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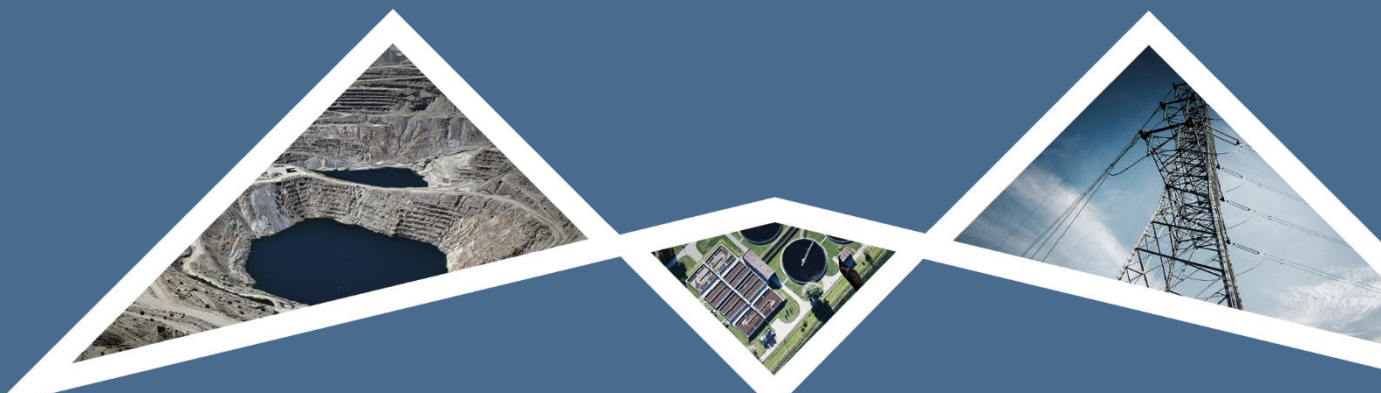
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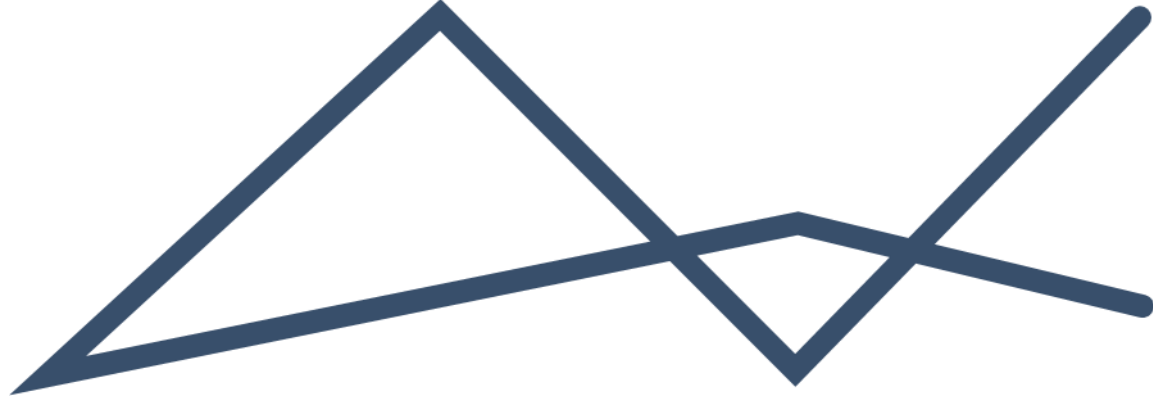
LIFE-CYCLE ENVIRONMENTAL MANAGEMENT PROGRAMME

