of 40 consecutive days will be allowed for public comment. Reports will be made available in the following way:

- Distribution for comment at central public places, which were used during the scoping phase. Provision has been made for the placement of the reports at three venues;
- The document will be made available to download from Lidwala's website; and
- Copies of CDs will be made available on request.

Either a public meeting or an open day (depending on specific requests) is proposed to be held during this phase (venue to be confirmed). The meeting / open day will be facilitated by key members of the PPP project team. The purpose of the public meeting or open day will be to present the findings of the impact assessment. Focus group meetings will be held, if required, in accordance with topics of concern raised during the scoping phase as well as the assessment phase. I&APs will be given the opportunity to debate and discuss key issues and concerns.

All comments received during the EIA phase will be recorded in the comments and response report, which will be included in the draft and final EIR. The final EIR will incorporate public comment received on the Draft EIR and will be made available for public review with hard copies distributed mainly to the authorities and key stakeholders.

### **Notification of Environmental Authorisation**

All I&APs will receive a letter at the end of the process notifying them of the authority's decision, thanking them for their contributions, and explaining the appeals procedure.

### **10.6.5 Consultation with DEA**

It is envisaged that consultation with DEA and MDEDET will coincide with the compilation of the following key documents:

- PoS for EIA;
- Draft EIR and EMP and Waste Licence Report (WLR); and
- Final EIR and EMP and WLR.

Consultation outside of the above deliverables will be undertaken as necessary in order to ensure that DEA and MDEDET are aware of the status of the project.

### **10.6.6 Terms of Reference for Specialist Studies**

**Table 10.7** provides a list of the Specialists that are involved in this study and their areas of expertise.

**Table 10.7:** List of Specialist Studies

<b>Specialist Study</b>	<b>Organisation Responsible for the Study</b>
Impacts on groundwater	Metago Water GeoSciences Consulting
Impacts on surface water and aquatic fauna & flora	Ecotone Freshwater Consultants
Impacts on terrestrial fauna & flora	Bathusi Environmental
Impacts on soils & agricultural potential	Agricultural Research Council
Impacts on heritage resources	Johnny van Schalkwyk
Impacts on air quality	Airshed Planning Professionals
Impacts due to noise	Francois Malherbe Acoustic Consultants
Impacts on the social environment	Lidwala Consulting Engineers (SA)
Impacts on avifauna	Endangered Wildlife Trust
Visual impact assessment	MetroGIS
Conceptual Design	Lidwala Consulting Engineers (SA) and Alan Robinson
Geotechnical Studies	Alan Robinson
GIS	Lidwala Consulting Engineers (SA)
Survey	Global Geomatics

The terms of reference for each of the above mentioned specialist studies during the EIA phase of the project are detailed below.



- **Biodiversity (Bathusi Environmental)**

The Terms of Reference for the biophysical assessment is as follows:

- Obtain all relevant biophysical data for the preferred alternative;
- Assess the importance and relevance of biophysical attributes in terms of the local ecology;
- Present an overview of relevant biophysical attributes and estimated sensitivity in terms of biodiversity;
- Compile a biophysical sensitivity analysis of the area;
- Incorporate results into the Biodiversity Impact Evaluation; and
- Map all relevant aspects.

The Terms of Reference for the floristic EIA assessment is as follows:

- Obtain all relevant PRECIS and Red Listed flora information;
- Incorporate MTPA requirements in assessments and subsequent reports;
- Conduct a photo analysis of the proposed area;
- Identify preliminary floristic variations;
- Survey the area for plant community variations;
- Survey the area for floristic diversity (common flora species, Red List flora species, alien and invasive plant species and plant with medicinal properties);
- Assess the potential presence of Red List flora species;
- Assess the habitat suitability for Red List flora species;
- Assess the presence of Protected tree species;
- Describe the variation in floristic communities in terms of physical attributes;
- Describe the status and importance of regional vegetation types;
- Compile a floristic sensitivity analysis;
- Incorporate results into the Biodiversity Impact Evaluation;
- Map all relevant aspects; and
- Present all results in a suitable format.

