

**THE PROPOSED CONSTRUCTION OF A 66KV OVERHEAD
POWERLINE FROM THE WORCESTER INDUSTRIAL SUBSTATION TO
THE TRANSHEX SUBSTATION, WORCESTER, WESTERN CAPE.**

ENVIRONMENTAL MANAGEMENT PROGRAMME

DEADP Ref: 16/3/3/1/B2/32/1021/23

**(INCLUDING THE WASTE, WATER USE AND ELECTRICITY CONSUMPTION
MINIMIZATION AND MANAGEMENT PLAN)**

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***ANY AMENDMENTS TO THIS REPORT SINCE THE 2ND DBAR PPP HAS BEEN DISPLAYED IN BLUE FOR EASE OF REFERENCE**

ABREVIATIONS

DEA&DP	Department of Environmental Affairs and Development Planning
DEFF	Department of Environment, Forestry and Fisheries
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
EO	Environmental Officer
ESO	Environmental Site Officer
GNEC ..	Guillaume Nel Environmental Consulting
I&AP	Interested and Affected Parties

DEFINITIONS

Alien species - Plants and animals which do not arrive naturally in an area - they are brought in by humans. Alien plants often force indigenous species out of the area. Rooikrans is a good example of alien species in the Cape.

Alternative - A possible course of action, in place of another, that would meet the same purpose and need defined by the development proposal. Alternatives considered in the EIA process can include location and/or routing alternatives, layout alternatives, process and/or design alternatives, scheduling alternatives or input alternatives.

Aspect - Element of an organisation's activities, products or services that can interact with the environment.

Auditing - A systematic, documented, periodic and objective evaluation of how well the environmental management programme is performing with the aim of helping to safeguard the environment by facilitating management control which would include meeting regulatory requirements. Results of the audit help the organisation to improve its environmental policies and management systems.

Biodiversity - The rich variety of plants and animals that live in their own environment. Fynbos is a good example of rich biodiversity in the Cape.

Built environment - Physical surroundings created by human activity, e.g., buildings, houses, roads, bridges and harbours.

Conservation - Protecting, using and saving resources wisely, especially the biodiversity found in an area.

Contamination - Polluting or making something impure.

Corrective (or remedial) action - Response required to address an environmental problem that is in conflict with the requirements of the EMP. The need for corrective action may be determined through monitoring, audits or management review.

Degradation - The lowering of the quality of the environment through human activities, e.g. river degradation, soil degradation.

Ecology - The scientific study of the relationship between living things (animals, plants and humans) and their environment.

Ecosystem - The relationship and interaction between plants, animals and the non-living environment.

Environment - Our surroundings, including living and non-living elements, e.g. land, soil, plants, animals, air, water and humans. The environment also refers to our social and economic surroundings, and our effect on our surroundings.

Environmental Impact Assessment (EIA) - An Environmental Impact Assessment (EIA) refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of a proposed development. The EIA includes an evaluation of alternatives; recommendations for appropriate management actions for minimising or avoiding negative impacts and for enhancing positive impacts; as well as proposed monitoring measures.

Environmental Management System (EMS) - Environmental Management Systems (EMS) provide guidance on how to manage the environmental impacts of activities, products and services. They detail the organisational structure, responsibilities, practices, procedures, processes and resources for environmental management. The ISO14001 EMS standard has been developed by the International Standards Organisation.

Environmental policy - Statement of intent and principles in relation to overall environmental performance, providing a framework for the setting of objectives and targets.

Fynbos - Low-growing and evergreen vegetation found only in the south Western Cape. Fynbos is known for its rich biodiversity.

Habitat - The physical environment that is home to plants and animals in an area, and where they live, feed and reproduce.

Hazardous waste – Waste, even in small amounts, that can cause damage to plants, animals, their habitat and the well-being of human beings, e.g., waste from factories, detergents, pesticides, hydrocarbons, etc.

Impact - A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

Indigenous species - Plants and animals that are naturally found in an area.

Infrastructure - The network of facilities and services that are needed for economic activities, e.g., roads, electricity, water, sewerage.

Integrated - Mixing or combining all useful information and factors into a joint or unified whole. See Integrated Environmental Management.

Integrated Environmental Management (IEM) - A way of managing the environment by including environmental factors in all stages of development. This includes thinking about physical, social, cultural and economic factors and consulting with all the people affected by the proposed developments. Also called "IEM".

Land use - The use of land for human activities, e.g. residential, commercial, industrial use.

Mitigation - Measures designed to avoid, reduce or remedy adverse impacts.

Natural environment - Our physical surroundings, including plants and animals, when they are unspoiled by human activities.

Over-utilisation - Over-using resources - this affects their future use and the environment.

Policy - A set of aims, guidelines and procedures to help you make decisions and manage an organisation or structure. Policies are based on people's values and goals. See Integrated Metropolitan Environmental Policy.

Process - Development usually happens through a process - a number of planned steps or stages.

Proponent – Developer. Entity which applies for environmental approval and is ultimately accountable for compliance to conditions stipulated in the Environmental authorisation (EA) and requirements of the EMP.

Recycling - Collecting, cleaning and re-using materials.

Resources - Parts of our natural environment that we use and protect, e.g., land, forests, water, wildlife, and minerals.

Scoping Report - A report presenting the findings of the scoping phase of the EIA. This report is primarily aimed at reaching closure on the issues and alternatives to be addressed in the EIA (in the case of a full EIA process).

Stakeholders - A subgroup of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term includes the proponent, authorities and all interested and affected parties.

Storm water management – Strategies implemented to control the surface flow of storm water such that erosion, sedimentation and pollution of surface and ground water resources in the immediate and surrounding environments are mitigated. This is specifically important during the construction and decommissioning phases of a project.

Sustainable development - Development that is planned to meet the needs of present and future generations, e.g., the need for basic environmental, social and economic services. Sustainable development includes using and maintaining resources responsibly.

Sustainability - Being able to meet the needs of present and future resources.

Waste Management – Classifying, recycling, treatment and disposal of waste generated during construction and decommissioning activities.

Wetlands - An area of land with water mostly at or near the surface, resulting in a waterlogged habitat containing characteristic vegetation species and soil types e.g., vleiland, swamps.

Zoning - The control of land use by only allowing specific type development in fixed areas or zones.

REFERENCES

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DEAT (2004a) Environmental Management Plans, Integrated Environmental Management, Information Series 12, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

Department of Environmental Affairs and Development Planning Generic Environmental Management Plan Guideline, prepared by Strategic Environmental Focus, 2007

CITY OF CAPE TOWN: ENVIRONMENTAL MANAGEMENT PROGRAMME (2002) Specification EM – 02/07: ENVIRONMENTAL MANAGEMENT, Ver 5 (03/2002)

Lochner, P. 2005. Guideline for Environmental Management Plans. CSIR Report No ENV-S-C 2005-053 H. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

National Environmental Management Act 107 of 1998 (NEMA)

SECTION 1 - INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION AND BACKGROUND

The Applicant, *Breedeville Municipality*, will use this Planning, Construction and Operational Phase Environmental Management Programme (EMP) as a tool in managing the impacts of the application for the proposed construction of a 66kV overhead powerline from the Worcester Industrial Substation to the Transhex Substation in Worcester, after environmental approval from the Department of Environmental Affairs and Development Planning (DEADP) in terms of the Environmental Impact Assessment Regulations – National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), which replaced the regulations under the, Environment Conservation Act, 1989 (Act No. 73 of 1989) and has been effective as of 3 July 2006.

This document is based on the EMP Guideline provided by DEA&DP which was compiled in accordance with the Integrated Environmental Management (IEM) philosophy which aims to achieve a desirable balance between conservation and development (DEAT, 1992). IEM is a key instrument of the National Environmental Management Act [NEMA] (Act No. 107 of 1998). NEMA promotes the integrated environmental management of activities that may have a significant effect on the environment, while IEM prescribes a methodology for ensuring that environmental management principles are fully integrated into all stages of the development process. It advocates the use of several environmental and management tools that are appropriate for the various levels of decision-making. One such tool is an Environmental Management Programme (EMP).

The IEM guidelines intend encouraging a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels. The basic principles underpinning IEM are that there be:

- informed decision-making;
- accountability for information on which decisions are taken;
- accountability for decisions taken;
- a broad meaning given to the term environment (i.e. one that includes physical, biological, social, economic, cultural, historical and political components);
- an open, participatory approach in the planning of proposals;
- consultation with interested and affected parties;
- due consideration of alternative options;
- an attempt to mitigate negative impacts and enhance positive aspects of proposals;
- an attempt to ensure that the 'social costs' of development proposals (those borne by society, rather than the developers) be outweighed by the 'social benefits' (benefits to society as a results of the actions of the developers);
- democratic regards for individual rights and obligations;
- compliance with these principles during all stages of the planning, implementation and decommissioning of the proposals (i.e., from 'cradle to grave'), and

- The opportunity for public and specialist input in the decision-making process.

These principles are in line with NEMA, which has repealed a number of the provisions of the Environment Conservation Act, 1989 [ECA] (Act No. 73 of 1989), and is focussed primarily on co-operative governance, public participation and sustainable development. The Environmental Impact Assessment Regulations that took effect in July 2006 regulate the procedures and criteria for the submission, processing, consideration and decision on applications for environmental authorisation of listed activities.

1.2 SCOPE AND TERMS OF REFERENCE

The general principles contained within this document apply to all **PRE-CONSTRUCTION, CONSTRUCTION AND OPERATIONAL** activities.

Principles of this EMP

This EMP is compiled using the following concepts and implementation requirements so that the higher principles of sustainable development are realised:

- **Continuous improvement.** The project proponent (or implementing organisation) must be committed to review and to continually improve environmental management, with the objective of improving overall environmental performance.
- **Broad level of commitment.** A broad level of commitment will be required from all levels of management as well as the workforce in order for the development and implementation of this EMP to be successful and effective.
- **Flexible and responsive.** The implementation of the EMP must be responsive to new and changing circumstances, i.e. rapid short-term responses to problems or incidents. The EMP is a dynamic “living” document and thus regular planned review and revision of the EMP must be carried out.
- **Integration across operations.** This EMP is integrated across existing line functions and operational units such as health, safety and environmental departments in a company/project. This is done to change the redundant mindset of seeing environmental management as a single domain unit.
- **Legislation.** It is understood that any development project during its construction phase is a dynamic activity within a dynamic environment. The Developer, Engineer, Contractor and sub-contractor must therefore be aware that certain activities conducted during construction may require further licensing or environmental approval, e.g., river or stream diversions, bulk fuel storage, waste disposal, etc. The Contractor must consult the RE, EO and ECO on a regular basis in this regard.

SECTION 2 – SITE SPECIFIC INFORMATION

2.1 PROPOSED ACTIVITY AND LOCAL CONTEXT

The Breede Valley Municipality proposes the construction of a new 66kV overhead powerline from the existing Worcester Industrial Substation on Erf 13518 to the Transhex Substation on the Remaining Extent of Erf 1 in Worcester, Western Cape. The proposed overhead powerline will start at the Worcester Industrial Substation (33°38'5.47"S, 19°28'54.97"E) and run approximately 500m east-southeast before kinking 90 degrees southwest whereafter it will run adjacent to the western side of the Hex River for approximately 1.5km (33°38'41.75"S, 19°28'46.66"E). The proposed powerline will then traverse the Hex River once in a south easterly direction whereafter the R60 and adjacent railway line will also be traversed en route. The remaining powerline installation will be aligned on the eastern side of the Hex River and will run approximately 650m before connecting to the Transhex substation on the Remaining Extent on Erf 1 (33°39'25.94"S, 19°28'32.91"E).

The approximate 3km powerline will run adjacent to the Hex River for much of its alignment and will traverse the Hex River once on its way to the Transhex Substation. The proposed construction of the overhead powerline will run through and adjacent to aquatic CBA's and the Hex River for much of its alignment and some of the physical pylon footing structures will be located directly within watercourses (EDL's & Braided Channels of the Hex River), or within 32m from the Hex River's delineated extent (GN509 ZOR) as well as the 1:100-year flood lines. A number of other powerlines exist in the immediate vicinity of the proposed powerline route, and it is considered that the pressing need to increase the electrical infrastructure capacity for the ever-expanding town of Worcester outweighs the potential negative impacts the project can cause to the environment.

The physical footprint of the proposed overhead powerline alignment will also be relatively small as only the pylon footings will require construction and excavations, which would in effect minimise potential disturbance to the immediate environs. It is thus not expected that the proposed project will have an irreversible negative biophysical impact but will require specialist input to ensure that the proposed construction of the overhead powerline will be environmentally sustainable and that the potential detrimental impacts are mitigated accordingly to ensure sustainable environmental best practice.

Like mentioned before, the proposed overhead powerline will be approximately 3km in length and the pylon footing structures (23 in total, 6 located within substation boundary, so effectively 17 structures in the line route) will vary in size based on the specific pylon footing location and terrain. Please refer to the diagram in Figure 2 as well as the breakdown below:

Technical dimensions/footprint of overhead powerline and pylon footing structures:

- Total length of powerline = +/- 3km
- Total number of powerline footing structures = 23 Structures (6 located within substation boundary, so effectively 17 structures in the line route)
- Powerline utility pole average diameter = 1650mm
- The vertical length of the powerline structure will vary between 18m and 29m, with the tallest structure being 28.60m.
- Total expected physical footprint of pylon footing structures (per structure) ranges between 9.6m² and 40.5m².
- Due to the fact that there will be 23 Pylon footing structures, the expected total development footprint will range between 220.8 m² and 931.5 m². Application will be made for a total development footprint of 931.5m².

The proposed construction of the new overhead powerline will provide the town of Worcester with adequate service delivery through the provision of electricity and expansion of electrical infrastructure capacity. Worcester has undergone rapid growth which has resulted in the rise in demand on the existing electricity distribution network. If mitigation measures are implemented accordingly, it is not expected that the proposed new overhead powerline will have any irreversible biophysical and socio-economic impacts on the natural environment adjacent to the Hex River and overhead powerline route.

Pylons

Like mentioned before, the physical footprint of the proposed overhead powerline alignment will be relatively small as only the pylon footings will require construction and excavations, which would in effect minimise potential disturbance to the immediate environs. Some of these pylon footing structures will be located within an EDL & a braided channel of the Hex River (6 & 14), below the 1:100-year flood line (Pylon 11, 12, 13, 14 & 17) and within the 100 m GN509 ZoR (1, 2, 3, 4, 5, 6, 7, 22 & 23). The Hex River will be traversed by the proposed OHPL for the section which spans between support towers 14 and 15. All the pylon footing structure locations have been assessed from a botanical and freshwater specialist perspective to minimise the overall effect by recommending adequate mitigation measures to be implemented accordingly. Please note that there will be 23 pylons (6 located within substation boundary, so effectively 17 structures in the line route) in total spanning approximately 3km between the two substations. It is important to note that there will be two pylon structures located at pylon 6 & 7 which is necessary so that the new line can pass under the existing Eskom line in a flat formation. Please refer to the below diagram (Figure 2) which depicts the various pylon footing structures and physical footprints proposed to be used for the project.

Technical dimensions/footprint of overhead powerline and pylon footing structures:

- Total length of powerline = +/- 3km
- Total number of powerline footing structures = 23 Structures (6 located within substation boundary, so effectively 17 structures in the line route)
- Powerline utility pole average diameter = 1650mm
- The vertical length of the powerline structure will vary between 18m and 29m, with the tallest structure being 28.60m.
- Total expected physical footprint of pylon footing structures (per structure) ranges between 9.6m² and 40.5m².
- Due to the fact that there will be 23 Pylon footing structures, the expected total development footprint will range between 220.8 m² and 931.5 m². Application will be made for a total development footprint of 931.5m².

Pylon location coordinates:

Start - 33°38'5.47"S, 19°28'54.97"E

Middle - 33°38'41.75"S, 19°28'46.66"E

End - 33°39'25.94"S, 19°28'32.91"E

Please refer to Figure 1 below for the locality map of the proposed development extent

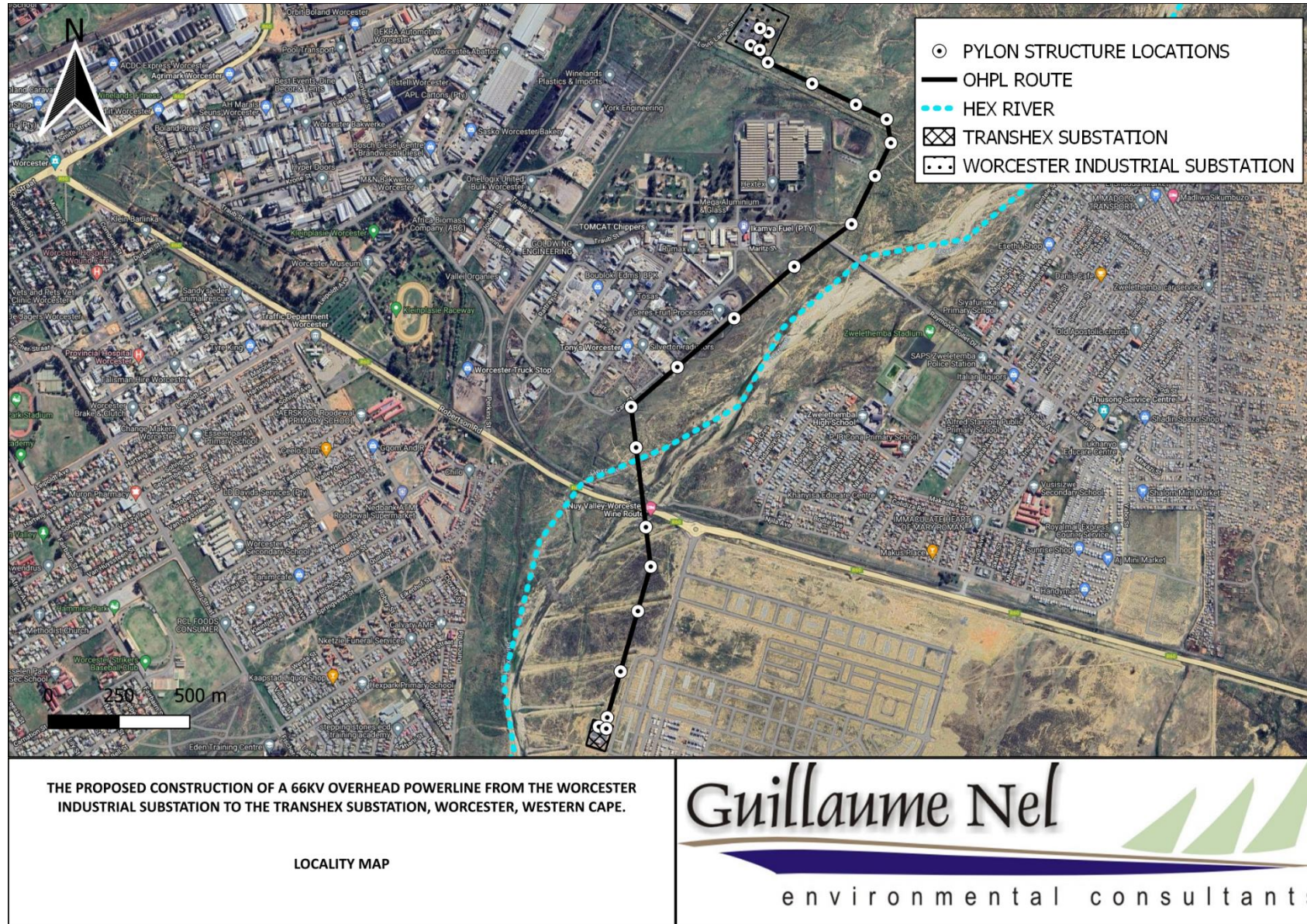


FIGURE 1: LOCALITY MAP

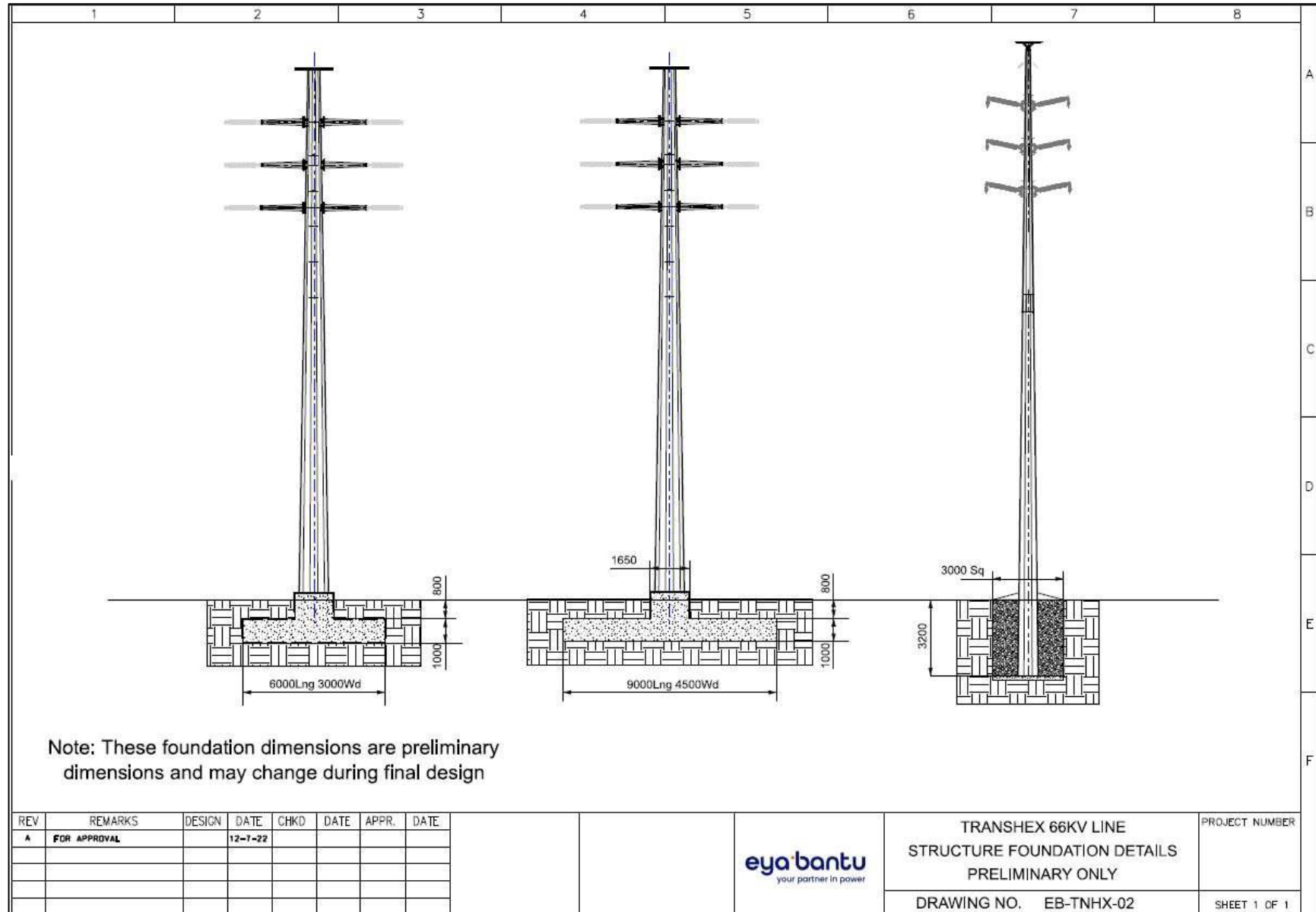


FIGURE 2: PYLON FOOTING STRUCTURE DIAGRAM

FRESHWATER

Freshwater Ecologist Network (FEN) Consulting (Pty) Ltd was appointed to conduct a specialist freshwater assessment as part of the EA and WULA processes for the proposed overhead powerline and associated support towers (pylons) that is routed between the two existing substations in the southern Worcester district, Western Cape Province.

A desktop analysis, field verification, delineation and assessment of freshwater ecosystems within the investigation area was conducted which confirmed the following freshwater ecosystems applicable to the proposed project:

- No wetlands were identified to be traversed by the proposed overhead powerline, nor were any identified within the investigation area;
- A series of EDL's draining south westwards within the northern portion of the investigation area; and
- The Hex River, a lower foothill cobble bed river, draining south westwards through the middle of the investigation area which receives stormwater from the adjacent areas to the west (Worcester industrial area and Hex Park) and east (Zweletemba and Klipvlakte).

The following components of the proposed overhead powerline and associated pylon infrastructure will traverse these freshwater ecosystems:

- The foundations of support towers 6 and 14 will be positioned within an EDL and a braided channel of the Hex River respectively;
- The Hex River will be traversed by the proposed overhead powerline for the section which spans between support towers 14 and 15; and
- Support towers 1 – 7, 22 and 23 will be within the 100 m GN509 ZoR and support towers 11 – 14 and 17 will be within the 1:100-year flood line of the Hex River.

TABLE 1: ECOLOGICAL ASSESSMENT SUMMARY OF THE HEX RIVER AND ASSOCIATED EDL'S

Freshwater Ecosystem	PES	Important Ecoservices	EIS	REC
Hex River	D (Largely modified)	• Biodiversity Maintenance • Water for human use	Very High	REC: Category C (Moderately modified) (Improve)
Ephemeral Drainage Lines	C/D (Moderately to Largely modified)	• Biodiversity Maintenance	Moderate	REC: Category C/D (Moderately/Largely modified) (Maintain)

Following the ecological assessment of the freshwater ecosystems, the DWS Risk Assessment Matrix was applied which determined that the site (powerline route), the earthworks and concrete works associated with the installation of powerline pylon support towers was determined to pose a **LOW**-risk significance to these freshwater ecosystems after considering stringent mitigation measures towards the manual down adjustment of the risk significance impact scores.

The points below summarise the considerations made when applying the impact assessment of the proposed powerline project:

- The foundations of support towers 6 and 14 will be positioned within an EDL and a braided channel of the Hex River respectively;
- The Hex River will be traversed by the proposed OHPL for the section which spans between support towers 14 and 15;

- Support towers 1 – 7, 22 and 23 will be within the 100 m GN509 ZoR and support towers 11 – 14 and 17 will be within the 1:100-year flood line of the Hex River;
- At the time of this assessment the layout for any access roads associated with the proposed OHPL was not available. As such, it is assumed that the existing informal farm roads and access road associated with the existing OHPL will be used as access roads. It is assumed that these roads will be used as is or will be graded (but the width of the roads will remain the same) to accommodate construction vehicles. No formal construction of roads, widening of roads, use of tar or concrete, was considered as part of this risk assessment;
- The risk assessment was applied assuming that a high level of mitigation is implemented and thus the results of the risk assessment provided present the impact significance post-mitigation;
- Since it is expected that the 100 m GN509 ZoR cannot be avoided for the placement of support structures (spanning width is usually at most 80 m), the legal issues for the construction of support structures were scored a maximum value of “5”;
- The activities relating to the proposed OHPL are all highly site specific, not of a significant extent relative to the area of the freshwater ecosystems assessed, and therefore have a limited spatial extent;
- While the operation of the proposed OHPL will be a permanent activity, the installation thereof is envisioned to take no more than a few months. However, the frequency of the construction impacts in a given area may be daily during this time;
- Most impacts are considered to be easily detectable and mitigation measures easily practicable;
- As per GN509, a manual down-adjustment in the risk significance impact of a maximum of 25 points is permissible provided that stringent mitigation measures are developed and indicated in bold red text in the risk assessment matrix.

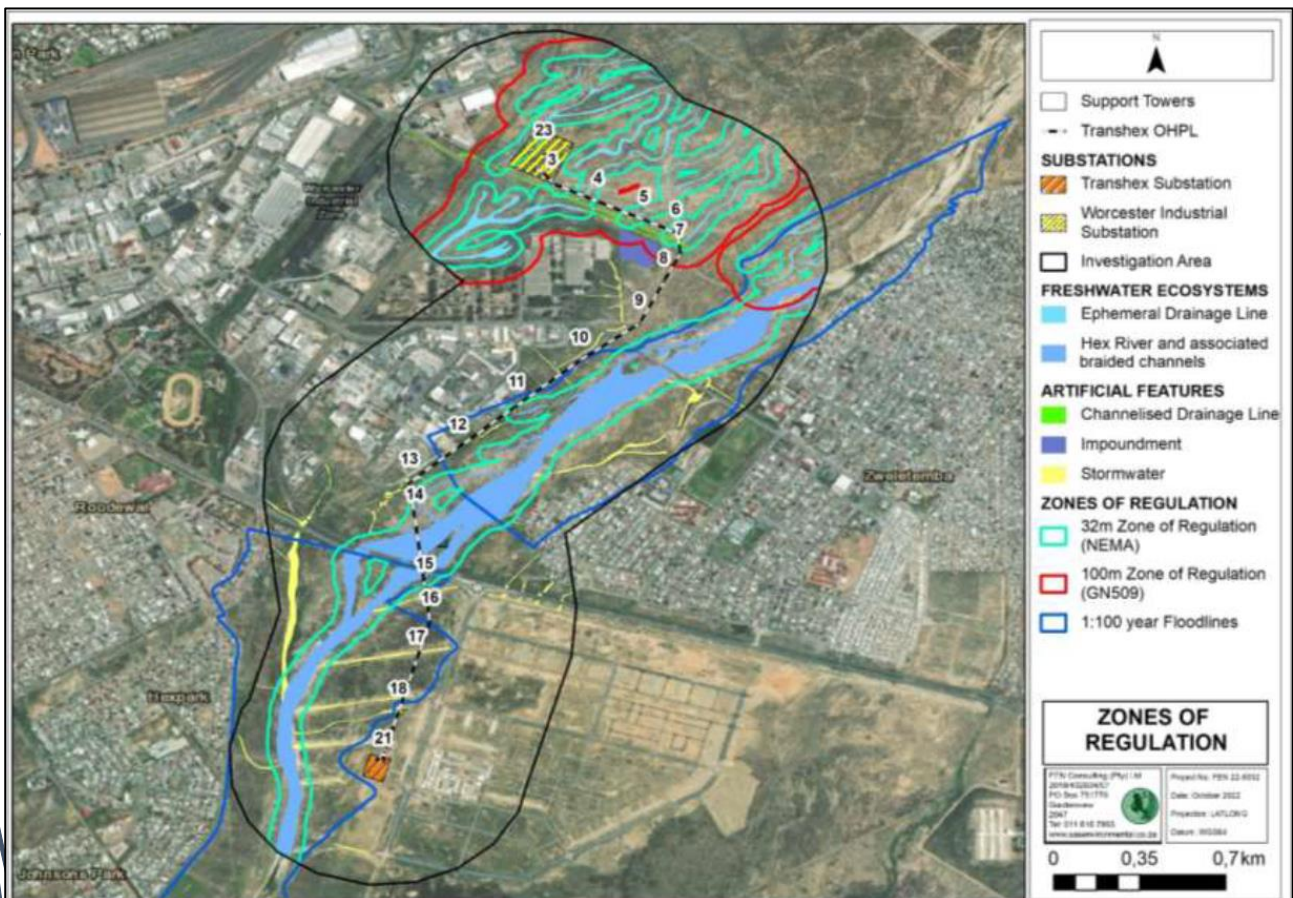


FIGURE 3: ZONES OF REGULATION IN TERMS OF NEMA AND GN509 AS IT RELATES TO THE NWA FOR THE FRESHWATER ECOSYSTEMS FALLING WITHIN THE INVESTIGATION AREA OF THE PROPOSED OHPL.

The activities associated with the construction and operational phases of the proposed overhead powerline based on the alignment provided by the proponent include:

- Site preparation within and at least 32 m away from freshwater ecosystems in terms vegetation removal and vehicular movement;
- Installation of the support tower foundations (pylons) within and at least 32 m away from freshwater ecosystems by means of earth works involving the excavation of foundation pits, stockpiling of soils and movement of construction vehicles;
- Installation of the support tower foundations within and at least 32 m away from freshwater ecosystems by means of the mixing and casting of concrete;
- Spanning of the proposed overhead powerline over the Hex River;
- Operation and maintenance of the proposed overhead powerline and;
- Operation and maintenance of the existing roads traversing freshwater ecosystems.

The site preparation, earthworks and concrete works associated with the installation of support towers 6 and 14 within an EDL and associated braided channel of the Hex River respectively was determined to pose a **Medium** risk significance to these freshwater ecosystems due to the powerline posing direct impacts. The significance risk rating was however be reduced to a **LOW** impact provided that the following stringent mitigation measures are followed:

- Activities must take place in the summer period to prevent erosion and sedimentation of freshwater ecosystems;
- The EDL and braided channel of the Hex River in which a portion of the respective support tower footprint will overlap must be stabilised against future flow events by laying down a single layer cobble bed. This will protect the exposed soil layer by preventing erosion and preserve the natural flow path of these freshwater ecosystems;
- All developed areas associated with the support towers must be compacted to natural soil compaction levels to prevent the formation of preferential surface flow paths and subsequent erosion. Conversely, areas compacted as a result of construction activities must be loosened to natural soil compaction levels;
- Vehicular movement must be limited to construction areas and must make use of existing freshwater ecosystem crossings to limit further disturbance to these systems;
- Support tower vertices must be stabilised against soil erosion by piling cobbles around the vertices and these piles must be monitored during the operation phase and repacked if necessary; and
- An alien vegetation management plan must be in place to monitor and manage alien vegetation that may establish around previously disturbed areas associated with the completed OHPL.

Direct and indirect impacts identified within the assessed freshwater ecosystems can predominantly be attributed to informal road crossings leading to limited alien and invasive species establishment. Considering that the proposed overhead powerline support structures (pylons) will be located within the assessed freshwater ecosystems in some cases, increased vehicular movement and infrastructure in the surrounding landscape may result in direct edge effects. Such edge effects may have cumulative impacts to the freshwater ecosystems, with specific mention of alien and invasive species establishment and increased sediment loads. With management and mitigation measures implemented during the construction phase and monitoring of support structures for any erosion

during the operational phase, the direct and indirect negative impacts can be reduced, thus cumulative impact on the larger catchment can, therefore, be considered **low/limited**.

Should the recommended mitigation measures be implemented accordingly, a Low-risk significance is expected to occur. It is considered advantageous if impacted areas adjacent to the freshwater ecosystems (following installation of the support structures and grading of roads (where applicable) be rehabilitated with indigenous terrestrial vegetation to create an open space corridor and reinstate the ecological buffer to the freshwater ecosystems. Natural growth of vegetation must be monitored and were deemed necessary; revegetation must be undertaken if feasible.

Considering that the proposed OHPL falls within the NEMA 32 m, GN509 100 m and 1:100-year flood line of freshwater ecosystems, the proposed OHPL will potentially require registration of an EA in terms of Activity 19 of GN 327, Listing Notice 1, with DEADP. A WULA will need to be registered with the DWS which under the authority and discretion of the DWS should qualify for a GA under the authority and discretion of the DWS, considering the overall **LOW** risk significance impact score.

All mitigation measures as stipulated in this EMPr and as described above must be implemented to prevent any negative edge effects from occurring in the freshwater ecosystem. Assuming that strict enforcement of cogent, well-developed mitigation measures takes place, the significance of impacts arising from the proposed overhead powerline installation & conveyance are likely to be reduced during the construction and operational phases assuming that a high level of mitigation takes place. Additional “good practice” mitigation measures applicable to a project of this nature are provided in the Freshwater Assessment, as well as this EMPr. Therefore, the specialist is of the opinion that the project can be considered for authorisation from a freshwater ecological perspective.

VEGETATION

According to the Western Cape Biodiversity Spatial Plan, the environment along the powerline alignment supports *Breede Alluvium Renosterveld* and remnant vegetation were in abundance. According to the “*National List of Ecosystems That Are Threatened and In Need of Protection (2012)*”, the *Breede Alluvium Renosterveld* vegetation type is listed as Vulnerable. A Botanical Impact Assessment was conducted to confirm if the vegetation is present and confirm its ecological sensitivity as the proposed project will result in potential vegetation clearance for the construction of the pylon footing structures.

Capensis Ecological Consulting (Pty) Ltd (Capensis) was commissioned by Guillaume Nel Environmental Consultants to carry out a botanical assessment for the construction of the Transhex overhead powerline, along the south eastern outskirts of the town of Worcester in the Western Cape Province.

According to the Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018) (VEGMAP), the predominant vegetation type occurring in the study area is *Breede Alluvium Renosterveld*. According to the 2007 Upper Breede River Valley fine-scale mapping project, (Helme, 2007), the study area is also home to two other vegetation types: a small section of *Worcester Renosterveld Karoo* in the north, with the main extent of the line passing through *Worcester Fynbos Renosterveld Mosaic*. Please refer to the image below:

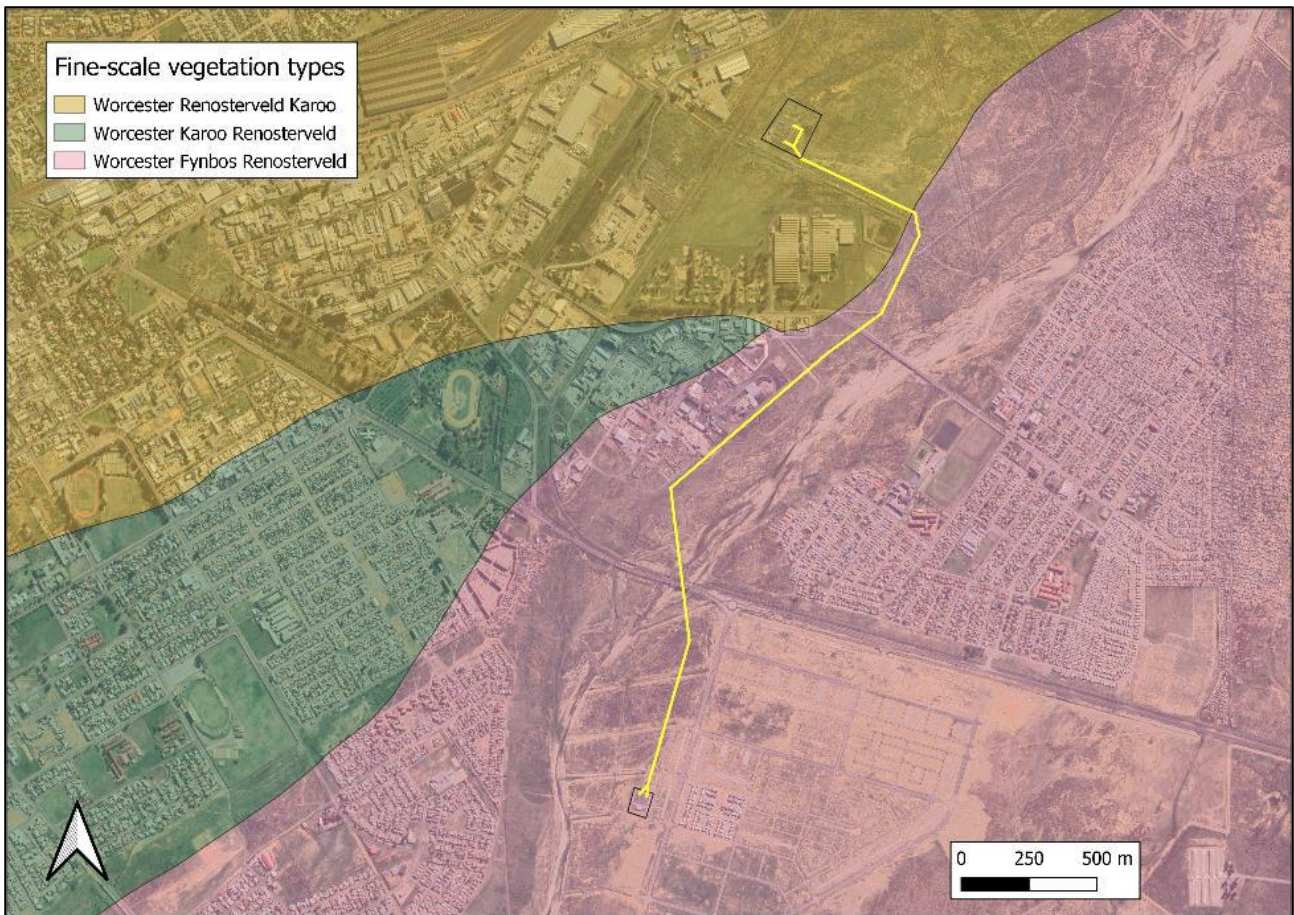


FIGURE 4: FINE SCALE VEGETATION MAP

The *Breede Alluvium Renosterveld* ecosystem is listed as Endangered (A1) in the NLTTE (Government Gazette, 2011). The vegetation type is listed as Endangered (B1) in the National Biodiversity Assessment 2018 (SANBI, 2019) and also as Endangered in the Western Cape State of Biodiversity Report (Turner, 2017), having been upgraded from Vulnerable status in 2016.