The Terms of Reference for the faunal EIA assessment is as follows:

- Obtain all relevant PRECIS and Red Listed faunal information;
- Incorporate MTPA requirements in assessments and subsequent reports;
- Survey the site for faunal diversity by means of relevant survey methods;
- Assess the potential presence of Red Listed fauna species;
- Assess habitat suitability for Red Listed fauna species;
- Describe the status of available habitat;
- Compile a faunal sensitivity analysis;
- Incorporate results into the Biodiversity Impact Evaluation;
- Map all relevant aspects; and
- Present all results in a suitable format.

- **Avifauna (EWT)**

The following scope of work will be applicable:

- Acquire shape files of the proposed sites
- Map these files against known sensitive avifaunal environments (IBA's protected areas, etc)
- Map these files against existing power lines
- Map these files against CSIR land cover data and vegetation data.
- Utilise the SABAP data for the various quarter degree squares to get a baseline of what avifauna occurs in the area.
- Analyse this data for each route and mathematically determine a sensitivity for each route. This will be done by taking into account sensitive sites from the land cover data as well as the IBA's etc.
- Visit the site and assess the alternatives.
- Amend the report and add impact tables for the remaining routes in the EIA phase.
- Conduct a site visit if needed during the EIA phase.
- Once tower positions have been specified conduct an avifaunal EMP to determine which spans require mitigation and have input into micro level siting.
- Compile the EMP report and waste management report

- **Soil and Agricultural Potential (Agricultural Research Council)**

- Land type and digital elevation data would be manipulated to provide the following:
  - Land type map of the study area.
  - Slope class map.
  - Agricultural potential map, showing the distribution of dry land agricultural potential classes per land type.
  - Tables defining the dominant, sub-dominant and sub-sub dominant soils per land type. The average texture and depth of each category will be provided.
- A land cover class map will be produced from the National Land Cover Database
- A detailed survey of the study area will be undertaken
- A report will accompany the maps, and will contain tables and describe the methodology used

- **Ground Water (Metago Water GeoSciences)**

The EIA phase will go into more detail, using existing data including the Department of Water Affairs' (DWA) GRA I and GRA II datasets, the NGDB and the WARMS database. A third site visit will be conducted, and water samples will be taken from accessible boreholes (up to eight samples) and submitted to an accredited laboratory for major and minor ion analysis. This will allow ambient groundwater quality to be characterised, prior to the establishment of the new ash storage facility. Provision has also been made for the development of a numerical groundwater flow and transport model (modelling sub-phase),

using suitable identified parameters, to allow for better quantification of groundwater impacts by the ash dam, and to assist in the development of an adequate monitoring network. The following parameters will be determined or estimated where possible, from available data, on-site measurements, or following the numerical modelling process:

- · Aquifer hydraulic properties (T and S)
- · Aquifer types according to accepted classifications
- · Potential single and cumulative impacts of ash dam extension on the groundwater (nature, extent, duration, intensity, probability and significance), along with level of confidence of assessment
- · Assessment of alternatives will include evaluation of the “no-go” option
- · Suggested mitigation measures and/or management actions
- · Proposed groundwater monitoring programme

An estimate of groundwater vulnerability will be included in the assessment, as well as an estimate of the impact of groundwater pollution on nearby groundwater users. All deliverables will be in a format suitable for inclusion in the final Baseline and EIA reports. Provision has been made for a one-day site visit in the EIA phase, a one-day workshop, and input into the EMP and waste application report.

- **Surface Water (Ecotone Freshwater Consulting)**

The Scope of Work that will be encompassed to reach the objectives is outlined below:

- A field survey for the EIA phase to collect river and wetland data and identify potential impacts. The detailed survey will make use of the following methods and indices at the selected sites:
  - Aquatic Macroinvertebrates - SASS5 (Dickens & Graham, 2002).
  - Fish – FRAI (Kleynhans, 2009).
  - Habitat – IHAS v.2 (McMillan, 1998)
  - Habitat - IHI (Kleynhans, 1996).
- Riparian Vegetation - VEGRAI (Kleynhans, Mackenzie & Louw, 2009).
  - Fish cover ratings (Kleynhans, 2009)
  - Water Quality: Selected (applicable) in situ water quality variables.
  - Applicable wetland assessment methodology dependant on the type of wetlands present on the site – either Palustrine wetland habitat assessment (Kleynhans, 1996) or WET IHI.
- Input into the EMP based on the potential impacts and findings of the detailed EIA report.
- Input into the Waste License based on the potential impacts and findings of the detailed EIA and Waste License application report.

- **Approach.**

For each ecological component an assessment will be made of the reference, or natural, conditions in the detailed EIA study. The Present Ecological State (PES) for the

ecological responses (aquatic invertebrates, riparian vegetation, wetlands and fish) will be determined for each site. These methods are based on DWA's rule-based models for each main ecosystem component as follows (responses):

- SASS5: South African Scoring System Version 5 (Dickens & Graham, 2007).
- FRAI: Fish Response Assessment Index (Kleynhans, 2007).
- VEGRAI: Riparian Vegetation Response Assessment Index (Kleynhans, Mackenzie & Louw, 2007).
- Wetlands: TBA based on types of wetlands present on selected study site.

The models use a ranking system in which key ecological components are ranked, rated, weighted and finally integrated to provide consistent results. The results of the rule-based models for each component are provided as Ecological Categories (ECs) ranging from Natural (A) to Critically Modified (F) (**Table 10.8**).

**Table 10.8:** Ecological categories, categories, key colours and category descriptions presented within the biotic assessment.

Category	Category	Description
<b>A</b>	Very good	Unmodified state- no impacts, conditions natural.
<b>B</b>	Good	Largely natural- Small changes in community characteristics, most aspects natural.
<b>C</b>	Moderate	Moderately modified- Clear community modifications, some impairment of health evident.
<b>D</b>	Poor	Largely modified- Impairment of health clearly evident. Unacceptably impacted state.
<b>E</b>	Very poor	Seriously modified- Most community characteristics seriously modified, unacceptable state.
<b>F</b>	Critical	Critically modified- Extremely low species diversity Unacceptable state.

Data on driving variables will be collected to enrich and validate responder data. The following drivers will be assessed using DWAF approved methodology:

- IHAS v.2: Integrated Habitat Assessment Index version 2 (McMillan, 1998).
- IHI: Index of Habitat Integrity (Kleynhans, 2008).
- Water Quality: in situ variables only.

- **Heritage (Dr. J van Schalkwyk)**

A heritage impact assessment is not limited to archaeological artefacts, historical buildings and graves. It is far more encompassing and includes intangible and invisible resources such as places, oral traditions and rituals. The Act defines a heritage resource as any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This includes the following wide range of places and objects:

- places, buildings, structures and equipment;

- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds;
- movable objects;
- battlefields; and
- traditional building techniques.

Reports in fulfilment of Section 27(3) of the Act must include the following information:

- the identification and mapping of all heritage resources in the area affected;
  - an assessment of the significance of such resources in terms of the heritage assessment criteria set out in regulations;
  - an assessment of the impact of the development on such heritage resources;
  - an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
  - the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
  - if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
  - plans for mitigation of any adverse effects during and after completion of the proposed development
- **Visual (MetroGIS)**

This recommended work must be undertaken during the Environmental Impact Phase of reporting for this proposed project. In this respect, the Plan of Study for EIA is as follows:

- **Determine Visual Distance/Observer Proximity:**

In order to refine the visual exposure of the infrastructure on surrounding areas / receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence.

Proximity radii for the proposed site are created in order to indicate the scale and viewing distance of the infrastructure and to determine the prominence of the structures in relation to their environment.