For the fine-scale vegetation types, ecosystem threat status is derived from the appendices of the technical report for the C.A.P.E. Fine-Scale systematic Conservation Planning Assessment (Pence, 2008). In the case of *Worcester Renosterveld Karoo*, the ecosystem threat status is given as Least Threatened (LT), while the remaining percentage of the ecosystem is 84.14% and the conservation target is 16% (Pence, 2008: 44). In the case of *Worcester Fynbos Renosterveld*, the ecosystem threat status is given as Vulnerable (VU), while the remaining percentage of the ecosystem is 41.99% and the conservation target is also 16% (Pence, 2008: 44).

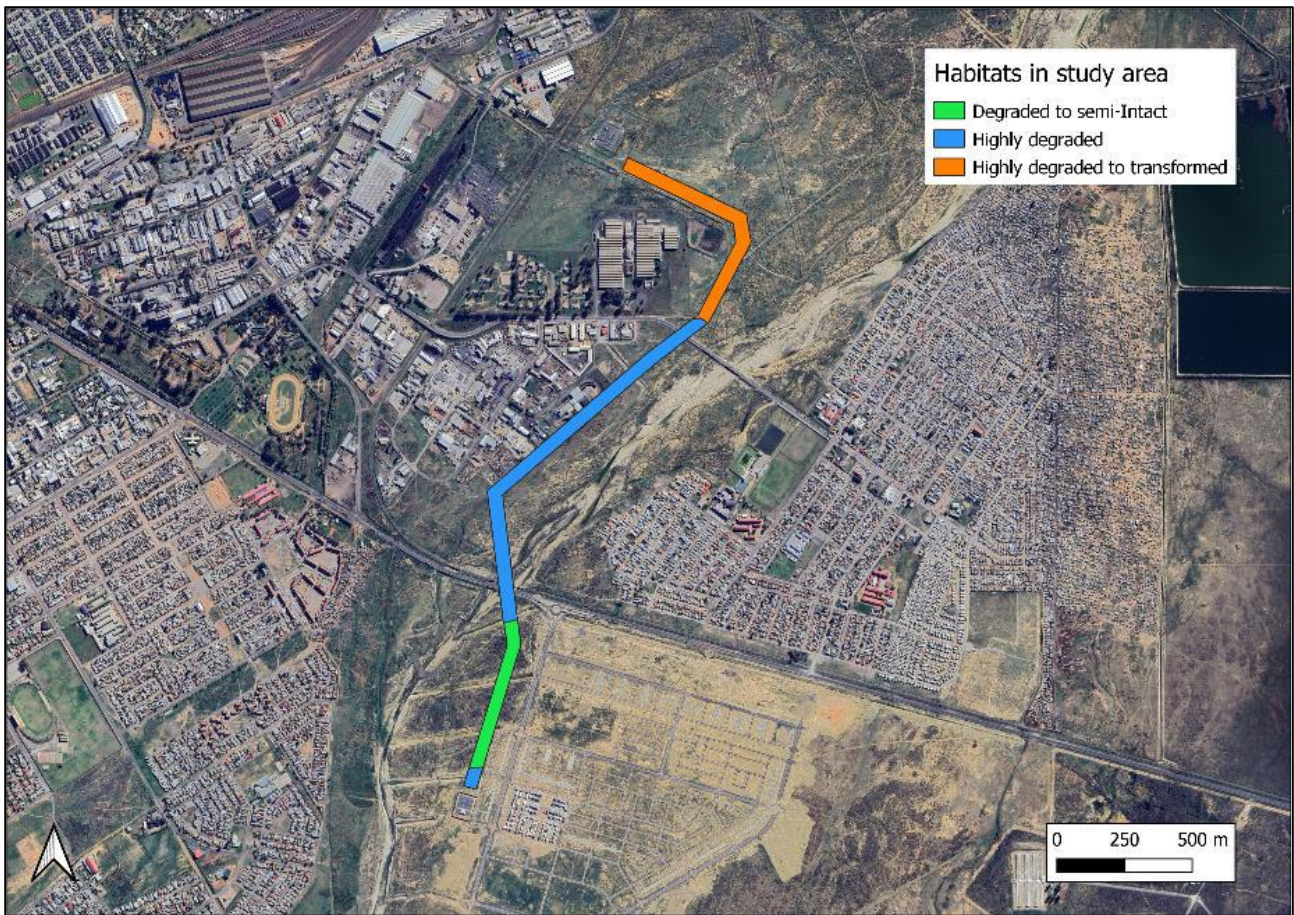


FIGURE 5: DIFFERENT HABITATS ASSOCIATED WITH THE POWERLINE ROUTE

Highly degraded to transformed habitat

At the far northern extent of the study area, the habitat is very close to entirely transformed (Please refer to Figure 5 above).

Highly degraded habitat

The longest section of the route passes through highly degraded vegetation. Although it is mapped as originally having comprised *Worcester Fynbos Renosterveld*, relatively few species were observed that could be considered typical of that vegetation type. The species recorded tended to be common, widespread and often pioneer species (predominantly indigenous). The fact that a relatively large number of species were recorded is explained by the heterogeneity of the highly degraded veld patches. Although all could be considered highly degraded, they often included very different communities of these common or pioneer plant species. The total number of plant species recorded is therefore quite high (Please refer to Figure 5 above).

Degraded to semi-intact habitat

For a portion of the study area, south of the Robertson Road (R60), the route passes through examples of semi-intact *Worcester Fynbos Renosterveld*, or *Brede Alluvium Renosterveld* according to the national vegetation types. However, the semi-intact habitat is punctuated with degraded habitat, at numerous points, such that it was not feasible to separate the two habitats. They are therefore grouped as degraded to semi-intact habitat. Channelled watercourses cut across

the route at several points too, and the far southernmost point of the route returns to highly degraded habitat. This relatively short section of the route has a large number of species, and unlike the previous sections, these include many species that are not pioneers or indicators of disturbance, and also three threatened species (Please refer to Figure 5 above).

The **highly degraded** and **highly degraded to transformed** habitats are **Very low Sensitivity**, not only because they are not representative of the original vegetation, but also because rehabilitation potential is low and is not recommended for these habitats.

The **degraded to semi-intact** habitat is **High sensitivity** for the following reasons:

1. According to the national vegetation map, the habitat represents an Endangered ecosystem (*Brede Alluvium Renosterveld*).
2. According to the fine-scale vegetation map, the habitat represents a Vulnerable ecosystem (*Worcester Fynbos Renosterveld*).
3. It preserves the habitat's original integrity, including several indigenous species, and continues to support ecological processes. This is especially the case with the semi-intact portions but is also the case even with the small and interspersed degraded portions.
4. The watercourses have inherent sensitivity as freshwater features, even though their ecological function has been somewhat compromised. The extent and sensitivity of these, and other watercourses (including the course of the Hex River where it crosses the study area) should be detailed in a freshwater assessment of the site.

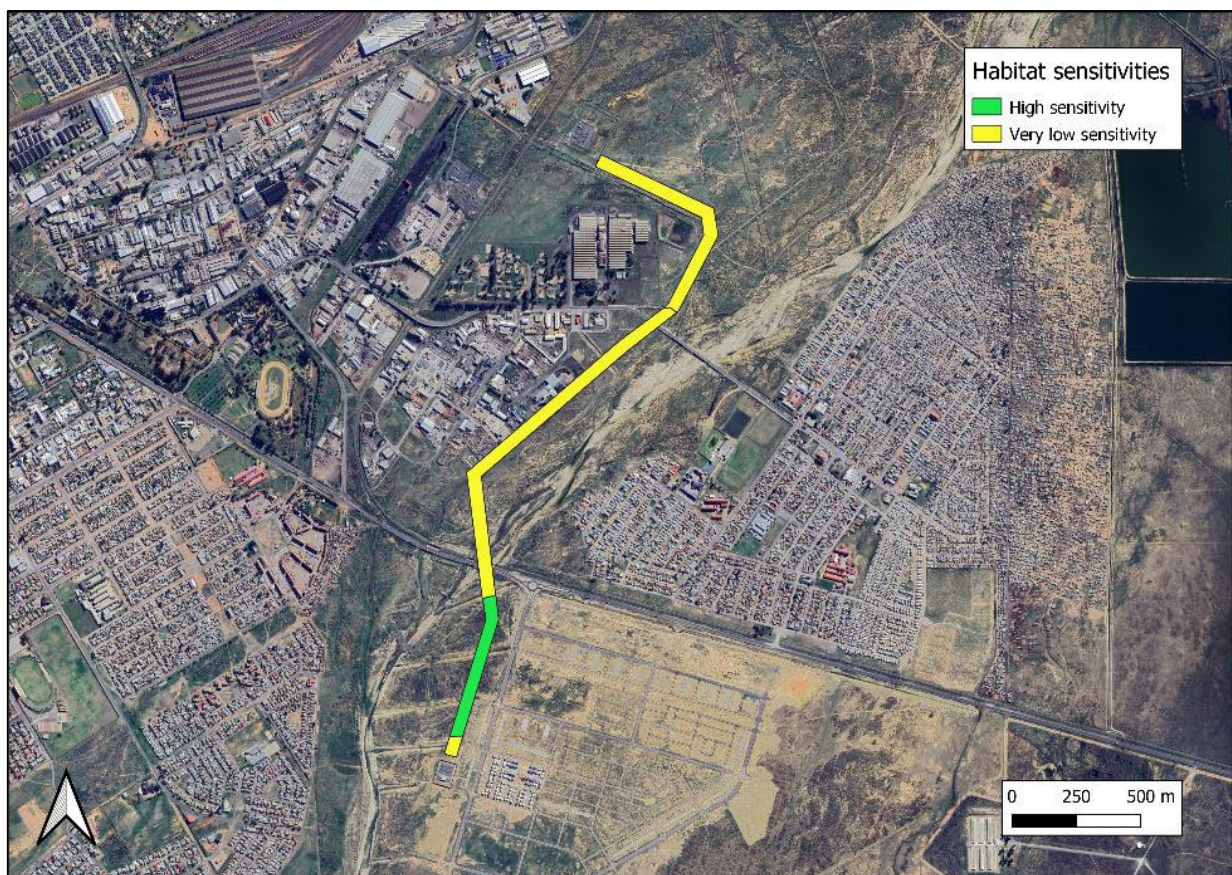


FIGURE 6: HABITAT SENSITIVITY MAP IN RELATION TO POWERLINE ROUTE

The proposed development occurs in an area of historical botanical significance. The predominant ecosystem mapped within the study area according to the national vegetation types, *Brede Alluvium Renosterveld*, is Endangered. However, most of the area has been highly modified (highly degraded

or transformed) in the past, and the only vegetation representative of the original ecosystem is located towards the south of the study area, south of the Robertson Road (R60). This habitat is considered to be of high sensitivity, while the remaining parts of the study area are considered to be of very low sensitivity.

The cumulative impacts of the proposed development are Very low from the terrestrial perspective; however, the overall riverine and floodplain function are again a potential concern from a freshwater perspective. This will be addressed in a separate freshwater ecology study. According to the Botanist, if the recommended mitigation measures are implemented accordingly, the construction of the proposed powerline is supported from a botanical perspective.

HERITAGE

An NID in terms of Section 38 of the NHRA was submitted to HWC on the 7th of June 2022. A positive ROD was received from HWC on 31 August 2022 (Please refer to Appendix E1 for a copy of the positive ROD).

AGRICULTURE

From an agricultural perspective, the proposed overhead powerline will not run through any cultivated land and won't traverse any land deemed to have agricultural potential. The proposed powerline will run adjacent to the Hex River for much of its alignment, therefore it is not considered that the proposed powerline project will have any negative impacts on agricultural resources.

AVIFAUNAL

The study area is of low and intermediate avifaunal importance. The Hex River is an important landscape feature as a result of its water channelling properties and as a corridor for avifaunal movement. However, as a result of its position within the town of Worcester and the associated anthropogenic impacts (dumping, fragmentation, industrial and residential development, AIP proliferation and the increased human presence) the habitat is not considered optimal for most avifauna. The probability of avifaunal SCC occurring or establishing viable populations in the long term within the study area is highly unlikely. Furthermore, the proposed transformation of habitat is negligible and thus potential impacts to SCC and avifauna are considered low.

From an avifaunal perspective and the findings of the site inspection the sensitivities attributed to the study area by the Screening Tool are disputed. The habitat associated with the study area is deemed to be of low and intermediate sensitivity/suitability for supporting viable populations of avifaunal SCC, especially in terms of nesting areas, areas of congregation or roosts. No SCC were observed, and current reporting rates indicate the presence of SCC within the study areas is sporadic at most. The Hex River may be utilised as a movement corridor for most avifauna, as such, it is recommended that bird flappers are installed where the proposed powerline spans this feature.

2.1.1 Summary of impacts associated with the proposed activity

Freshwater Impacts

The following components of the proposed overhead powerline and associated pylon infrastructure will traverse these freshwater ecosystems:

- The foundations of support towers 6 and 14 will be positioned within an EDL and a braided channel of the Hex River respectively;
- The Hex River will be traversed by the proposed overhead powerline for the section which spans between support towers 14 and 15; and
- Support towers 1 – 7, 22 and 23 will be within the 100 m GN509 ZoR and support towers 11 – 14 and 17 will be within the 1:100-year flood line of the Hex River.

Following the ecological assessment of the freshwater ecosystems, the DWS Risk Assessment Matrix was applied which determined that the site (powerline route), the earthworks and concrete works associated with the installation of powerline pylon support towers was determined to pose a **LOW**-risk significance to these freshwater ecosystems after considering stringent mitigation measures towards the manual down adjustment of the risk significance impact scores.

The activities associated with the construction and operational phases of the proposed overhead powerline based on the alignment provided by the proponent include:

- Site preparation within and at least 32 m away from freshwater ecosystems in terms vegetation removal and vehicular movement;
- Installation of the support tower foundations (pylons) within and at least 32 m away from freshwater ecosystems by means of earth works involving the excavation of foundation pits, stockpiling of soils and movement of construction vehicles;
- Installation of the support tower foundations within and at least 32 m away from freshwater ecosystems by means of the mixing and casting of concrete;
- Spanning of the proposed overhead powerline over the Hex River;
- Operation and maintenance of the proposed overhead powerline and;
- Operation and maintenance of the existing roads traversing freshwater ecosystems.

The site preparation, earthworks and concrete works associated with the installation of support towers 6 and 14 within an EDL and associated braided channel of the Hex River respectively was determined to pose a **Medium** risk significance to these freshwater ecosystems due to the powerline posing direct impacts. The significance risk rating was however be reduced to a **LOW** impact provided that the following stringent mitigation measures are followed:

- Activities must take place in the summer period to prevent erosion and sedimentation of freshwater ecosystems;
- The EDL and braided channel of the Hex River in which a portion of the respective support tower footprint will overlap must be stabilised against future flow events by laying down a single layer cobble bed. This will protect the exposed soil layer by preventing erosion and preserve the natural flow path of these freshwater ecosystems;
- All developed areas associated with the support towers must be compacted to natural soil compaction levels to prevent the formation of preferential surface flow paths and subsequent erosion. Conversely, areas compacted as a result of construction activities must be loosened to natural soil compaction levels;
- Vehicular movement must be limited to construction areas and must make use of existing freshwater ecosystem crossings to limit further disturbance to these systems;

- Support tower vertices must be stabilised against soil erosion by piling cobbles around the vertices and these piles must be monitored during the operation phase and repacked if necessary; and
- An alien vegetation management plan must be in place to monitor and manage alien vegetation that may establish around previously disturbed areas associated with the completed OHPL.

Direct and indirect impacts identified within the assessed freshwater ecosystems can predominantly be attributed to informal road crossings leading to limited alien and invasive species establishment. Considering that the proposed overhead powerline support structures (pylons) will be located within the assessed freshwater ecosystems in some cases, increased vehicular movement and infrastructure in the surrounding landscape may result in direct edge effects. Such edge effects may have cumulative impacts to the freshwater ecosystems, with specific mention of alien and invasive species establishment and increased sediment loads. With management and mitigation measures implemented during the construction phase and monitoring of support structures for any erosion during the operational phase, the direct and indirect negative impacts can be reduced, thus cumulative impact on the larger catchment can, therefore, be considered **low/limited**.

Should the recommended mitigation measures be implemented accordingly, a Low-risk significance is expected to occur. It is considered advantageous if impacted areas adjacent to the freshwater ecosystems (following installation of the support structures and grading of roads (where applicable) be rehabilitated with indigenous terrestrial vegetation to create an open space corridor and reinstate the ecological buffer to the freshwater ecosystems. Natural growth of vegetation must be monitored and where deemed necessary; revegetation must be undertaken if feasible.

Considering that the proposed OHPL falls within the NEMA 32 m, GN509 100 m and 1:100-year flood line of freshwater ecosystems, the proposed OHPL will potentially require registration of an EA in terms of Activity 19 of GN 327, Listing Notice 1, with DEADP. A WULA will need to be registered with the DWS which under the authority and discretion of the DWS should qualify for a GA under the authority and discretion of the DWS, considering the overall **LOW** risk significance impact score.

All mitigation measures as stipulated in this EMPr, RMMP (Appendix M) and as described above must be implemented to prevent any negative edge effects from occurring in the freshwater ecosystem. Assuming that strict enforcement of cogent, well-developed mitigation measures takes place, the significance of impacts arising from the proposed overhead powerline installation & conveyance are likely to be reduced during the construction and operational phases assuming that a high level of mitigation takes place. Additional “good practice” mitigation measures applicable to a project of this nature are provided in the Freshwater Assessment, as well as this EMPr. Therefore, the specialist is of the opinion that the project can be considered for authorisation from a freshwater ecological perspective.

Biodiversity Impacts

The proposed development occurs in an area of historical botanical significance. The predominant ecosystem mapped within the study area according to the national vegetation types, *Breedde Alluvium Renosterveld*, is Endangered. However, most of the area has been highly modified (highly degraded or transformed) in the past, and the only vegetation representative of the original ecosystem is located towards the south of the study area, south of the Robertson Road (R60). This habitat is considered to be of high sensitivity, while the remaining parts of the study area are considered to be of **very low** sensitivity.

The cumulative impacts of the proposed development are **Very low** from the terrestrial perspective; however, the overall riverine and floodplain function are again a potential concern from a freshwater perspective. This will be addressed in a separate freshwater ecology study. According to the Botanist, if the recommended mitigation measures are implemented accordingly, the construction of the proposed powerline is supported from a botanical perspective.

Faunal Impacts

No impact on Species of Conservation Concern expected with regards to faunal species. The remainder of the site contains little habitat for faunal species. Anthropogenic noise and past disturbance is also associated with the lack of faunal species present on site. The study area is of low and intermediate avifaunal importance. The Hex River is an important landscape feature as a result of its water channelling properties and as a corridor for avifaunal movement. However, as a result of its position within the town of Worcester and the associated anthropogenic impacts (dumping, fragmentation, industrial and residential development, AIP proliferation and the increased human presence) the habitat is not considered optimal for most avifauna. The probability of avifaunal SCC occurring or establishing viable populations in the long term within the study area is highly unlikely. Furthermore, the proposed transformation of habitat is negligible and thus potential impacts to SCC and avifauna are considered low.