MetroGIS determined the proximity radii based on the anticipated visual experience of the observer over varying distances. The distances are adjusted upwards for

larger facilities and downwards for smaller facilities (i.e. depending on the size and nature of the proposed infrastructure).

The proximity radii (calculated from the boundary lines of the site) are as follows:

- 0 – 2,5km. Short distance view where the facility would dominate the frame of vision and constitute a very high visual prominence.
- 2,5 - 5km. Medium distance view where the structures would be easily and comfortably visible and constitute a high visual prominence.
- Greater than 5km. Medium to longer distance view where the facility would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a medium visual prominence.

- **Determine Viewer Incidence/Viewer Perception**

The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers, then there would be no visual impact. If the visual perception of the infrastructure is favourable to all the observers, then the visual impact would be positive.

It is therefore necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed facility and its related infrastructure.

It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer; regularity of sighting, cultural background, state of mind, and purpose of sighting which would create a myriad of options.

- **Determine the Visual Absorption Capacity of the landscape**

This is the capacity of the receiving environment to absorb or screen the potential visual impact of the proposed infrastructure. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC.

The VAC would also be high where the environment can readily absorb the structure in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC for a structure contrasting markedly with one or more of the characteristics of the environment would be low.

The VAC also generally increases with distance, where discernable detail in visual characteristics of both environment and structure decreases.

The digital terrain model utilised in the calculation of the visual exposure of the facility does not incorporate the potential visual absorption capacity (VAC) of the region. It is therefore necessary to determine the VAC by means of the interpretation of the natural visual characteristics, supplemented with field observations.

- **Determine the Visual Impact Index**

The results of the above analyses are merged in order to determine where the areas of likely visual impact would occur. These areas are further analysed in terms of the previously mentioned issues (related to the visual impact) and in order to judge the severity of each impact.

The above exercise should be undertaken for the ash dam as well as the ancillary infrastructure, as these structures are envisaged to have varying levels of visual impact at a more localised scale.

The site-specific issues (as mentioned earlier in the report) and potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact.

In addition, cumulative visual impact should be addressed, as well as suggested mitigation measures for all identified impacts (if any).

- **Social (Lidwala Consulting Engineers)**

The purpose of the Socio-economic impact assessment will be to conduct a systematic analysis in advance of the likely impacts that the project will have on the day-to-day life of individuals and communities. The assessment will serve to identify issues that will need to be addressed by avoidance or mitigation, as well as social impacts that cannot be resolved. Recommendations regarding mitigation measures will be developed for inclusion in the EMP. The socio-economic impact assessment will also highlight potential positive impacts of the project, so that these impacts may be enhanced.

The socio-economic impact assessment will draw on information obtained during the public participation process. In particular, the consultation with stakeholders will enable the project team to identify their needs, expectations and perceptions regarding the proposed development.

- *Socio-economic baseline assessment*

The objective of this phase will be to determine the most up to date socio-economic variables and trends that are likely to mediate the impact of the project on the lives of people. Issues to be addressed in this baseline assessment include:

- *Demographic profiles* of areas likely to be affected (including population sizes, economic activities, employment rates, livelihoods, access to services, etc.);
- Current and planned *development activities*;
- *Social characteristics* of potentially affected communities (e.g. community structures, social capital and cohesion, attitudes towards the project, future aspirations, etc.);
- Relationships between potentially affected communities and the environment (including *sense of place*, historical or cultural ties, etc.)
- *Assets* and *amenities* that may be lost, and productive activities that may be affected by the project;
- *Public health status* (including communicable and sexually transmitted diseases); and
- Current authority and capacity of *institutions* that may be involved in management and monitoring of the project's effects.

Data sources for the socio-economic baseline assessment will include:

- *Secondary* sources, such as existing publications and databases;
- Primary data collected through the public participation process and focused consultation with stakeholders by the EIA team; and
- Latest research from companies such as Global insight.

- *Projection and estimation of impacts*

This phase of the EIA will concentrate on the anticipated impacts associated with the most-preferred site identified during the Scoping Study.

- *Conceptualising social impacts.* This will entail assessing the *differences* between (a) predicted conditions *without* the development (extrapolated from the baseline projection) and (b) predicted conditions *with* the development.
- *Predicting responses to impacts.* This will entail determining the *significance* that affected individuals, communities and institutions attach to the identified socio-economic impacts.
- *Indirect and cumulative impacts.* This will entail estimating likely consequences and ripple effects of direct impacts. These may result from the incremental impacts of an action added to other past, present and reasonably foreseeable future.
- *Rating impacts* in terms of their nature, extent, duration, intensity, probability, overall significance and mitigation potential.

- *Development of mitigation and management measures*

This phase will involve the formulation of a detailed *Management Plan* containing the following:

- Description of mitigation measures for whatever is relevant.
- *Description of monitoring requirements.* This component of the plan will propose detailed arrangements required for monitoring impacts and the implementation of mitigating measures. It will include a description of monitoring methodology, specific operations and features to be monitored, monitoring reporting relationships, and other relevant arrangements.



- **Geotechnical study and Concept Design (Lidwala Consulting Engineers and Alan Robinson)**

The Geotechnical investigation will be a phase 1 investigation of the broader study area in order to identify those areas that will be suitable for the development of the proposed ash dam and will be undertaken during the screening phase of the study. The Geotechnical investigation has made provision for material testing.

The conceptual design will only be undertaken for the preferred site and will be undertaken in conjunction with the EIA phase of the project. The conceptual design will include associated infrastructure but has excluded materials handling infrastructure. The conceptual design costs include the costs required for a topographical ground survey of the preferred site. The following brief scope of work can be provided:

- **Phase 1 – Geotechnical Investigation and Conceptual design**

- Locate and select the site for the ash facilities, in conjunction with others.
- Carry out conceptual design.
- Evaluate the water balance of the ash facilities, including sizing of stormwater drains, and pollution control dams.
- Size the facilities for 17,5x106 m<sup>3</sup> capacity, together with the associated stormwater control measures.
- Preliminary assessment of 1:50 and 100 floodlines, and possible river diversions, by others.
- Preliminary geotechnical investigation of the proposed sites for the dumps, and pollution control dams. (assuming geohydrology will be done by others)

- **Phase 2 – Preliminary Design**

- Confirm site selection.
- Geotechnical investigation of the selected site, and pollution control dams
- Refine the water balance of the ash facilities, for the mine as a whole, including pollution control dams and stormwater control measures.
- Refine the size and design the facilities for the selected site.
- Prepare preliminary design drawings of pre-deposition civil work.
- Others to carry an assessment of 1:50 and 100 floodlines, and possible river diversions.
- Cost estimate for civil pre-deposition work. (70% accuracy)

- **Air Quality Assessment (Airshed Planning Professionals)**

A full air quality impact assessment is not deemed necessary, however a professional opinion regarding this issue will be undertaken. As part of the professional opinion for the air quality assessment the scope of work includes assessing the baseline air quality without the new ash dam and the predicted impact (professional opinion) with the new dam. Unfortunately, the closest air quality monitoring station is at Elandsfontein,

approximately 30 km southwest of the power station. A comparison of these measurements with the predicted concentrations would therefore require the inclusion of all emission sources in a relatively large area, well beyond the current study area. This is not included in the proposal. Instead, the cumulative impacts would be dealt with in a qualitative manner, which includes the assessment of air quality from studies undertaken in the area, using a single background concentration to represent all other sources that may have a potential impact in the study area

The following sections contain brief discussions of the proposed methodology:

- *Baseline Air Quality Characterisation*

The baseline assessment will include the following:

- The regional climate and site-specific atmospheric dispersion potential;
- Preparation of hourly average meteorological data;
- Identification of existing sources of emission and characterisation of ambient air quality within the region based on observational data recorded to date (if available) and available studies.