From an avifaunal perspective and the findings of the site inspection the sensitivities attributed to the study area by the Screening Tool are disputed. The habitat associated with the study area is deemed to be of **low** and **intermediate** sensitivity/suitability for supporting viable populations of avifaunal SCC, especially in terms of nesting areas, areas of congregation or roosts. No SCC were observed, and current reporting rates indicate the presence of SCC within the study areas is sporadic at most. The Hex River may be utilised as a movement corridor for most avifauna, as such, it is recommended that bird flappers are installed where the proposed powerline spans this feature.

Heritage Impacts

No cultural or historical heritage resources in close proximity to the development footprint will be negatively affected by the proposed powerline project. It is important to note that an NID in terms of Section 38 of the NHRA was submitted to HWC on the 7th of June 2022. A positive ROD was received from HWC on 31 August 2022 (Please refer to Appendix E1 for a copy of the positive ROD).

Socio-Economic Impacts

The proposed powerline construction will run adjacent the low-cost housing developments, informal settlements and industrial areas, mostly within the regulated zone of the Hex River or within the 1:100-year flood line and is not expected to have any negative impacts on the socio-economic well-being of the people in close proximity to the powerline footprint. In fact, it is expected that the proposed project will result in positive spin-offs for the Worcester community as the overhead powerline construction will result in potential short-and-long term job opportunities and the increase in capacity of the electrical infrastructure supply.

Health, Traffic, Noise, Visual and Dust Impact

No long-term negative impacts are expected to stem from the proposed powerline development with regards to health and well-being (e.g. in terms of noise, odours, visual character and sense of place etc). There will be a noise, traffic and dust impact during the construction period, however this is temporary and will ultimately improve the overall electrical service delivery of the people of Worcester.

2.1.2 Breede Valley Municipality environmental management policy and commitments

The proponent understands the importance of conserving the environment and will endeavour to apply all necessary mitigation measures to conserve and maintain sensitive areas and prevent environmental degradation.

2.1.3 Interpretations

The implementation of the EMP is not an additional or “add on” requirement. The EMP is legally binding through NEMA and the relevant EA. This EMP is to be used during the planning, construction and operational phases of the proposed project. The Environmental Control Office, appointed by the developer after environmental approval, must use this EMP during the ECO audits to determine the developer’s compliance to it.

Further on, the proponent is to ensure that through the project tender process the EMP forms part of the Project Construction Contract Document to be incorporated in line with:

- General project specifications; and
- SANS 1200 A or SANS 1200 AA, as applicable.

The proponent is also to ensure that through any tender or appointment process, the operational EMP forms part of the management contract with all service providers and contractors, for a period of time as stipulated by the DEA&DP during which the development will be audited for compliance to the operational EMP. This EMP is compiled in line with relevant legislation and general construction project specifications. However, to ensure sound environmental practice, the measures as described in the operational EMP should be implemented for the full operational life of the development.

2.1.4 Project phase

The first part of this EMP is specifically compiled for the ***period of time prior to commencement of and activities associated with construction of the above-mentioned activity***, and for the ***operational phase*** of the proposed development.

If and when applicable, where specific activities of the proposed development fall outside of the general principles contained herein, the Department will attach further 'activity – specific' EMP's as appendices to this document.

2.1.5 Role players and responsibility matrix

In order for the EMP to be successfully implemented, all the role players involved in the project need to co-operate. For this to happen, role players must have a clear understanding of their roles and responsibilities in the project, must be professional, form respectful and transparent relationships, and maintain open lines of communication. The EMP therefore clearly defines the role players involved and indicates their role in the implementation of the generic EMP.

Typically, these role players or the project team may include the Authorities (A), Other Authority (OA), Developer/Proponent (D), Consulting Engineers (CE), Resident Engineer (RE), Environmental Officers (EO), Environmental Site Officer (ESO), Environmental Control Officer (ECO), Project Manager (PM), Contractors (C), Environmental Assessment Practitioner (EAP) and Property Owners Association (POA). Furthermore, landowners, interested and affected parties and the relevant environmental and project specialists are also important role players.

This EMP is to be implemented by the Holder of the EA. The holder of the EA will be directly responsible for the Planning Phase of the EMP and will have the responsibility to appoint a contractor and an ECO. The contractor must implement the Construction Phase EMP (CEMP) whilst the ECO will audit compliance throughout the construction period. Although the contractor is responsible for implementing the CEMP, the holder of the EA is ultimately responsible for compliance with the conditions contained therein. The Operational Phase EMP (OEMP) must be implemented by the holder of the EA.

SECTION 3 – ENFORCEMENT, MONITORING AND AUDITING

3.1 PRE-CONSTRUCTION AND CONSTRUCTION PHASE

The Breede Valley Municipality must appoint, at their own cost, an **ECO** and full time EO (as part of the construction team) who will oversee the implementation of the EMP.

The Breede Valley Municipality and DEADP (Department of Environmental Affairs and Development Planning) must be informed of the appointment of the **ECO** prior to construction activities. Please note that the responsibility of the particular ECO may end at the end of the construction period. In the event that an ECO is appointed during the operational phase, it must be noted that this ECO may be different from the original ECO and the Department of Environmental Affairs and Development Planning (DEADP) as well as the Breede Valley Municipality must be notified of this appointment again.

The independent ECO is responsible for fortnightly audits on compliance to relevant environmental legislation, conditions of the Environmental Authorisation (EA), and the EMP for the project.

The ECO shall conduct fortnightly independent environmental audits. **Monthly Audit reports** are to verify the projects compliance with the EMP and conditions of the Environmental Authorisation (EA).

Before any construction activities commence, the ECO must compile, for the approval by the Department, an audit checklist based on the contents of this EMP and conditions of the Environmental Authorisation (EA). The ECO shall at the request of the Department forward audit reports to the Department and the *Breede Valley Municipality* at a frequency determined by the Department which shall be stipulated in the Environmental Authorisation (EA). Evidence of the following as **key performance indicators**, must be included in the audit reports:

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

A copy of all ESO and EO monitoring reports, contractor method statements and pro forma documentation must be held by the ESO and/or the EO on site and be made available to the Department and or the ECO upon request.

In terms of Regulation 34 of the NEMA EIA Regulations, 2014 (as amended), the holder must conduct environmental audits to determine compliance with the conditions of the Environmental Authorisation and the EMP and submit Environmental Audit Reports to the Competent Authority. The Audit Report must be prepared by an independent person and must contain all the information required in Appendix 7 of the NEMA EIA Regulations, 2014 (as amended).

3.2 OPERATIONAL PHASE

The ECO shall conduct, at a frequency as determined by the Department of Environmental Affairs and Development Planning (DEADP) and stipulated in the relevant Environmental Authorisation (EA) for the project, independent environmental audits. The audits are to verify the developments compliance with the operational EMP and conditions of the Environmental Authorisation (EA).

The ECO must compile, for the approval by the Department of Environmental Affairs and Development Planning (DEADP), an audit checklist based on the contents of this EMP and conditions of the Environmental Authorisation (EA). The ECO shall at the request of the Department of Environmental Affairs and Development Planning (DEADP) forward audit reports to the Department at a frequency determined by the Department which shall be stipulated in the Environmental Authorisation (EA).

The following **Key Performance Indicators** must be included in the audit reports:

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

The minutes of site meetings, to which the ECO will have unrestricted access to, shall be the official record of environmental activities, complaints and communications. These minutes will be circulated to the entire project team. A copy of the standard site meeting agenda is available on request.

3.3 FORMAL ENVIRONMENTAL COMMUNICATION CHANNELS

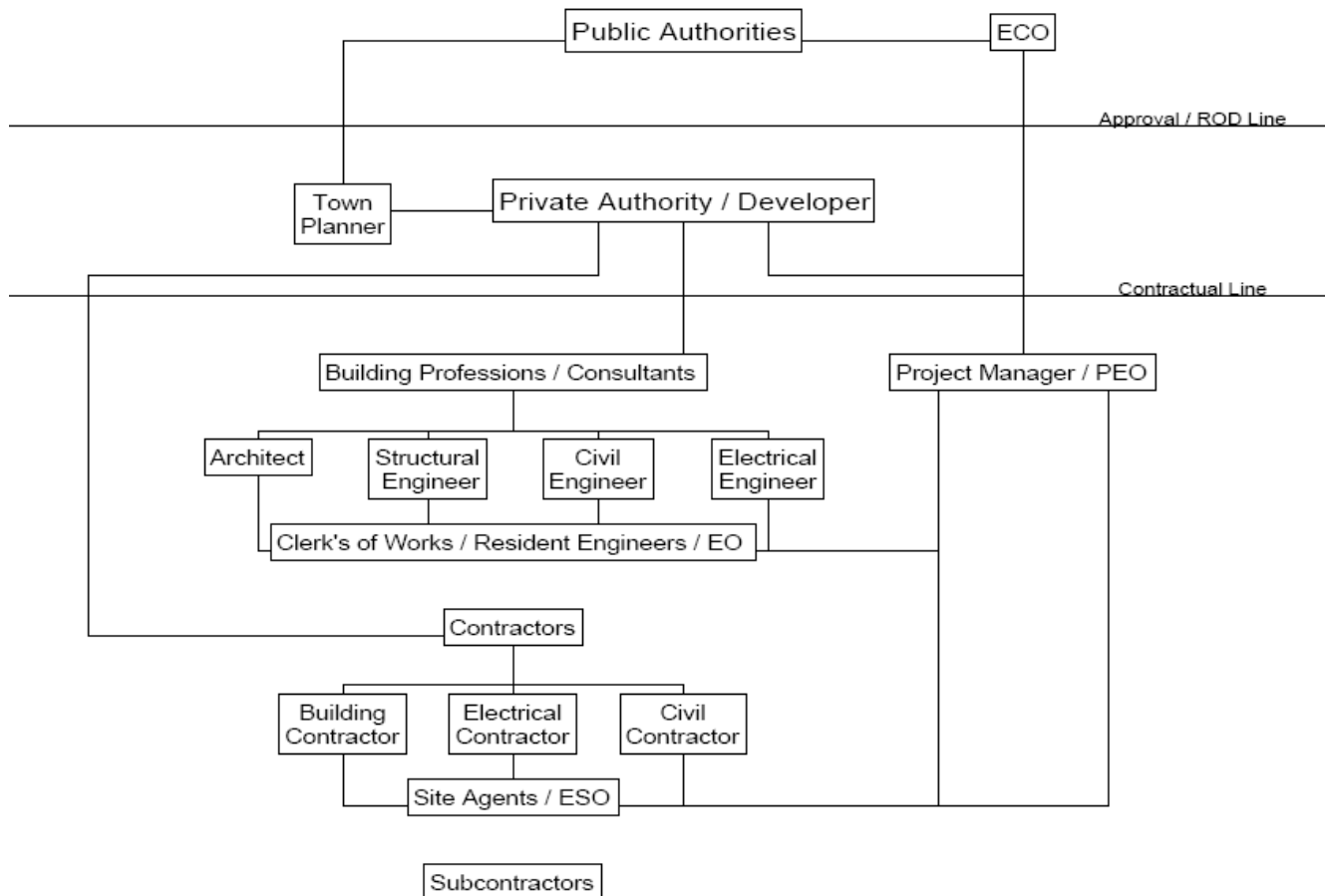


FIGURE 7: REPORTING STRUCTURE AND ROLE PLAYERS INVOLVED IN THE PROPOSED TRANSHEx OHPL EMP

Please note that due to the timeline of the development as well as the coming and leaving of consultants and contractors, as well as the many crossed channels of communication in the DEAD&DP EMP Guideline, it was decided by the project team to use the GACP-channels of communication whereby the Project Manager remains the central pivot between all the disciplines. All instructions and reports shall flow through the Project Manager (PM). In the environmental matters the PM becomes the Project Environmental Officer (PEO).

3.4 MEASUREMENT AND PAYMENT

It is understood that environmental requirements included in this EMP will entail costs over and above those of the civil requirements. These include provision for: mitigation and enhancement actions; training and environmental awareness requirements; monitoring; auditing; and corrective actions. The proponent shall recognise this and make provision for it in the tender. Costing for management action should be done with inputs and advice from appropriate technical members of the project team and relevant EAP who have knowledge of the management actions being recommended as well as practical experience in implementing similar measures and techniques.

A lump sum must be allocated for the management of Environmental Specifications where it is not possible to cost requirements of the EMP.

3.6 GENERAL GUIDELINES

Guidelines as per standardised construction documentation must be used.

3.7 AWARENESS (INDUCTION) TRAINING

3.7.1 Construction Phase

The EO or ESO, or ECO are responsible in ensuring everyone on site is given an environmental awareness induction session which not only clearly defines what the environment is and specifics detailing the local environment but outlines the requirements of the EMP as a management tool to protect the environment.

Refresher courses must be conducted as and when required. The EO or ESO must ensure daily toolbox talks include alerting the workforce to particular environmental concerns associated with the tasks for that day or the area/habitat in which they are working. Awareness posters and a handout must be produced to create awareness throughout the site.

3.7.2 Operational Phase

The ECO is responsible in ensuring everyone involved in the operation of the development at ground level receives an environmental awareness induction which not only clearly defines what the environment is and specifics detailing the local environment but outlines the requirements of the EMP as a management tool to protect the environment.

Awareness posters and a handout must be produced to create awareness throughout the site.

3.8 SITE DOCUMENTATION

3.8.1 Construction Phase

The following is list of documentation that must be held on site and must be made available to the ECO and/or the Department of Environmental Affairs and Development Planning (DEADP) on request.

- Access negotiations and physical access plan
- Site daily diary /instruction book
- Records of all remediation / rehabilitation activities
- Copies of EO reports (management and monitoring)
- Environmental Management Programme (EMP)
- Complaints register

3.8.2 Operational Phase

The following is a list of documentation which must be held on sight and must be made available to the ECO and/or the Department of Environmental Affairs and Development Planning (DEADP) on request.

- Environmental monitoring reports (if required)
- Records of all remediation / rehabilitation activities (if required)
- Environmental Management Programme (EMP)
- Complaints register

3.8.3 Pro forma documentation

3.8.3.1 Prior to the commencement of construction activities

The following attached pro forma documentation is to be filled out and is binding to the EMP and project contract and includes, but not limited to, the following:

- Declaration of understanding by the Developer
- Declaration of understanding by the Contractor

3.8.3.2 During construction activities

The following attached pro forma documentation is to be filled out and maintained. These are binding to the EMP and project contract. They include, but are not limited to, the following:

- Environmental incidents
- Records of all remediation / rehabilitation activities

3.8.3.2 During the Operational Phase

The following attached pro forma documentation is to be filled out and is binding to the EMP and project contract and includes, but not limited to, the following:

- Declaration of understanding by the Proponent
- Environmental incidents

3.9 TOLERANCES AND NON-COMPLIANCE

The independent ECO is responsible for fortnightly audits on compliance to relevant environmental legislation, conditions of the Environmental Authorisation (EA), and the EMP for the project.

The ECO shall conduct fortnightly independent environmental audits. **Monthly Audit reports** are to verify the projects compliance with the EMP and conditions of the Environmental Authorisation (EA).

Should the contractor show repeated non-compliance in terms of the audits, a range of fines may be issued to the contractor. These fines are included as part of the Construction EMP.

The Engineer, in conjunction with the ECO, shall be the judge as to what constitutes a transgression in terms of this clause, subject to the General Conditions of Contract.

SECTION 4 - GENERIC CONSTRUCTION PHASE EMP - IMPLIMENTATION

4.1 PREAMBLE

The point of departure for the application, the proposed construction of a 66kV overhead powerline from the Worcester Industrial Substation to the Transhex Substation in Worcester, Western Cape, EMP is to empower a pro-active rather than re-active approach to environmental performance by addressing potential problems before they occur. This will limit corrective measures needed during the construction phase of the project. Therefore, the purpose of this EMP is to provide management measures that must be implemented by *Motheo Construction Group (Pty) Ltd. / Breede Valley Municipality*, and all contractors and sub-contractors alike to ensure that the potential impacts of the proposed development are minimised. It must also be ensured that the EMP is maintained and upheld as a dynamic document in order for the project team to add or improve on issues that might be considered left out or not relevant to the project. In such instances the Department of Environmental Affairs and Development Planning (DEADP) may authorise the ECO to make such changes.

The following tables form the core mitigation measures appropriate to the pre-construction and construction phase. The tables present, the objectives to be achieved and the management actions that needs to be implemented in order to mitigate the negative impacts and enhance the benefits of the project. Associated responsibilities, criteria/targets and timeframes are clearly specified.

The ‘**pre-construction**’ section of this generic EMP, refers to the period of time leading up to and prior to commencement of construction activities, and is included to ensure pro-active environmental management measures with the goal of identifying avoidable environmental damage at the outset and sustain optimal environmental performance throughout the construction phase.

Most impacts will occur during the construction phase and must be mitigated through the contingency plans identified in the pre-construction phase.

The bulk of environmental impacts will have immediate effect during the ‘construction’ phase (e.g., noise, dust, and water pollution). If the site is monitored on a continual basis during the construction phase, it is possible to identify these impacts as they occur. These impacts will then be mitigated through the measures outlined in this section, together with a commitment to sound environmental management from the project team.

The “construction” section refers to all construction and its operation-related activities that will occur within the approved area and access roads, until the project is completed. This “construction” section is divided into three functional areas, namely “materials”; “plant”; and “construction”. Each of these functional areas within the EMP contains specific generic mitigation requirements and requested contractor method statements stipulated where required.

Many potential environmental impacts will have immediate or long-term effects during the ‘operational’ phase (e.g., noise, waste management, and water pollution). If the development is monitored on a continual basis during operations, it is possible to identify these impacts as they occur. These impacts will then be mitigated through the measures outlined in this section, together with a commitment to sound environmental management from the proponent and management team.

It must be noted that the responsible party for the majority of the mitigation measures is that of the Management body, unless otherwise stipulated. The names of the responsible parties must be made available to Department of Environmental Affairs and Development Planning (DEADP) for record purposes.

The management body must ensure that a maintenance team is employed with the correct equipment and skill to maintain boardwalks, pathways, fences etc. The following tables will refer to the responsible party as “Management body: ‘to be announced’ and “maintenance crew”.

4.2 STRUCTURE AND CONTENTS OF THE TABLES

The table consists of seven parts as follows:

“Phase of development” - This row will identify either pre-construction (planning) or actual construction phase.

“Impact / issue” - This row will identify the issue being addressed, e.g. Materials, site demarcation, heritage, etc.

Mitigation Measure - This column will include all the necessary mitigation measures for each impact/issue’.

Management objectives - This column will indicate what the management objectives to be achieved for each mitigation measure are.

Measurable targets - This column will indicate what evidence is to be used as an indication to whether or not the ‘Management objectives’ have been implemented and hence achieved.

Responsible party - This column will provide information as to which role player, e.g. ECO, RE, etc. is responsible for the implementation and or management of each mitigation measure.

Frequency of action - These columns provide time guidelines for the ‘Responsible party’ by which he/she is to action or manage the required mitigation.

4.2.1 SPECIALIST RECOMMENDATIONS

4.2.1.1 Pre-Construction and Construction Phases

The last part of the table provides space for the EAP to add specialist recommendations that need to be addressed during the pre-construction and construction phases.

4.2.1.2 Operational Phase

Additional requirements may need to be added to the table pending conditions required in the Environmental Authorisation (EA). The last part of the table provides space for such conditions, which must be added before the “declaration of understanding” is signed by the proponent and ECO.

TABLE 2: THE PROPOSED CONSTRUCTION OF A 66KV OVERHEAD POWERLINE FROM THE WORCESTER INDUSTRIAL SUBSTATION TO THE TRANSHEX SUBSTATION, WORCESTER, WESTERN CAPE, PRE-CONSTRUCTION (PLANNING) PHASE EMP

Phase of development	PRE-CONSTRUCTION (PLANNING)				
Impact / issue	GENERAL				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	
Project contract and programme The EMP must be included as part of the tender documentation thereby making it part of the enquiry document to make the recommendations and constraints, as set out in this document, enforceable under the general conditions of contract. A copy of this EMP must be available on site. The Contractor shall ensure that all the personnel on site, sub-contractors, suppliers, etc. are familiar with and understand the specifications contained in the EMP.	- Contingencies for minimising negative impacts anticipated to occur during the construction phase - Ensure environmental awareness and formalise environmental responsibilities and implementation	- Contract records - Signed declaration pro forma's	Project team		
Appointments and duties of project team The contact details for the ECO, RE, EO, Contractor and ESO shall be completed on the attached pro forma and a copy kept on site. This document must be made available to the Department of Environmental Affairs and Development Planning (DEADP) on request. Before construction activities commence, role players must have a clear indication to their role in the implementation of this EMP. Subcontractor(s) contracts with the principle contractor must contain a clause to the effect that the disposal of all construction-generated refuse / waste to an officially approved dumping site is the responsibility of the subcontractor in question and that the subcontractors are	Contingencies for minimising negative impacts anticipated to occur during the construction phase	- Contract records - Signed declaration pro forma's	Project team		

Phase of development	PRE-CONSTRUCTION (PLANNING)			
Impact / issue	GENERAL			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
bound to the management activities stipulated in this EMP.				
Site demarcation and development The surveys for the overall project area and construction footprint as approved in the Environmental Authorisation (EA) must be complete and clearly demarcated before the contractors set up their crew camps or begin construction. All relevant 'general' and 'specific' conditions contained in the Environmental Authorisation (EA) must be included in the space provided below and included as part of this EMP when the "<i>declaration of understanding</i>" is signed by Breede Valley Municipality, the Engineer and the Contractor. The EO and ECO must be on site in order to make sure the correct areas are fully demarcated.	Contingencies for minimising negative impacts anticipated to occur during the construction phase	- Demarcated area's - Filled in section of this document	EAP specialist, Engineer, contractor	As and when required

Phase of development	PRE-CONSTRUCTION (PLANNING)				
Impact / issue	GENERAL				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	
Emergencies, non-compliance and communication The contractor must provide method statements on the protocols to be followed, and contingencies to be put in place for the following, before construction may begin: • Emergency spills procedures for the contamination of soils from spills and fire • Handling & storage of oils and chemicals • Cement and concrete batching, which includes the storage, washing & disposal of cement, packaging, tools and plant. • Diesel tanks and refuelling procedures • Crew camps and construction lay down areas • Workshop maintenance and cleaning of plant Communication in emergencies must follow the suggested lines of communication as stipulated.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase	• Method statements	Contractor, Engineer	As and when required	

Phase of development	PRE-CONSTRUCTION (PLANNING)			
Impact / issue	GENERAL			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
Fauna All <i>possible</i> sensitive faunal species present on the site must be rescued and relocated to another suitable location prior to the commencement of construction activities. They can be re-located to the wetland area in the Wellington Industrial Park.	To protect possible faunal species on the site from being exterminated.	Should sensitive species be present on the site, the correct re-establishment of these species	Contractor and Developer	Before construction commences

TABLE 3: ADDITIONAL CONDITIONS FOR THE PROPOSED CONSTRUCTION OF A 66KV OVERHEAD POWERLINE FROM THE WORCESTER INDUSTRIAL SUBSTATION TO THE TRANSHEX SUBSTATION, WORCESTER, WESTERN CAPE, EMP

Phase of development	PLANNING	EA reference number	16/3/31/B2/32/1021/23		
Impact / issue	EA Conditions				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	OF
<u>Freshwater Management Measures (as per specialist report conducted by FEN Consulting (Pty) Ltd.</u> 1. Site preparation prior to construction activities at least 32m away from freshwater ecosystems but within the 100m GN509 of the EDLs and the 1:100-year flood line of the Hex River (Support Tower 1, 2, 3, 4, 7, 12, 13, 17, 22, 23). - Additional freshwater ecosystem crossings must be limited, and use made of existing freshwater ecosystem crossings to access the project sites which will limit edge effects, erosion and sedimentation of the freshwater ecosystems during the construction phase; - The reaches of the freshwater ecosystems where no OHPL activities are planned must be considered no-go areas; - Contractor laydown areas, vehicle re-fuelling areas and material storage facilities to remain outside of the	- Manage transportation of construction materials to avoid disturbances to soil, and sedimentation and erosion; - Prevent loss of freshwater ecosystem vegetation, associated habitat and ecosystem services; - Prevent soil and stormwater contamination from potentially spilled oils and hydrocarbons originating from construction vehicles. - Prevent proliferation of alien and/or invasive vegetation.	- Compliance, enforcement & monitoring of proposed mitigation measures/method statements. - No evidence of soil disturbance, erosion, contamination of watercourse and associated disturbance to vegetation. - No signs of alien vegetation proliferation.	Motheo Construction Group/Breede Valley Municipality/ECO/Contractor	As and when required	

Phase of development	PLANNING	EA reference number	16/3/3/1/B2/32/1021/23		
Impact / issue	EA Conditions				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	OF
freshwater ecosystems and their associated 32 m NEMA exclusion buffer and outside of the 100 m GN509 ZoR (due to the potential risk of pollution associated with these dangerous goods • Vehicles to be equipped with drip trays to prevent spillage in the environment ; • Removed vegetation must be stockpiled outside of the delineated boundary of the freshwater ecosystem. The footprint areas and height of these stockpiles must be kept to a minimum. Should the vegetation not be suitable for reinstatement after the construction phase or be alien/invasive vegetation species; the material must be disposed of at a registered garden refuse site a.s.a.p. and may not be burned or mulched on site; • The clearing of vegetation must be limited to woody vegetation above a certain minimum clearance height within a strip width not exceeding 4 m wide and must remain within the proposed road/jeep track servitude only and may not extend beyond this area. No unnecessary disturbance within the active channel of the EDLs will					

Phase of development	PLANNING	EA reference number	16/3/3/1/B2/32/1021/23		
Impact / issue	EA Conditions				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	OF
be acceptable and lower lying shrub growth must be retained both within the freshwater ecosystems as well as their immediate catchment to afford them protection from erosion and sedimentation; - Activities must take place in the summer period to prevent erosion and sedimentation of freshwater ecosystems; and - The EDL and braided channel must be suitably rehabilitated in terms of erosion control, alien vegetation removal and reinstatement of indigenous vegetation. 2. Site preparation prior to construction activities outside of the delineated extent of freshwater ecosystems, but within 32m from freshwater ecosystems (Support Tower 5 & 11). - Additional freshwater ecosystem crossings must be limited, and use made of existing freshwater ecosystem crossings to access the project sites which will limit edge effects, erosion and sedimentation of the					

Phase of development	PLANNING	EA reference number	16/3/3/1/B2/32/1021/23		
Impact / issue	EA Conditions				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	OF
freshwater ecosystems during the construction phase; • The reaches of the freshwater ecosystems where no OHPL activities are planned must be considered no-go areas; • Contractor laydown areas, vehicle re-fuelling areas and material storage facilities to remain outside of the freshwater ecosystems and their associated 32 m NEMA exclusion buffer and outside of the 100 m GN509 ZoR (due to the potential risk of pollution associated with these dangerous goods • Vehicles to be equipped with drip trays to prevent spillage in the environment ; • Removed vegetation must be stockpiled outside of the delineated boundary of the freshwater ecosystem. The footprint areas and height of these stockpiles must be kept to a minimum. Should the vegetation not be suitable for reinstatement after the construction phase or be alien/invasive vegetation species; the material must be disposed of at a registered garden refuse					

Phase of development	PLANNING	EA reference number	16/3/3/1/B2/32/1021/23		
Impact / issue	EA Conditions				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	OF
site a.s.a.p. and may not be burned or mulched on site; • The clearing of vegetation must be limited to woody vegetation above a certain minimum clearance height within a strip width not exceeding 4 m wide and must remain within the proposed road/jeep track servitude only and may not extend beyond this area. No unnecessary disturbance within the active channel of the EDLs will be acceptable and lower lying shrub growth must be retained both within the freshwater ecosystems as well as their immediate catchment to afford them protection from erosion and sedimentation; • Activities must take place in the summer period to prevent erosion and sedimentation of freshwater ecosystems; and • The EDL and braided channel must be suitably rehabilitated in terms of erosion control, alien vegetation removal and reinstatement of indigenous vegetation. 3. Site preparation prior to construction activities within the EDLs and braided					

Phase of development	PLANNING	EA reference number	16/3/3/1/B2/32/1021/23		
Impact / issue	EA Conditions				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	OF
channels of the Hex River (Support Tower 6 & 14). • Additional freshwater ecosystem crossings must be limited, and use made of existing freshwater ecosystem crossings to access the project sites which will limit edge effects, erosion and sedimentation of the freshwater ecosystems during the construction phase; • The reaches of the freshwater ecosystems where no OHPL activities are planned must be considered no-go areas; • Contractor laydown areas, vehicle re-fuelling areas and material storage facilities to remain outside of the freshwater ecosystems and their associated 32 m NEMA exclusion buffer and outside of the 100 m GN509 ZoR (due to the potential risk of pollution associated with these dangerous goods • Vehicles to be equipped with drip trays to prevent spillage in the environment ; • Removed vegetation must be stockpiled outside of the delineated boundary of the freshwater ecosystem. The footprint areas and height of these stockpiles must be kept to a minimum. Should the vegetation not be					

Phase of development	PLANNING	EA reference number	16/3/3/1/B2/32/1021/23		
Impact / issue	EA Conditions				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY ACTION	OF
suitable for reinstatement after the construction phase or be alien/invasive vegetation species; the material must be disposed of at a registered garden refuse site a.s.a.p. and may not be burned or mulched on site; • The clearing of vegetation must be limited to woody vegetation above a certain minimum clearance height within a strip width not exceeding 4 m wide and must remain within the proposed road/jeep track servitude only and may not extend beyond this area. No unnecessary disturbance within the active channel of the EDLs will be acceptable and lower lying shrub growth must be retained both within the freshwater ecosystems as well as their immediate catchment to afford them protection from erosion and sedimentation; • Activities must take place in the summer period to prevent erosion and sedimentation of freshwater ecosystems; and • The EDL and braided channel must be suitably rehabilitated in terms of erosion control, alien vegetation removal and reinstatement of indigenous vegetation.					

Phase of development	PLANNING	EA reference number	16/3/3/1/B2/32/1021/23		
Impact / issue	EA Conditions				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	OF
<u>Botanical Management Measures</u> The following mitigation measures were identified by the botanical specialist (Capensis Ecological Consulting Pty Ltd), 2022. • Topsoil management- Moved to the side during construction, protected, and then returned after construction. • Minimising footprint- Working area is to be cordoned off before construction starts to prevent unnecessary damage to surrounding habitat. • Site access routes- The sites for the pylon construction should be accessed from the existing road, immediately to the east of the high sensitivity portion of the study area, south of the R60. A new road should not be constructed. • The vegetation is relatively low, meaning that with some care in selecting the exact access routes, it should not be necessary to brush-cut the vegetation or engage in earthworks when establishing the access routes. • The topsoil should then be removed, at the commencement of construction, and placed immediately alongside the site, to be protected from erosion and covered with hessian so that	• Keep construction footprint size to a minimum. • Use existing roads for site access. • Prioritise topsoil management	• Compliance, enforcement & monitoring of proposed mitigation measures/method statements. • No evidence of new access roads. • No loss/disturbance to topsoil.	• Motheo Construction Group/Breede Valley Municipality/ECO/Contractor	• As and when required.	

Phase of development	PLANNING	EA reference number	16/3/3/1/B2/32/1021/23		
Impact / issue	EA Conditions				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	OF
it can be returned after construction is complete. • The moving aside of some of the larger boulders should be sufficient in most cases. These routes will then be useful for the ongoing maintenance of the line. • An Environmental Control Officer (ECO) must be present and oversee the above activities.					

TABLE 4: THE PROPOSED CONSTRUCTION OF A 66KV OVERHEAD POWERLINE FROM THE WORCESTER INDUSTRIAL SUBSTATION TO THE TRANSHEX SUBSTATION, WORCESTER, WESTERN CAPE, CONSTRUCTION PHASE EMP (MATERIALS)

Phase development of	CONSTRUCTION				
Impact / issue	Materials				
MITIGATION MEASURE		MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
Handling					
Stockpiles All stockpiled material must be easily accessible on site without any environmental damage of the surrounding properties. All temporarily stockpiled material must be stockpiled in such a way that the spread of materials are minimised. In the case of strong wind and/or rain all stockpile material must be covered with a tarpaulin in order to prevent erosion. The stockpiles may only be placed within the demarcated areas the location of which must be approved by the RE, EO or ECO. Stockpiles are to be stabilised if signs of erosion are visible. Soils from different horizons must be stockpiled such that topsoil stockpiles do not get contaminated by sub-soil material. Topsoil stockpiles must be monitored for invasive exotic vegetation growth. Contractors must remediate as and when required in consultation with the EO, RE and ECO. No plant, workforce or any construction related activities may be allowed onto the topsoil stockpiles.		• Minimise scarring of the soil surface and land features • Minimise disturbance and loss of soil • Minimise construction footprint • Maintain the integrity of topsoil's for landscaping and rehabilitation • Containment of invasive plant growth by means of topsoil monitoring. • Minimise contamination of storm water run-off	• No visible erosion scars once construction is completed • The footprint has not exceeded the agreed site in terms of EA etc. • Minimal invasive weed and grass growth • No signs of sedimentation and erosion	Contractor	Daily

Phase of development	CONSTRUCTION			
Impact / issue	Materials			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
Topsoil stockpiles must be clearly demarcated as no-go areas. Stockpiles must not be higher than 2m to avoid compaction thereby maintaining the soil integrity and chemical composition.				
Oil and chemicals The contractor must provide method statements for the "handling & storage of oils and chemicals", "fire", and "emergency spills procedures" These substances must be confined to specific and secured areas within the contractor's camp, and in a way that does not pose a danger of pollution even during times of high rainfall. These areas must be imperviously bunded with adequate containment (at least 1.1 times the volume of the fuel) for potential spills or leaks. Drip trays (minimum of 10cm deep) must be placed under all machinery and vehicles. The surface area of the drip trays will be dependent on the vehicle and must be large enough to catch any hydrocarbons that may leak from the vehicle while standing. The depth of the drip tray must be determined considering the total amount / volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle. Any spills larger than 100l should be reported to all local authorities.	• Prevention of pollution of the environment • Minimise chances of transgression of the acts controlling pollution	• No pollution of the environment and especially the river • No litigation due to transgression of pollution control acts • No complaints from I & AP's • Method statements	Contractor	Daily

Phase of development	CONSTRUCTION			
Impact / issue	Materials			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
Spill kits must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. Spill kits must be made up of material/product that is in line with environmental best practice (Sunsorb is a recommended product that is environmentally friendly). All spilled hazardous substances must be contained in impermeable containers for removal to a General & Hazardous Waste Landfill site, (this includes contaminated soils, and drenched spill kit material).				
Cement It is suggested that ready-mix cement be used as far as possible to minimize the possible impact on the surrounding environment. Cement batching areas must be located in consultation with the RE, EO or ECO to ensure residues are contained and that the proposed location does not fall within sensitive areas such as drainage lines, storm water channels, etc. The contractors must provide and maintain a method statement for "cement and concrete batching" which includes the storage, washing & disposal of cement, packaging, tools and plant. The mixing of concrete shall only be done at selected sites on mortar boards or similar structures to contain	- Minimise the possibility of cement residue entering into the surrounding environment - Minimise pollution of soil, surface and ground water resources	- No evidence of contaminated soil on the construction site - No evidence of contaminated water resources - Method statement	Contractor	Monitored daily

Phase of development	CONSTRUCTION				
Impact / issue	Materials				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	
run-off into natural vegetation, soils, and streams leading to the river. Cleaning of cement mixing and handling equipment shall be done using proper cleaning trays. All empty containers must be stored in a dedicated area and later removed from the site for appropriate disposal at a Licensed Landfill site. All empty cement bags are to be picked up immediately to ensure that cement dust is not blown away. Cement dust is poisonous and will be detrimental to the environment and especially to the river. Any spillage that may occur must be investigated and immediate remedial action shall be taken. The visible remains of concrete, either solid, or from washings, shall be physically removed immediately and disposed of as waste to a Licensed Landfill site. Washing of the remains into the ground is unacceptable. Freshwater Management Measures (as per specialist report) <u>Cement usage</u> Concrete and cement-related mortars can be toxic to aquatic life. Proper handling and disposal should minimize or eliminate discharges into watercourses. High alkalinity associated with cement, which can dramatically affect and contaminate both soil and					

Phase development of	CONSTRUCTION			
Impact / issue	Materials			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
ground water. The following recommendations must be adhered to: • Fresh concrete and cement mortar should not be mixed below the modelled 1:100-year flood line and at least 32 m from the delineated extent of the Hex River. Mixing of cement may be done within the construction camp, may not be mixed on bare soil, and must be within a lined, bound or bunded portable mixer. Consideration must be taken to use ready mix concrete; • No mixed concrete shall be deposited directly onto the ground. A batter board or other suitable platform/mixing tray is to be provided onto which any mixed concrete can be deposited whilst it awaits placing; • Cement bags must be disposed of in the demarcated hazardous waste receptacles and the used bags must be suitably disposed of; and • Spilled or excess concrete must be disposed of at a suitable landfill site.				

Phase of development	CONSTRUCTION				
Impact / issue	Materials				
MITIGATION MEASURE		MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
DANGEROUS AND TOXIC MATERIALS Provision of storage facilities Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bermed areas or under lock and key, as appropriate, in well-ventilated areas. Storage facilities should be bunded, roofed, secure, rain, wind and tamper proof. Storage areas shall display the required safety signs depicting “no smoking”, No Naked lights” and “Danger” containers shall be clearly marked to indicate contents as well as safety requirements. Sufficient care must be taken when handling these materials to prevent pollution. Training on the handling of dangerous and toxic materials must be conducted for all staff prior to the commencement of construction. <u>Paint, herbicide and insecticides will not be allowed on or near the site.</u> In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water and Sanitation (DWS) must be informed immediately. Empty containers shall be removed to a General & Hazardous Waste Landfill site.		• Prevention of pollution of soil, surface and ground water resources in the immediate and surrounding environments • Minimise chances of transgression of the acts controlling pollution	• No visible signs of pollution • No litigation due to transgression of pollution control acts	Contractor	Monitor daily

Phase of development	CONSTRUCTION			
Impact / issue	Materials			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
Material Safety Data Sheets (MSDS) must be prepared for all hazardous substances on site and supplied by the supplier where relevant. MSDS's must be updated as required.				
Bulk storage of fuels and oils The contractors must provide and maintain a method statement for "Diesel tanks and refuelling procedures". Bulk fuel storage tanks on the site shall be on an impervious surface that is bunded and able to contain at least 110% of the volume of the tanks. A Flammable Liquid License must be obtained for diesel volumes greater than 200 litres. As no application was lodged for this activity, it should be noted that Environmental Authorisation is required for the storage of Diesel and/or Petrol with volumes greater than 30 000 litres. Bulk fuel storage tanks shall be located in a portion of the construction camp where they do not pose a high risk in terms of water pollution (i.e. they must be located far away from the non-perennial watercourse found on site.	- Prevention of pollution of soil, surface and ground water resources in the immediate and surrounding environments - Minimise chances of transgression of the acts controlling pollution	- No visible signs of pollution - No litigation due to transgression of pollution control acts - Method statement	Contractor	Once off, as required

Phase of development	CONSTRUCTION				
Impact / issue	Materials				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	
Bulk fuel storage tanks shall be placed so that they are out of the way of traffic, so that the risk of the tanks being ruptured or damaged by vehicles is minimised. Bulk fuel storage should be covered during the rainy season.					
Use of dangerous and toxic materials The contractor shall keep the necessary materials and equipment on site to deal with spills/ fire of the materials present should they occur. The contractor shall set up a procedure for dealing with spills/ fire, which will include notifying the ECO and the relevant authorities prior to commencing with construction. These procedures must be developed in consultation and approval by the appointed EO. All staff should receive some form of fire training. Fire buckets and hoses shall be in good working order and easily accessible on site. A record must be kept of all spills and the corrective action taken.	• Prevention of pollution of soil, surface and ground water resources in the immediate and surrounding environments • Minimise chances of transgression of the acts controlling pollution	• No pollution of the environment • No litigation due to transgression of pollution control acts	Contractor	As required	

TABLE 5: THE PROPOSED CONSTRUCTION OF A 66KV OVERHEAD POWERLINE FROM THE WORCESTER INDUSTRIAL SUBSTATION TO THE TRANSHEX SUBSTATION, WORCESTER, WESTERN CAPE, CONSTRUCTION PHASE EMP (PLANT)

Phase of development		CONSTRUCTION		
Impact / issue		PLANT		
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
Eating areas and camp followers The contractors must provide and maintain a method statement for "Crew camps and construction lay down areas". The Contractor shall, in conjunction with the EO, designate the restricted eating area for eating during normal working hours. Two refuse bins with lids must be provided and cleaned on a daily basis. The bins are to be secure, wind, weather and scavenger proof. Designated areas for smoking must be provided. No fires are to be lit outside of a facility designed to contain fires. The adequacy and positioning of these structures must be determined in consultation with the EO and ECO. No animals, domestic or otherwise are allowed on the premises. The feeding, or leaving of food, for stray or	- Control potential influx of vermin and flies - Neat work place and hygienic environment - Minimise negative social impacts to local businesses and residences.	- No visual sign of vermin and flies - No complaints from I & AP's	Contractor, EO	Once off, monitor daily

Phase of development		CONSTRUCTION		
Impact / issue		PLANT		
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
other animals in the area is strictly prohibited. Camp followers/informal traders must not be allowed to congregate on pavements or outside the construction site. However, at the contractors discretion facilities can be made available within the designated eating area. Litter (even if originating outside the camp) and concrete bags etc. must be picked up and put into suitably closed bins.				