- *Air Quality Impact Assessment (Professional Opinion):*

- Identification and quantification of all sources of atmospheric emissions associated with the new ash dam.
- Use a 1st tier screening model to provide some guidance on the potential impacts from the proposed ash dump.
- Provide a professional opinion on the proposed air quality impacts from the proposed ash dump and recommendations on air quality monitoring.

- **Noise Impact (Professional Opinion) (Francois Malherbe)**

A full noise impact is not deemed to be required, however, a professional opinion regarding this issue will be obtained. The following methodology has been proposed:

- A site visit will be conducted in order to familiarise the consultant with the environment of the proposed development. Possible noise issues and the nearest noise sensitive receptors will be identified.
- Although major environmental noise measurements are not expected to be necessary, samples of the noise emission levels of existing noise sources, such as pumping stations, will help during the assessment of possible noise issues.
- In order to illustrate the reasoning behind the assessment of noise related issues, sample calculations will be made. Please note that no in-depth modelling will be made.
- The results of the observations and calculations will be assessed in terms of the applicable Mpumalanga noise regulations and the guidelines provided in SANS 10103:2008 'The measurement and rating of environmental noise with respect to annoyance and to speech communication'.
- A professional opinion will be written describing methodology, results and findings of the noise study.

### **10.6.7 Requirements for Waste License Report**

The waste licensing process for listed activities under Schedule 1 in the National Environment Management Waste Act 2008 (NEMWA) is as defined in the Environmental Impact Assessment (EIA) regulations made under section 24(5) of the National Environmental Management Act (NEMA) No 107 of 1998.

The following information will be required to be submitted as supporting documentation when applying for the scheduled activities listed under Category B:

- Scoping and Environmental Impact Assessment Report which should include:
  - Description of the environment that may be affected by the proposed activity and the manner in which the geographical, physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity
  - Description of significant environmental impacts, including cumulative impacts, that may occur as a result of the undertaking of the activity
  - Conducting public participation as outlined in EIA Regulations
  - Closure plan (report) (*preferred site only*)
  - Operational plan (*preferred site only*)
  - Waste disposal facility designs (*preferred site only*)
  - Application and report documents
  - A3 size layout plans
  - Landfill conceptual designs (*preferred site only*)
  - Geo-hydrological report
  - Consideration of alternatives
  - Description of mitigation measures and risk assessment
  - Any inputs made by specialists to the extent that may be necessary
  - Any specific information as may be required by the competent authority
- Plan of study for environmental impact assessment which must among others include:
  - Description of the tasks to be undertaken as part of the environmental impact assessment process, including specialist report or specialized processes, and a manner in which such tasks will be undertaken
  - An indication of stages of stages at which the competent authority will be consulted
  - Description of methods for assessing issues and alternatives, including the no-go alternative
  - Particulars of participation process that will be conducted during the EIA process
  - Draft environmental management plan
  - Copies of any specialist reports and specialized processes

Items such as the conceptual design, closure report and operational report will be done on the preferred site only.

The Waste License Report and relevant supporting documentation will be compiled and released to the public and authorities concurrently with the Environmental Impact Report.

### **10.6.8 Proposed Project Programme for the EIA**

The programme for the EIA suggests the following timeframes with respect to the most important activities to be undertaken:

- Submission of the Draft EIR and WRL for public comment – October 2011
- Public meetings – November 2011
- Submission of the Final EIR and WLR to DEA – December 2011

The EIA process is iterative by nature and it should therefore be appreciated that the above dates are provided as guidance only and are subject to change.

### **10.7 Conclusions and Recommendations**

This Plan of Study for EIA is aimed at meeting the requirements of the EIA Regulations and the guidelines issued in respect thereof as a minimum.

The methodologies proposed for obtaining the information required to effectively identify and assess the potential environmental impacts of the project are considered to be comprehensive and sufficient to allow for the compilation of an EIR and EMP which addresses I&AP concerns and which will provide the competent authority with the appropriate information necessary to allow for informed decision-making on the application for authorisation.