Phase of development		CONSTRUCTION		
Impact / issue		PLANT		
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
Toilets and ablution facilities The contractor will be responsible for providing all sanitary arrangements for his and the sub-contractors team. A minimum of one chemical toilet shall be provided per 15 persons. Sanitary arrangements shall be to the satisfaction of the ECO and the local authority. The contractor shall keep the toilets in a clean, neat and hygienic condition. The contractor shall supply toilet paper at all toilets at all times. Toilet paper dispensers shall be provided in all toilets. Toilets provided by the contractor must be easily accessible and a maximum of 150m from the works area to ensure they are utilised. All toilets will be located within the contractor's camp. Should toilets be needed elsewhere, their location must first be approved by the RE, EO or ECO. The contractor (who must use reputable toilet-servicing company) shall be responsible for the cleaning, maintenance	• Ensure proper sanitation is achieved which will encourage the workforce to utilise toilets provided and not the surrounding habitat • Minimise potential of diseases on site • Minimise potential to pollute soils, water resources and natural habitats	• Workforce use toilets provided • No complaints received from I & AP's as well as members of the workforce • No visible or measurable signs of pollution of the environment (soils, ground and surface water)	Contractor, RE or EO	As and when required

Phase of development		CONSTRUCTION		
Impact / issue		PLANT		
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
and servicing of the toilets. The contractor (using reputable toilet-servicing company) shall ensure that all toilets are cleaned and emptied before the builders' or other public holidays. Toilets out on site must be secured to the ground and have a sufficient locking mechanism operational at all times. The natural surrounding area <u>may NOT</u> be used for any ablution activities. FINES will be payable should any person be caught.				

Phase of development		CONSTRUCTION		
Impact / issue		PLANT		
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
Waste management Please refer to the waste minimization plan herewith attached	• Sustainable management of waste by recycling • To keep the site neat and tidy • Minimise litigation and complaints by I&AP's • Reduce visual impact • Control potential influx of vermin and flies thereby minimising the potential of diseases on site and the surrounding environment. • Minimise potential to pollute soils, water resources and natural habitats	• Disposal of rubble and refuse in an appropriate manner with no rubble and refuse lying on site • Site is neat and tidy • No complaints from surrounding industries and businesses • Sufficient containers available on site • No visible or measurable signs of pollution of the environment (soils, ground and surface water)	Contractor, EO	Daily

Dust It is imperative that method statements regarding dust control be supplied to the ECO by the contractor prior to the commencement of any construction activities. Dust management and dust suppression during the construction phase is deemed very important. The method statement must provide information on the proposed source of water to be utilised and the details of the licenses acquired for such usage. Potable water cannot (as far as possible) be used as a means of dust suppression, alternative measures must be sourced. The use of 'grey' water must be investigated as an alternative. The contractor will be responsible to source this water and obtain the required approvals. Water extraction from the non-perennial storm water channel will not be allowed. The construction camp shall be watered during dry and windy conditions to control dust fallout. Dust production must be controlled by regular watering of roads and works area, should the need arise. (NB: Concrete dust is toxic and damages soil properties.	• Reduce dust fall out • Reduce visual impact • Minimise loss of valuable soil material	• No visible signs of dust • No complaints from interested and Affected parties • No incidences reported to ECO • No visible evidence of dust contamination on the surrounding environment • Method statement • Baseline targets not exceeded during regular monitoring of dust counts	RE, Contractor, EO	Monitored daily
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Therefore, watering to prevent dust spread must not be done where concrete dust has fallen or it will infiltrate into the soil. Concrete bags must not be allowed to blow around the site and spread cement dust. This cement dust will be detrimental to the environment.) At the end of construction, the site camp must be fully rehabilitated by removing the temporary surface, ripping the area to loosen the soil and the area must be re-vegetated with locally indigenous vegetation only, according to the landscape development plan for the project.				
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Workshop equipment, maintenance and storage The contractors must provide and maintain a method statement for “workshop maintenance and cleaning of plant”. All maintenance and washing of vehicles and equipment shall be done off-site as far as possible. During servicing of vehicles or equipment, a suitable drip tray shall be used to prevent spills onto the soil. Leaking equipment shall be repaired immediately or be removed from site to facilitate repair. Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and remediate to the satisfaction of the EO or RE. Cleaning and remediation must be done with products that are in line with best environmental practice i.e. Sunsborb. The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site. The Contractor must ensure that senior and the other relevant members of the workforce are trained in	• Prevent pollution of the environment • Minimise chance of transgression of the acts controlling pollution • Disposal of hazardous substances to a General & Hazardous Waste Landfill site.	• No pollution of the environment • No litigation due to transgression of pollution control acts • Method statement	RE, Contractor, EO	Monitor daily
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dealing with spills by using emergency spill kits. All spills of hazardous substances must be reported to the ESO, EO, RE or ECO. The contractor must comply with the regulations of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) as well as specific specifications set forth by the health and safety agent.				
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Phase of development		CONSTRUCTION		
Impact / issue		PLANT		
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
Noise All construction vehicles must be in a good working order to reduce possible noise pollution. Work hours during the construction phase shall be strictly enforced unless permission is given (07H00 – 18H00). Permission shall not be granted without consultation with the local industries and businesses by the EO. No work to be done on Sundays. Noise reduction is essential and Contractors shall endeavour to limit unnecessary noise, especially loud talking, shouting or whistling, radios, sirens or hooters, motor revving, etc. The use of silent compressors is a specific requirement. All machinery to be muffled where possible. Noisy activities shall take place only during working hours. The EO must inform the residents of houses and businesses adjacent to the development in writing 24 hours prior to any	• Maintain noise levels below “disturbing” as defined in the National Noise Regulations • Minimise the nuisance factor of the development	• No complaints from surrounding landowners or I&APs	Contractor, EO	As and when required

Phase of development		CONSTRUCTION		
Impact / issue		PLANT		
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
planned activities that will be unusually noisy or any other activities that could reasonably have an impact on the adjacent sites. These activities could include, but are not limited to use of pneumatic jackhammers and compressors etc. No noise louder than 70dB from the ambient noise level. Machinery and equipment on site must be maintained so as to avoid any unnecessary noises.				

TABLE 6: THE PROPOSED CONSTRUCTION OF A 66KV OVERHEAD POWERLINE FROM THE WORCESTER INDUSTRIAL SUBSTATION TO THE TRANSHEX SUBSTATION, WORCESTER, WESTERN CAPE, CONSTRUCTION PHASE EMP (CONSTRUCTION)

Phase of development	CONSTRUCTION				
Impact / issue	CONSTRUCTION				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	
Crew camps Accommodation for members of the workforce will not be permitted on site unless authorisation has been given in terms of the Environmental Authorisation issued for the site. If accommodation is to be provided for workers, details need to be provided as to the location and facilities to be provided for the workers. Dedicated wash areas must be situated away from surface water sources. The contractor's camp shall be monitored for dust fallout and dust suppression applied as required. This may include the laying of gravel, the use of grey water can be considered as an option if the required permits have been acquired. The contractor's camp, offices and storage facilities shall be located within the site boundaries. If this is not feasible an alternative should be designated in consultation with the ECO. The contractor shall provide labourers to clean up the contractor's camp and construction site on a daily basis. These areas shall then be inspected by the contractor or his/her ESO to ensure compliance with this requirement. The contractor shall be responsible for cleaning the contractor's camp and construction site of all structures, equipment, residual litter and building materials at the end of the construction period and, the topsoil restored in areas where landscaping is to take place.	• Minimise water pollution • Minimise dust fallout • Minimise unwarranted environmental damage outside the footprint • Maintain a clean and healthy working environment • Minimise visual impact to surrounding environment	• No signs of water or soil pollution • No complaints from surrounding landowners or I&APs • No visible signs of litter • Method statements	Contractor, EO, ESO	Monitor daily	

Fires The contractors must provide and maintain a method statement for “fires”, clearly indicating where and for what fires will be utilised plus details on the fuel to be utilised in creating the fire. Fire training and equipment to be nearby to put fires out. No wood is to be collected from private or surrounding property. Fires must be within designated areas and must be in small scale. Absolutely no burning of waste is permitted. Fires will only be allowed in facilities especially constructed for this purpose within fenced Contractor's camps. Wood and/or charcoal are the only fuels permitted to be used for fires. The contractor must provide sufficient wood (fuel) for this purpose. Fires in the designated areas must be small in scale so as to prevent excessive smoke being released into the atmosphere. Heavy smoke may not be released into the air. No felling of trees or wood collection is allowed from private or public property. The Contractor shall ensure that there is appropriate fire-fighting equipment available on site at all times.	• Minimise risk of veldt fires • Minimise destruction of natural fauna and flora • Maintain safety on site	• No veldt fires started by the contractor's workforce • No claims from landowners for damages due to veldt fires • Method statement	Contractor, EO, ESO	Monitor daily
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Erosion and sedimentation To reduce the loss of material by erosion, the contractor shall ensure that disturbance on site is kept to a minimum. The disturbance especially includes the movement of heavy vehicles. The contractor shall be responsible for rehabilitating all eroded areas in such a way that the erosion potential is minimised after construction has been completed. These areas are to be filled with mulch or funnels constructed to route the water. All disturbed areas must be mulched to encourage vegetation re-growth. Mulch used must be free from alien seed. These areas must be cordoned off so that vehicles or construction personnel cannot gain access to these areas. In the case of strong wind and/or rain all stockpile material must be covered with a tarpaulin in order to prevent erosion.	• Minimise erosion damage • Minimise scarring of the soil surface and land features • Minimise disturbance and loss of topsoil • Re-growth of disturbed areas.	• No erosion scars • No loss of topsoil • No interference with the natural flow of water • No visible erosion scars once construction is completed • The footprint has not exceeded the agreed boundaries • All damaged areas successfully rehabilitated	Contractor, EO, ESO	As and when required
Fauna <u>All activities on site must comply with:</u> The regulations of the Animal Protection Act, 1962 (Act No. 71 of 1962); and Marine Living Resources Act, 1998 (Act No. 18 of 1998). All construction workers must be informed that the intentional killing of any animal is not permitted as faunal species are a benefit to society. Poaching is illegal and it must be a condition of employment that any employee caught poaching will be dismissed. Employees must be trained on how to deal with fauna species as intentional killing will not be tolerated. In the case of a problem animal e.g. a large snake a specialist must be called in to safely relocate the animal if the EO or ECO is not able to.	• Minimise disturbance to animals • Minimise interruption of breeding patterns of birds • Minimise destruction of habitat	• No complaints from Nature Conservation • No litigation concerning applicable animal protection acts • No measurable or visible signs of habitat destruction	RE, Contractor, EO, ESO	Monitor daily

Flora No plants/trees may be destroyed prior to notify the ECO about the plan. The ECO is to approve all plants to be removed. The contractor must rehabilitate the construction camp and any other disturbed areas once construction activities have terminated. Compacted areas will be ripped and mulched in order to ensure recovery of the natural vegetation cover. Once construction is complete, rehabilitation of un-built areas must be undertaken in order to restore the aesthetic & ecological value of the area. It is recommended that a qualified landscape architect, qualified botanist, aquatic specialist and the ECO be consulted with regard to the most appropriate rehabilitation vegetation and structures. Active re-vegetation must take place with locally indigenous vegetation under the supervision of the ECO. No open fires shall be allowed on site under any circumstances, fires will only be permitted in adequate facility within the crew camp, Forest Act, 1984 (Act No. 122 of 1984). The bulbs in the sensitive area may not be removed and must be rehabilitated post construction.	• Encourage natural habitat fauna • Minimise scarring of the soil surface and land features • Minimise disturbance and loss of topsoil • Minimise risk of veldt fires • Minimise risk of fauna and flora destruction	• No exotic plants used for landscaping • No visible erosion scars once construction is completed • The footprint has not exceeded the agreed boundaries • All damaged areas successfully rehabilitated • No veldt fires started by contractors work force • No claims from landowners for damages due to veldt fires.	Contractor, EO, ESO, Landscape Architect	As and when required
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Heritage No archaeological or historical material of any significance was noted on site. In terms of the National Heritage Act, 1999 (Act No. 25 of 1999), should any archaeological artefacts be exposed during construction activities, work on the area where the artefacts were found shall cease immediately and the ECO as well as the Local Council shall be notified within 24 hours. Upon receipt of such notification, the ECO will arrange for the excavation to be examined by an Archaeologist. Under no circumstances shall archaeological artefacts be removed, destroyed or interfered with. Any archaeological sites exposed during demolition or construction activities must not be disturbed prior to authorisation by the Heritage Western Cape and/or the South African Heritage Resources Agency on the appropriate provincial heritage resource agency.	• Limit the destruction of the country's heritage resources • The preservation and appropriate management of new archaeological finds should these be discovered during construction.	• No destruction of or damage to known archaeological sites	Contractor, EO, RE, ESO	Monitor Daily
No-go / sensitive areas Topsoil stockpiles are to be demarcated with danger tape and seen as no-go areas. All construction activities must remain within the boundaries of the development area, as demarcated at the start of the construction phase. There must be no vehicular access to the drainage lines outside the development area thus reducing the infringement of the development on natural habitat. The construction footprint must be kept to a minimum by constructing boundaries and demarcated areas not to be disturbed. These No-go areas must be demarcated with fencing / warning tape and signs before any construction activities commence. These areas and	• Minimise the potential for the spread of the construction footprint. • Reduce loss of fauna and flora habitat. • Minimise the potential for loss of protected and or endangered fauna and flora species.	• No sign of movement through "no go" areas. • Containment of footprint	RE, Contractor, ESO, EO	Monitor daily

the type of fencing/demarcation must be approved by the relevant specialist involved in the EIA process. The EO and ECO must be on site in order to make sure the correct areas are fully demarcated.				
Access route/haul roads Existing roads and services must be utilised thus reducing the infringement of the development on natural habitat. If new access roads have to be constructed the road should follow existing roads for as far as possible in order to minimize the area of disturbance. Any authorised clearing for access roads must be done under the supervision of the ECO. Access roads for earthmoving-equipment must be clearly designated and be positioned as close as possible to the proposed development site. No driving off from the marked roads is permitted and designated parking areas must be identified and demarcated with applicable signage. Neither the site nor its access roads must be allowed to be utilised for recreational activities, this includes but is not limited to quad bikes, 4x4's and dirt bikes. Security personnel ensure that this is enforced. No unauthorised access is permitted.	- Minimise loss of topsoil and enhancement of erosion - Minimise fauna and flora displacement by destruction of natural habitats	- No erosion on access roads after completion of construction - No loss of topsoil due to runoff water on access roads	Contractor, RE or EO	As required, monitor daily
Crime, safety and security No site staff, other than security personnel and skeleton staff shall be housed on site unless otherwise stipulated in the Environmental authorisation. Security personnel and skeleton staff shall be supplied with adequate protective clothing, ablution facilities, water and refuse collection facilities. A boundary fence will serve to prevent public access to the site, for public safety and security reasons. The access to the site must be controlled so as to restrict unauthorised personnel from entering the site. The workers on site must	- Reduce the risk of potential incidences - Minimise the potential impact on the environment - Reduce the risk of possibly fatal incidents occurring on site.	No incidences reported	RE, Contractor, ESO, EO	Monitor daily

retain some means of identification. The ESO and the contractor are responsible for ensuring that only authorised personnel are on site at all times. The site and crew are to be managed in strict accordance with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and the National Building Regulations. Site specific conditions and regulations as set forth by the health and safety agent should also be adhered to. The contractor shall ensure that all emergency procedures are in place prior to commencing work. Emergency procedures shall include (but not be limited to) fire, spills, contamination of the ground, accidents to employees, use of hazardous substances and materials, etc. The contractor shall ensure that lists of all emergency telephone numbers / contact persons are kept up to date and that all numbers and names are posted at relevant locations throughout the construction site. The nearest emergency service provider must be identified during all phases of the project as well as its capacity and the magnitude of accidents it will be able to handle. The contact details of this emergency centre, as well as the police and ambulance services must be available at prominent locations around the construction site and the construction crew camps.				
Visual impact Shade cloth must be utilised to conceal and minimise the visual impact of contractor camps, lay down and storage areas. Rubble and litter must be removed every two weeks or more often as the need arises and be disposed of at a registered landfill site as designated by the Breede Valley Municipality, Solid Waste removal department.	Minimise visual impact	No complaints from I & AP's	Contractor, landscape contractor, ESO	Monitor daily

Unified materials must be used in the construction of the buildings on site.				
Hydrology Increased run-off during construction must be managed using berm and other suitable structures as required to ensure flow velocities are reduced; this must be done in consultation with the Resident engineer as well as the ECO. The Contractor shall take reasonable measures to control the erosive effects of storm water runoff. Storm water, wherever possible, should be allowed to soak into the land in the area on which the water fell. In the event of pollution caused as a result of construction activities, the contractor, according to section 20 of the National Water Act, 1998 (Act No. 36 of 1998) shall be responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas and water courses. The contractor shall ensure that excessive quantities of sand, silt and silt-laden water do not enter the non-perennial watercourse found on site. No wastewater may run freely into the surrounding area. Construction in the Watercourse must be done during the drier months of the year. Small scale rehabilitation of the banks must be done. This includes alien vegetation clearance and active revegetation.	• Minimise pollution of soil, surface and ground water resources in the immediate and surrounding environments • Minimise impeding the natural flow of water • Minimise the impact on natural water flow dynamics • Minimise scarring of the soil surface and land features	• No visible signs of pollution • No signs of siltation of water courses • No visible erosion scarring once construction is completed • Minimum loss of topsoil	RE, Contractor, EO	As and when required, monitor daily

Soil Topsoil must be stripped from all areas that are to be utilized during the construction period and where permanent structures and access is required. These areas will include comprising the permanent works, pipeline trenches, stockpiles, access roads, construction camps and lay down areas. Topsoil must be deemed to be the top layer of soil containing organic material, nutrients and plant grass seed. For this reason it is an extremely valuable resource for the rehabilitation and vegetation of disturbed areas. At the beginning of the construction phase, topsoil removed for vegetation clearance must be stripped to a minimum depth of 300 mm and stockpiled on the demarcated topsoil stockpile areas. All topsoil must be removed and stockpiled on the site. However, the use of topsoil for rehabilitation contaminated by the seed of alien vegetation must not be permitted unless a programme to germinate the seed and eradicate the seedlings is drawn up and approved, or some other mitigatory feature is found. This must be approved by the ECO. Single handling is recommended. Stock piles must not be higher than 2m to avoid compaction. Dust suppression is necessary for stockpiles older than a month – with either water or a biodegradable chemical binding agent. Backfill will require contouring to ensure that it blends in with the surrounding environment.	• Minimise scaring of the soil surface and land features • Minimise disturbance and loss of soil • Minimise construction footprint • Maintain the integrity of topsoil's for future landscaping and rehabilitation • Containment of invasive plant growth	• No visible erosion scars once construction is completed • The footprint has not exceeded the agreed site in terms of EA etc. • Minimal invasive weed growth • No signs of sedimentation and erosion • Method statement	Contractor	Daily
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FRESHWATER Freshwater Management Measures (as per specialist report conducted by FEN Consulting (Pty) Ltd. 2022) 4. Earthworks for the support tower foundations at least 32m away from freshwater ecosystems but within the 100m GN509 of the EDLs and the 1:100-year flood line of the Hex River and spanning of the proposed powerline across these freshwater ecosystems (Support Towers 1, 2, 3, 4, 7, 12, 13, 17, 22, 23). • Excavation of foundation pits for the support structure foundations may result in loose sediments within the landscape, specifically if works are taken during a period of rainfall. As such, sediment traps should also be installed downstream/downgradient of the construction area (where practically feasible). Sediment traps can be created by pegging an appropriate geotextile across the entire width of the work area at the specified support tower, held down by cobbles/boulders or by geotextile wrapped hay bales spanning the width of the work area and staked into position; • During excavation activities, soil must be stockpiled upgradient of the excavated area and not in close proximity to the freshwater ecosystem. Mixture of the lower and upper layers of the excavated soil must be kept to a minimum, so as to ensure successful revegetation using the top layer after construction. Local soil must be used to backfill the foundation pits (support structures), immediately after installation of the support structures and/or other infrastructure;	• Prevent disturbances of soil leading to potential impacts to the freshwater ecosystem vegetation, increased alien vegetation proliferation in the footprint areas, and in turn to altered freshwater ecosystem habitat; and • Prevent activities that will lead to altered runoff patterns, leading to increased erosion and sedimentation of the freshwater ecosystems.	• Compliance, enforcement & monitoring of proposed mitigation measures/method statements. • No evidence of soil disturbance, erosion, contamination of watercourse and associated disturbance to freshwater ecosystem vegetation. • No signs of altered runoff patterns. • No signs of alien vegetation proliferation.	• Motheo Construction Group/Breede Valley Municipality/ECO/Contractor	• As and when required.
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• Suitable dust suppression actions must be implemented for the duration of the construction works, especially considering the action of wind within these semi-arid landscapes; • Bedding material (at the bottom of the excavated foundation pit) must be stockpiled outside of the 32 m NEMA ZoR but as close as possible to the support structures footprint area and backfilled immediately after excavation has been completed; • When the powerline is strung between the support structures, no vehicles may indiscriminately drive through the freshwater ecosystems, use must be made of the dedicated access roads; • Activities must take place in the summer period to prevent erosion and sedimentation of freshwater ecosystems; and • The EDL and braided channel of the Hex River in which a portion of the respective support tower footprint will overlap must be stabilised against future flow events by laying down a single layer cobble bed. This will protect the exposed soil layer by preventing erosion and preserve the natural flow path of these freshwater ecosystems. 5. Earthworks for the support tower foundations outside of the delineated extent of freshwater ecosystems, but within 32m from freshwater ecosystems (Support Tower 5 & 11). • Excavation of foundation pits for the support structure foundations may result in loose sediments within the landscape, specifically if works are taken during a period of rainfall. As such, sediment traps should also be installed downstream/downgradient of				
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the construction area (where practically feasible). Sediment traps can be created by pegging an appropriate geotextile across the entire width of the work area at the specified support tower, held down by cobbles/boulders or by geotextile wrapped hay bales spanning the width of the work area and staked into position; • During excavation activities, soil must be stockpiled upgradient of the excavated area and not in close proximity to the freshwater ecosystem. Mixture of the lower and upper layers of the excavated soil must be kept to a minimum, so as to ensure successful revegetation using the top layer after construction. Local soil must be used to backfill the foundation pits (support structures), immediately after installation of the support structures and/or other infrastructure; • Suitable dust suppression actions must be implemented for the duration of the construction works, especially considering the action of wind within these semi-arid landscapes; • Bedding material (at the bottom of the excavated foundation pit) must be stockpiled outside of the 32 m NEMA ZoR but as close as possible to the support structures footprint area and backfilled immediately after excavation has been completed; • When the powerline is strung between the support structures, no vehicles may indiscriminately drive through the freshwater ecosystems, use must be made of the dedicated access roads; • Activities must take place in the summer period to prevent erosion and sedimentation of freshwater ecosystems; and				
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• The EDL and braided channel of the Hex River in which a portion of the respective support tower footprint will overlap must be stabilised against future flow events by laying down a single layer cobble bed. This will protect the exposed soil layer by preventing erosion and preserve the natural flow path of these freshwater ecosystems. 6. Earthworks for the support tower foundations within the EDLs and braided channels of the Hex River (Support Tower 6 & 14). • Excavation of foundation pits for the support structure foundations may result in loose sediments within the landscape, specifically if works are taken during a period of rainfall. As such, sediment traps should also be installed downstream/downgradient of the construction area (where practically feasible). Sediment traps can be created by pegging an appropriate geotextile across the entire width of the work area at the specified support tower, held down by cobbles/boulders or by geotextile wrapped hay bales spanning the width of the work area and staked into position; • During excavation activities, soil must be stockpiled upgradient of the excavated area and not in close proximity to the freshwater ecosystem. Mixture of the lower and upper layers of the excavated soil must be kept to a minimum, so as to ensure successful revegetation using the top layer after construction. Local soil must be used to backfill the foundation pits (support structures), immediately after installation of the support structures and/or other infrastructure; • Suitable dust suppression actions must be implemented for the duration of the construction				
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works, especially considering the action of wind within these semi-arid landscapes; • Bedding material (at the bottom of the excavated foundation pit) must be stockpiled outside of the 32 m NEMA ZoR but as close as possible to the support structures footprint area and backfilled immediately after excavation has been completed; • When the powerline is strung between the support structures, no vehicles may indiscriminately drive through the freshwater ecosystems, use must be made of the dedicated access roads; • Activities must take place in the summer period to prevent erosion and sedimentation of freshwater ecosystems; and • The EDL and braided channel of the Hex River in which a portion of the respective support tower footprint will overlap must be stabilised against future flow events by laying down a single layer cobble bed. This will protect the exposed soil layer by preventing erosion and preserve the natural flow path of these freshwater ecosystems. 7. Installation of the support tower lattices at least 32m away from freshwater ecosystems but within the 100m GN509 of the EDLs and the 1:100-year flood line of the Hex River and spanning of the proposed powerline across these freshwater ecosystems (Support Towers 1, 2, 3, 4, 7, 12, 13, 17, 22, 23). <u>Control measures for concrete mixing on site:</u> • No mixed concrete may be deposited outside of the designated construction footprint;	• Prevent contamination of surface water (if present) • Prevent soil erosion and sedimentation of freshwater ecosystems (if surface water present).	• Compliance, enforcement & monitoring of proposed mitigation measures/method statements. • No evidence of soil disturbance, erosion, contamination of surface water and associated	• Motheo Construction Group/Breede Valley Municipality/ECO/Contractor	• As and when required.
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• As far as possible, concrete mixing must be restricted to the batching plant. Additionally, batter / dagga board mixing trays and impermeable sumps must be provided, onto which any mixed concrete can be deposited while it awaits placing; and • Concrete spilled outside of the demarcated area must be promptly removed and taken to a suitably licensed waste disposal site. <u>With regards to backfilling of the concrete encasing:</u> • Soil removed for excavating the foundation pit must be used as backfill material; • Any remaining soil following the completion of backfilling of the foundation pits are to be spread out thinly surrounding the installed support structures (outside of the delineated freshwater ecosystems) to aid in the natural reclamation process; • The construction footprint must be limited to the foundation pit area and an additional 5 m buffer (to allow for the stockpiling and movement of personnel); • The area must be rehabilitated after the completion of the construction phase, including revegetation thereof with indigenous vegetation. In addition, alien vegetation eradication of the footprint area must be undertaken; • Activities must take place in the summer period to prevent erosion and sedimentation of freshwater ecosystems; • All developed areas associated with the support towers must be compacted to natural soil compaction levels to prevent the formation of preferential surface flow paths and subsequent erosion. Conversely, areas compacted as a result of construction activities must be loosened to natural soil compaction levels; and • Support tower vertices must be stabilised against soil erosion by piling cobbles around the vertices and these piles must be monitored during the operation phase and repacked if necessary.		disturbance to freshwater ecosystem vegetation. •No signs of altered runoff patterns.		
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8. Installation of the support tower lattices outside of the delineated extent of freshwater ecosystems, but within 32m from freshwater ecosystems (Support Tower 5 & 11). <u>Control measures for concrete mixing on site:</u> • No mixed concrete may be deposited outside of the designated construction footprint; • As far as possible, concrete mixing must be restricted to the batching plant. Additionally, batter / dagga board mixing trays and impermeable sumps must be provided, onto which any mixed concrete can be deposited while it awaits placing; and • Concrete spilled outside of the demarcated area must be promptly removed and taken to a suitably licensed waste disposal site. <u>With regards to backfilling of the concrete encasing:</u> • Soil removed for excavating the foundation pit must be used as backfill material; • Any remaining soil following the completion of backfilling of the foundation pits are to be spread out thinly surrounding the installed support structures (outside of the delineated freshwater ecosystems) to aid in the natural reclamation process; • The construction footprint must be limited to the foundation pit area and an additional 5 m buffer (to allow for the stockpiling and movement of personnel); • The area must be rehabilitated after the completion of the construction phase, including revegetation thereof with indigenous vegetation. In addition, alien vegetation eradication of the footprint area must be undertaken; • Activities must take place in the summer period to prevent erosion and sedimentation of freshwater ecosystems; • All developed areas associated with the support towers must be compacted to natural soil compaction				
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levels to prevent the formation of preferential surface flow paths and subsequent erosion. Conversely, areas compacted as a result of construction activities must be loosened to natural soil compaction levels; and • Support tower vertices must be stabilised against soil erosion by piling cobbles around the vertices and these piles must be monitored during the operation phase and repacked if necessary. 9. Installation of the support tower lattices within the EDLs and braided channels of the Hex River (Support Tower 6 & 14). <u>Control measures for concrete mixing on site:</u> • No mixed concrete may be deposited outside of the designated construction footprint; • As far as possible, concrete mixing must be restricted to the batching plant. Additionally, batter / dagga board mixing trays and impermeable sumps must be provided, onto which any mixed concrete can be deposited while it awaits placing; and • Concrete spilled outside of the demarcated area must be promptly removed and taken to a suitably licensed waste disposal site. <u>With regards to backfilling of the concrete encasing:</u> • Soil removed for excavating the foundation pit must be used as backfill material; • Any remaining soil following the completion of backfilling of the foundation pits are to be spread out thinly surrounding the installed support structures (outside of the delineated freshwater ecosystems) to aid in the natural reclamation process; • The construction footprint must be limited to the foundation pit area and an additional 5 m buffer (to allow for the stockpiling and movement of personnel); • The area must be rehabilitated after the completion of the construction phase, including revegetation thereof				
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with indigenous vegetation. In addition, alien vegetation eradication of the footprint area must be undertaken; • Activities must take place in the summer period to prevent erosion and sedimentation of freshwater ecosystems; • All developed areas associated with the support towers must be compacted to natural soil compaction levels to prevent the formation of preferential surface flow paths and subsequent erosion. Conversely, areas compacted as a result of construction activities must be loosened to natural soil compaction levels; and • Support tower vertices must be stabilised against soil erosion by piling cobbles around the vertices and these piles must be monitored during the operation phase and repacked if necessary.				
<u>Avifaunal Management Measures</u> The following mitigation measures were identified by the avifaunal specialist Scientific Terrestrial Services (STS), 2022. • If possible, ensure pylon positions remain outside of the Freshwater Habitat as delineated in the Freshwater Report (FEN 22 - 5032). • Vegetation clearing within these areas should be kept as small as possible and footprint areas must be clearly defined so to ensure that all activities remain within the approved footprint areas; • If avian SCC nests are located, a qualified avifaunal specialist must be consulted to determine the best management options. If nests are known to have nestlings or eggs within, these should be allowed to fledge prior to the nest removal;	•To protect possible avifaunal species on the site from being exterminated.	•Compliance, enforcement & monitoring of proposed mitigation measures/method statements. •Should sensitive species be present on the site, the correct re-establishment of these species.	•Motheo Construction Group/Breede Valley Municipality/ECO/Contractor	•As and when required.

• Should any nests of avifaunal species protected under the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) or the Western Cape Nature Conservation Laws Amendment Act, 2000 (Act No. 3 of 2000) be encountered, construction should be halted to determine if there is activity at the nest, if there is then construction should be moved further away until the nesting attempt has failed or succeeded; • Any structures which may act as perching sites for birds should be installed with anti-perching spikes; • Design of infrastructure should be environmentally sound and all construction equipment to be utilised must be in a good working condition, and all possible precautions taken to prevent potential avifaunal collisions or electrocutions; • Anti- collision devices (bird flappers) should be installed where the proposed powerline transverses the Hex River and 30m either side of the river. These must be Eskom approved anti-collision devices that are durable as the area is prone to strong winds. Anti-collision devices must be installed as soon as the wires are strung. The devices must be installed 5m apart and alternate between a light and dark colour in order to increase the visibility of the earth wires; • No hunting/trapping or collecting of avifaunal species is allowed. No collection of avifaunal SCC within the study area may be allowed by construction personnel; • Bird nests on powerlines are potential fire hazards and should be removed from structures regularly (should nests be those of SCC species permits from				
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Cape Nature or DFFE will be required before disturbing the nests); • No illicit fires must be allowed during the construction phase of the proposed development. <u>Botanical Management Measures</u> The following mitigation measures were identified by the botanical specialist (Capensis Ecological Consulting Pty (Ltd), 2022. • Topsoil management- Moved to the side during construction, protected, and then returned after construction. • Minimising footprint- Working area is to be cordoned off before construction starts to prevent unnecessary damage to surrounding habitat. • Site access routes- The sites for the pylon construction should be accessed from the existing road, immediately to the east of the high sensitivity portion of the study area, south of the R60. A new road should not be constructed. • The vegetation is relatively low, meaning that with some care in selecting the exact access routes, it should not be necessary to brush-cut the vegetation or engage in earthworks when establishing the access routes. • The topsoil should then be removed, at the commencement of construction, and placed immediately alongside the site, to be protected from erosion and covered with hessian so that it can be returned after construction is complete. • The moving aside of some of the larger boulders should be sufficient in most cases. These routes will then be useful for the ongoing maintenance of the line. • An Environmental Control Officer (ECO) must be present and oversee the above activities.				
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Phase development of	CONSTRUCTION		
Impact / issue	TOLERANCES		
MITIGATION MEASURE		RESPONSIBLE PARTY	FREQUENCY OF ACTION
Fines Fines for the activities detailed below, will be imposed by the Engineer on the Contractor and/or his Sub-contractors. a) Any employees, vehicles, plant, or thing related to the Contractor's operations operating within the designated boundaries of a "no-go" area. <u>R 5 000</u> b) Any vehicle driving in excess of designated speed limits. <u>R 500</u> c) Persistent and un-repaired oil leaks from machinery. <u>R 2 000</u> d) Persistent failure to monitor and empty drip trays timeously. <u>R 1 000</u> e) The use of inappropriate methods for refuelling. <u>R 1 000</u> f) Litter on site associated with construction activities. <u>R 5 000</u> g) Deliberate lighting of illegal fires on site. <u>R 2 000</u> h) Any employee eating meals on site, outside of the defined eating area. <u>R 500</u> i) Employees not making use of the site ablution facilities. <u>R 2 000</u> j) Failure to implement specified noise controls <u>R 1 000</u> k) Failure to empty waste bins on a regular basis. <u>R 1 000</u> l) Inadequate dust control. <u>R 1 000</u> m) Any act, that in the reasonable opinion of the Engineer, constitutes a deliberate contravention of the requirements of these Specifications. <u>R2 000</u> n) Any water abstraction activities from the river <u>R5 000</u> For each subsequent similar offence the fine shall be doubled in value to a maximum value of <u>R 40 000.</u> The Engineer, in conjunction with the ECO shall be the judge as to what constitutes a transgression in terms of this clause, subject to the General Conditions of Contract.		Engineer	Monitor daily

TABLE 7: THE PROPOSED CONSTRUCTION OF A 66KV OVERHEAD POWERLINE FROM THE WORCESTER INDUSTRIAL SUBSTATION TO THE TRANSHEX SUBSTATION, WORCESTER, WESTERN CAPE, OPERATIONAL PHASE EMP (GENERAL)

Phase of development	OPERATIONAL				
Impact / issue	General				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	
Waste management Please refer to the waste Minimization Plan Herewith attached.	• Sustainable management of waste by recycling • To keep the development neat and tidy • Minimise litigation and complaints by I&AP's • Reduce visual impact • Control potential influx of vermin and flies thereby minimising the potential of diseases at the site and the surrounding environment	• Disposal of refuse in an appropriate manner with no refuse polluting the development • Development is neat and tidy • No complaints from surrounding industries and businesses • Sufficient containers available on site • No visible or measurable signs of pollution of the environment (soils, ground and surface water)	Property Owners association and ECO	6 Monthly	

Phase of development	OPERATIONAL				
Impact / issue	General				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	
Storm water Management Storm water, wherever possible, must be allowed to soak into the land in the area on which the water has been discharged. No waste or refuse must be allowed to access the storm water infrastructure. In the event that silt runoff occurs off the development site, the cause of this must be investigated and suitable mitigation measures employed. This may include the vegetation of bare areas, installing flow diversion channels in consultation with an engineer, installing velocity reducing structures etc. For all maintenance undertaken reference must be made to recommendations in the engineer's reports and or the approved storm water management plan. All maintenance activities must be monitored to ensure that no environmental damage occurs. All damage must be mitigated immediately. The stream and associated culverts should be monitored and cleared of litter and other debris regularly.	• Minimise pollution of soil, surface and ground water resources. • Minimise the potential loss of topsoil. • Minimise the potential of flooding of the development, or its neighbouring properties.	• No evidence of pollution at the discharge points • No evidence of silt build-up at the discharge points • No complaints from I & AP's	Property Owners association and ECO	As and when required. Monitor seasonally	

Phase of development	OPERATIONAL				
Impact / issue	General				
MITIGATION MEASURE		MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
Dust Surface dust should be minimized during the operational phase of the development in order to prevent the dust from being blown to adjacent properties. The proposed development should be landscaped with indigenous plant species. Water extraction from the non-perennial storm water channel on site will not be allowed.		• No dust blown from the development to adjacent properties.	• No complaints from I&AP's		
Atmospheric pollution Air pollution All forms of dust/air pollution must be managed in terms of the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965), this includes the control of noxious and offensive gases, smoke, dust and vehicular emissions. Under no circumstances may heavy smoke be released into the air. Light pollution ▪ Light output is to be confined within property boundaries through using specifically designed luminaries such as full cut-off luminaries to minimise upward spread of light near to and above the horizontal; ▪ Spotlight luminaries to be tilted in order to direct the light to the intended spot, instead of allowing it to light areas outside its purpose. ▪ Outdoor spot lights to be mounted on the appropriate pole height. Higher mounting heights		• Reduce visual impact • Minimise chances of transgression of the acts controlling pollution	• No visible signs of pollution • No litigation due to transgression of pollution control acts • No complaints from surrounding residents and businesses	Property Owners association and ECO	Monitor daily

Phase of development	OPERATIONAL			
Impact / issue	General			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
allow lower main beam angles which can reduce glare. Noise pollution Noise levels shall be kept within acceptable limits, these are determined in terms of the relevant local by laws. Operation activities will remain within normal working hours (07:00am – 18:00pm).				
Safety and Security Boundary wall must be regularly inspected and maintained to prevent any damage. All fencing on site must be managed in terms of the Fence Act No. 31 of 1963 All maintenance and repair work must be done in accordance with National Building Regulations and Standards Act 103 of 1977 Maintenance work must not be the cause of environmental damage. Any environmental damage caused must be investigated and mitigated immediately. An emergency plan (including fire management) must be developed and implemented; the relevant authority must approve this plan. Ensure that all fire extinguishers are replaced on or before their expiry dates. Ensure that pump devices are in good working order.	• Reduce the risk of potential incidences • Minimise litigation and complaints by I&AP's	• No complaints from surrounding residents and businesses	Property Owners association and ECO	As and when required

Phase of development	OPERATIONAL				
Impact / issue	General				
MITIGATION MEASURE		MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
Traffic Management All traffic management must be done in accordance with the National Road Traffic Act No. 93 of 1996		- Minimise chances of transgression of the acts controlling traffic - Minimise traffic backlog	- No litigation due to transgression of traffic control acts - No complaints from surrounding industries and businesses	Property Owners association and ECO	Monitored continually
Freshwater Management Measures (as per FEN specialist report, 2022) 10. Operation and maintenance of the proposed OHPL - Maintenance vehicles must make use of dedicated access roads and no indiscriminate movement in the freshwater ecosystems may be permitted; - During periodic maintenance activities of the powerline and access roads, monitoring for erosion must be undertaken; - Should erosion be noted at the base of the support structure that may potentially impact on a freshwater ecosystem in the surrounding area, the area must be rehabilitated by infilling the erosion gully and revegetation thereof with suitable indigenous vegetation; - Hot spots for the build-up of debris and excess sediment must be identified and when necessary, debris/excess		- Prevent disturbance to soil and ongoing erosion as a result of periodic maintenance activities; and - Monitor and prevent altered water quality (if surface water is present) as a result of increased availability of pollutants.	- Compliance, enforcement & monitoring of proposed mitigation measures/method statements. - No evidence of soil disturbance, erosion, contamination of surface water and associated disturbance to freshwater ecosystem vegetation. - No signs of altered runoff patterns.	•Motheo Construction Group/ Breede Valley Municipality, ECO, contractor	•As and when required.

Phase of development	OPERATIONAL			
Impact / issue	General			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
sediment must be removed by hand to prevent future flooding and potential damage to infrastructure; • Routine maintenance of the roads must be undertaken to ensure that no concentration of flow and subsequent erosion occurs due to the road crossings/instream infrastructure. Such maintenance activities must specifically be undertaken after high rainfall events; • Stormwater runoff from the road crossings must be monitored (by the Operation and Maintenance (O&M) Manager), to ensure it does not result in erosion of the freshwater ecosystems. Stormwater must be allowed to diffusely spread across the landscape, by ensuring adequate surface roughness in the freshwater ecosystem (through vegetation and rocky areas); and • Monitoring for the establishment for alien and invasive vegetation species must be undertaken, specifically for access roads through or along the freshwater ecosystems used to service the powerline. Should alien and invasive plant species be identified, they must be removed and disposed of as per an alien and invasive species control plan and the area must be revegetated with suitable indigenous vegetation. • Refer to Appendix G5 for the comprehensive list of the OHPL annual maintenance activities and the tree and general bush cutting methodology. 11. Operation and maintenance of existing roads traversing freshwater ecosystems (where applicable).	• Prevent concentrated runoff from the road crossings leading to erosion and subsequent sedimentation of the freshwater ecosystems	• Compliance, enforcement & monitoring of proposed mitigation measures/method statements.	• Motheo Construction Group/ Breede Valley	• As and when required

Phase of development		OPERATIONAL			
Impact / issue		General			
MITIGATION MEASURE		MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
• Maintenance vehicles must make use of dedicated access roads and no indiscriminate movement in the freshwater ecosystems may be permitted; • During periodic maintenance activities of the powerline and access roads, monitoring for erosion must be undertaken; • Should erosion be noted at the base of the support structure that may potentially impact on a freshwater ecosystem in the surrounding area, the area must be rehabilitated by infilling the erosion gully and revegetation thereof with suitable indigenous vegetation; • Hot spots for the build-up of debris and excess sediment must be identified and when necessary, debris/excess sediment must be removed by hand to prevent future flooding and potential damage to infrastructure; • Routine maintenance of the roads must be undertaken to ensure that no concentration of flow and subsequent erosion occurs due to the road crossings/instream infrastructure. Such maintenance activities must specifically be undertaken after high rainfall events; • Stormwater runoff from the road crossings must be monitored (by the Operation and Maintenance (O&M) Manager), to ensure it does not result in erosion of the freshwater ecosystems. Stormwater must be allowed to diffusely spread across the landscape, by ensuring adequate surface roughness in the freshwater ecosystem (through vegetation and rocky areas); and		(increase in the sediment load) and turbulent flows when surface water is present. • Prevent higher flood peaks into the freshwater ecosystems due to reduced surface roughness in the freshwater ecosystems.	• No evidence of concentrated runoff, erosion and sedimentation. • No signs of higher flood peaks.	Municipality, ECO, contractor	

Phase of development	OPERATIONAL			
Impact / issue	General			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
- Monitoring for the establishment for alien and invasive vegetation species must be undertaken, specifically for access roads through or along the freshwater ecosystems used to service the powerline. Should alien and invasive plan species be identified, they must be removed and disposed of as per an alien and invasive species control plan and the area must be revegetated with suitable indigenous vegetation. - Refer to Appendix G5 for the comprehensive list of the OHPL annual maintenance activities and the tree and general bush cutting methodology. <u>Botanical Management Measures</u> The following mitigation measures were identified by the botanical specialist (Capensis Ecological Consulting Pty (Ltd), 2022. - No mitigation measures are required for the operational phase. However, it should be added that, for ongoing maintenance of the powerlines, the pylons should continue to be accessed from the existing road to the east, via the same routes that were used during the construction phase. In other words, there should be no new road construction for the purpose of maintaining the lines. Along these existing access routes (and in the surrounding area) there should also be no brush-cutting of the vegetation.				

**THE PROPOSED CONSTRUCTION OF A 66KV OVERHEAD
POWERLINE FROM THE WORCESTER INDUSTRIAL SUBSTATION
TO THE TRANSHEX SUBSTATION, WORCESTER, WESTERN CAPE.**

DEADP Ref: 16/3/3/1/B2/32/1021/23

**(WASTE, WATER USE AND ELECTRICITY CONSUMPTION MINIMIZATION AND
MANAGEMENT PLAN)**

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REFERENCES

DEA&DP, 2003. A Waste Minimization Guideline Document for Environmental Impact Assessments (2003) by Common Ground in association with de Villiers Brownlie Associates.

National Environmental Management Act 107 of 1998 (NEMA)

SUB SECTION 1 - INTRODUCTION

1.1 INTRODUCTION

The Breede Valley Municipality, will use this Planning, Construction and Operational Phase Environmental Management Programme (EMP) as a tool in managing the impacts of the application for the proposed construction of a 66kV overhead powerline from the Worcester Industrial Substation to the Transhex Substation in Worcester, Western Cape, after environmental approval from the Department of Environmental Affairs and Development Planning (DEADP) in terms of the Environmental Impact Assessment Regulations – National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), which replaced the regulations under the, Environment Conservation Act, 1989 (Act No. 73 of 1989) and has been effective as of 3 July 2006.

This document is based on the Waste Minimization Guideline Document on the DEA&DP website (by Common Ground in association with de Villiers Brownlie Associates) and the Stellendale Village DRAFT Green Building Guidelines by Steadfast Greening.

The regulation of activities that have a significant impact on the environment as well as the protection of the environment itself, have improved significantly in the last decade and a half with the promulgation of the Constitution, and general environmental legislation, such as the National Environmental Management Act (NEMA) and the National Water Act. One of the main impacts of human activities on the environment is that of waste disposal (Common Ground & de Villiers Brownlie Associates, 2003).

Waste may be in solid, liquid or gaseous form. It may be benign, toxic, or hazardous. The management of hazardous waste, with associated negative impacts on the environment, is generally covered by legislation. The longer term, cumulative impacts of relatively benign waste disposal is poorly addressed by our laws (DEA&DP Waste Minimization Guideline, 2003).

“Waste” in this document is primarily interpreted as solid waste. Waste minimization per se is not specifically legislated in South Africa at present. Similarly, there are no legal instruments that can be used to enforce reduction in wastage of electricity and water although the National Water Act No 36 of 1998 prohibits wastage of water without specifying what wastage means and how this section will be enforced. However, there are a number of laws and overarching policies that are aimed at sustainable development and sound environmental management, and which are relevant to waste and wastage minimisation.

Wastage is defined in the Oxford Dictionary as... “expend or employ to no purpose or for inadequate result, use extravagantly or ineffectually, squander”. Part of the obligation to protect the environment would be to limit wastage of resources. Thus, limiting wastage of water would fall within this obligation. So too would be limiting the wastage of electricity that results in pollution at the site of electricity generation (Common Ground & de Villiers Brownlie Associates, 2003).

SUB SECTION 2 - WASTE REDUCTION

2.1 BACKGROUND TO WASTE REDUCTION

A key element of environmentally friendly buildings is to promote awareness and change behaviour around all aspects of waste management.

Waste minimisation can therefore be assessed as a component of waste management that aims to reduce the amount of waste, which has to be disposed of. In this regard waste minimisation is aimed at tackling the causes and sources of waste rather than just trying to address and mitigate the symptoms (e.g. through treatment). Waste management can be depicted as a hierarchy, as shown in Figure 8 below. In the hierarchy, source reduction options are considered as a priority, followed by re-use and recycling options. Treatment options are considered only when acceptable waste minimisation techniques have been investigated. As a “last resort” disposal should be considered.

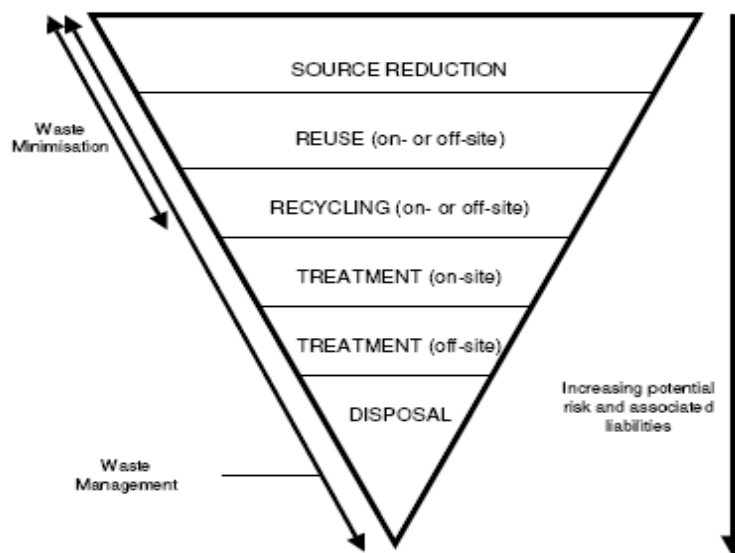


FIGURE 8: WASTE MANAGEMENT HIERARCHY (COMMON GROUND & DEVILLIERS BROWNLIE ASSOCIATES, 2003).

Waste Management, therefore, involves interventions to minimize waste generation in the planning, operation, management and maintenance of the built environment, and includes waste prevention, waste reduction, waste re-use, and recycling.

A further aspect is minimizing the environmental and health impacts by reducing toxicity and ensuring environmentally sound treatment and disposal of remaining waste. The ultimate is however to promote a zero-waste concept where all the related materials can be used again over the longer term with life-cycle assessments, cradle to cradle.

Zero Waste is a goal, a process, a way of thinking that is different to the way we think about products and processes. Not only is Zero Waste about recycling and avoiding waste going to landfill, it also changes production and distribution systems to prevent waste from being manufactured in the first place. It is a way of changing how materials flow through society in such a way that, as in nature, they flow in a closed loop – resulting in efficient use of material and other resources, such as energy and water (Steadfast Greening, 2008).

Zero Waste therefore aims to:

- Prevent rather than manage waste.
- Turn resource that would normally be thrown away into economic value instead of loss.
- Support sustainable development.
- Follows natural processes where everything is recycled.
- Promote the efficient flow of energy and materials.

It is thus essential to ensure that waste avoidance is built into the process at a design phase, referring to the construction and maintenance of the building. This will be done through selection of the appropriate building materials and managing the construction process in a responsible manner.

Opportunities for the separation of waste at source must also be built into the design of the building to encourage people to recycle their waste.

2.2 BENEFITS OF WASTE REDUCTION

The benefits of waste reduction as described in the DEA&DP Waste Minimization Guideline (Common Ground & de Villiers Brownlie Associates, 2003) include the following benefits.

2.2.1 Financial benefits

- Reduced transportation costs for waste materials (less transportation because of less material wasted). This includes transportation to and from the site and disposal.
- Reduced disposal costs of waste materials (disposal costs are likely to rise significantly in the near future)
- Reduced purchase quantity and price of raw materials by waste minimisation.
- Reduced purchase price of new materials when considering reuse and recycling (depending on materials).
- Increased returns can be achieved by selling waste materials to be reused.

2.2.2 Environmental benefits

Some of the environmental benefits are:

- Reduced quantity of waste generated.
- Efficient use of waste generated.
- Minimised amounts of waste disposed of at landfills, which therefore extend the lifespan of landfills.
- Reduced environmental effects as a result of disposal, e.g. noise, pollution.
- Reduced transportation of waste to be disposed of (hence less noise, vehicle emission pollution, and energy used).

2.2.3 Social benefits

- Increased site safety.
- Increased work efficiency.
- Enhanced company image.
- Job creation through recycling initiatives.

2.3 GENERATED WASTE

2.3.1 Examples of waste generated during construction:

- Waste wood from cutting structural elements, broken structural elements and damaged elements from incorrect storage
- Damaged or off-cut steel components
- Off-cut electrical wiring and cabling
- Broken or off-cut tiles
- Packaging
- Off-cut and broken bricks
- Surplus material from cut and fill activities

- Spoil from cut and fill activities
- Off-cut, or broken conduit and plumbing
- Off-cut or damaged insulation elements
- Surplus paint and paint containers
- Broken or redundant plant and equipment
- Surplus concrete, cement and grouting
- General waste

SUB SECTION 3 - WASTE MINIMIZATION PLAN

3.1 WASTE MINIMIZATION DURING CONSTRUCTION

Issue	Minimization Plan
General Considerations	
Standardization of dimensions	The developer will for as far as it is economically feasible design the buildings to maximise the use of standard dimensions in order to minimize the amount of cutting waste during construction.
Material Selection	The developer will, for as far as it is economically feasible select: • materials for least waste generation during preparation and use during construction • materials used in the construction which are durable in order to minimise maintenance or replacement • standard materials to increase re-use/ recycling potential • materials which are sourced locally
Pre-Fabrication	The developer will, for as far as it is economically feasible make use of pre-fabricated components in order to minimise waste on site and permit re-use by the manufacturers of any waste generated during construction of the units.
Hazardous Substances	The developer will, for as far as it is economically feasible make use of non-hazardous substances to replace hazardous substances such as replacing asbestos with fibre glass etc.
Maintenance	The developer will, for as far as it is economically feasible design the structure of buildings in such a way that it minimizes but facilitates maintenance, in order to prolong the life-span of the structure and reduce the amount of waste resulting from demolition. The developer will, for as far as it is economically feasible design the structure of buildings in such a way that maintenance does not require the use of hazardous or toxic substances. This will ensure that minimal waste will be un-recyclable due to contamination/

Ordering	The developer will strive to order materials “just-in-time” to avoid deterioration/ breakage during storage The developer will strive to (as far as reasonably possible) order materials only from suppliers which will take back any unused/ off-spec or broken materials favoured. The developer will strive to (as far as reasonably and economically possible) order materials in bulk to reduce packaging but without over-ordering resulting in waste generation. Suppliers which take back the packaging will be favoured by the developer.
Load and unloading of materials	The construction site staff will be trained to load and unload materials correctly to avoid breakage and wastage.
Storing of materials	Care will be taken to ensure that materials are stored appropriately according to supplier specifications to reduce the risk of damage or deterioration.
The use of temporary structures	The developer will attempt to keep temporary structures on site to a minimum. Where unavoidable the temporary structures used on this site, will be re-used on other sites.
General	The contractors must provide and maintain a method statement for “solid waste management”. The method statement must provide information on the proposed licensed facility to be utilised and details of proposed record keeping for auditing purposes. For the disposal of clean building rubble, a General & Hazardous Waste Landfill can be utilized • Waste shall be separated into recyclable and non-recyclable waste, and shall be separated as follows: Hazardous waste: including (but not limited to) old oil, paint, etc, • General waste: including (but not limited to) construction rubble, • Reusable construction material. Recyclable waste shall preferably be deposited in separate bins. The contractor is advised that “Collect-a-Can” collect tins, including paint tins, chemical tins, etc. and “Consol” collect glass for recycling. Any illegal dumping of waste will not be tolerated. Proof of legal dumping must be able to be produced on request. Bins must be clearly marked for ease of management. All refuse bins must have a lid secured so that animals cannot gain access.

	Under no circumstances may any waste be burnt. Dry vegetation removed during the execution of this project must be taken to a garden waste facility or be disposed of at an appropriately licensed facility, but not be disposed of on adjacent land. All waste must be managed in accordance with the Minimum Requirements for waste disposal by landfill 2nd ed 1998. The minimum requirements for easy access by waste disposal service trucks will be met in order for vehicles to effectively access the waste. All waste must be disposed of at a registered site. It is the management bodies' responsibility to ensure that the contracted party responsible for waste disposal disposes of the waste at the correct facility. This facility refers to a <i>General & Hazardous Waste Landfill site</i> as referred to by the Breede Valley Municipality Solid Waste Management Department. These landfill sites are permitted by Department Environmental Affairs and Development Planning with operating numbers in place.
	The use of building materials which result in least amount of waste generated (e.g. pre-fabrication as opposed to on-site construction/ fabrication) will be favoured by the developer as far as economically feasible. Materials will be re-used on site wherever possible. Off-cuts and equipment will be re-used on other jobs wherever possible.

SUB SECTION 4 – WATER USE AND MANAGEMENT PLAN

4.1- WATER USE MINIMIZATION AND MANAGEMENT DURING CONSTRUCTION AND OPERATION

CONSTRUCTION PHASE	
Issue	Management Plan
General Considerations	
DUST SUPPRESSION	Potable water cannot (as far as possible) be used as a means of dust suppression, alternative measures must be sourced. The use of 'grey' water must be investigated as an alternative. The contractor will be responsible to source this water and obtain the required approvals.
ABLUTIONS	The developer will reuse as much of the water from wash basins on site as possible.
CONCRETE AND CEMENT PREPARATION	The developer/contractor will order concrete and cement from supplier for as far as possible. The mixing area should contain any liquids to prevent contamination of soil and storm water
GENERAL CLEANSING OPERATIONS	All hoses will be fitted with trigger gun spray nozzles to limit wastage. Dry sweeping will be used (for as far as possible) in preference to washing of areas and equipment. Wherever possible biodegradable and non-toxic detergents, soaps and degreasers will be used. Regular Maintenance of equipment will be conducted in order to prevent wastage.

ANNEXURE 1 DECLARATION OF UNDERSTANDING BY THE DEVELOPER

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Programme for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 2 DECLARATION OF UNDERSTANDING BY THE ENGINEER

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Programme for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 3 DECLARATION OF UNDERSTANDING BY THE CONTRACTOR

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Programme for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 4 INCIDENT AND ENVIRONMENTAL LOG

ENVIRONMENTAL INCIDENT LOG				
Date	Env. Condition	Comments <i>(Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)</i>	Corrective Action Taken <i>(Give details and attach documentation as far as possible)</i>	<u>Signature</u>