PROPOSED PHOTOVOLTAIC ENERGY PLANT ON FARM STRUISBULT
NEAR COPPERTON, NORTHERN CAPE

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Abbreviations

CEMP	Construction Phase Environmental Management Programme
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DENC	<u>Northern Cape Department of Environment and Nature Conservation</u>
DFFE	Department of Forestry, Fisheries and the Environment (formerly DEA)
DWA	Department of Water Affairs
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Reports
EMP	Environmental Management Programme
LEMP	Life-Cycle Environmental Management Programme
NEMA	National Environmental Management Act (No. 107 of 1998)
OHS	Occupational Health and Safety Act (No. 85 of 1998)
OEMP	Operational Phase Environmental Management Programme
PV	<u>Photovoltaic</u>
SAHRA	<u>South African Heritage Resource Agency</u>
SDEMA	Specification Data Environmental Management
SKA	Square Kilometre Array
SPEC EMA	Specification Environmental Management



1 OVERVIEW

This document represents the Life-Cycle Environmental Management Programme (LEMP) for the proposed photovoltaic (PV) solar energy plant, near Copperton, Northern Cape.

1.1 Purpose of the LEMP

The LEMP has been included in the Environmental Impact Assessment Report (EIAR) in order to provide a link between the impacts identified in the EIA Process and the actual environmental management on the ground during project implementation and operation. The purpose of this document is to provide for environmental management throughout the various life-cycle stages of the proposed development. The following stages are included:

- Planning and design,
- Pre-construction and construction,
- Operation, and
- Decommissioning.

Furthermore, this LEMP aims for alignment and optimisation of environmental management processes with conditions of authorisation that may arise, thereby ensuring that identified environmental considerations are efficiently and adequately taken into account during all stages of development.

This Environmental Management Programme (EMPr) is an update of the LEMP submitted with the Environmental Impact Assessment (EIA) of the Environmental Authorisation issued on 02 January 2013 and amended on 28 March 2015 (DEA Ref No.:12/12/20/2540), as well as recommendations of the specialist walk-through surveys. Changes made have been underlined or struck through for ease of reference.

This EMPr is applicable to all employees and contractors (including subcontractors) working on the pre-construction, construction, and operation and maintenance phases of the Struisbult PV2 Facility. The document will be adhered to, updated as relevant throughout the project life cycle. This document fulfils the requirement of the department and is an update of the draft EMPr submitted with the EIA.

In terms of the EIA Regulations (Regulation 543 of 18 June 2010) enacted in terms of the National Environmental Management Act (no. 107 of 1998) (NEMA), the proposed project triggered Activity 10, Activity 11:(xi), Activity 22, Activity 23, Activity 26 and Activity 42 of Regulation R544 (18 June 2010), when the activity was originally authorised. Activity 1 of Regulation R545 (18 June 2010) as well as Activity 14 of Regulation R546 (18 June 2010). As the proposed project triggered listed activities in terms of Regulation R544 R545 and R546 it was necessary to submit an EIA for Environmental Authorisation (EA) to the then Department of Environmental Affairs (DEA). Section 22 (l) of the EIA Regulations in force at the time required that a draft EMP be submitted as part of the EIAR.

1.2 Update of the EMPr

EA Condition 13 stated that the Environmental Management Programme submitted as part of the EIR dated April 2012 was not approved and must be amended to include measures as dictated by the final site lay-out map and micro-siting; and the provisions of this environmental authorisation. The EMPr must be submitted to the Department for written approval prior to commencement of the activity. Once approved the EMPr must be implemented and adhered to.

The EMPr is amendable and must be implemented and strictly enforced during all phases of the project. It shall be seen as a dynamic document and shall be included in all contract documentation for all phases of the development when approved (EA Condition 14). Changes to the EMPr, which are environmentally defensible, shall be submitted to the Competent Authority (EA Condition 15). It should also be noted that the provisions of the approved EMPr including recommendations and mitigation measures in the EIR dated April 2012 and specialist' studies shall be an extension of the conditions of this EA and therefore noncompliance with them would constitute noncompliance with the EA (EA Condition 17). The amendments to the EMPr required by EA Condition 18 are specified in Table 1 below.



Table 1: Amendments to the EMPr required by EA Condition 18

No.	Condition	EMP Section
18.1	<u>All recommendations and mitigation measures recorded in the EIR dated April 2012.</u>	<u>Sections 3, 4, 5, 6, 7</u>
18.2	<u>The requirements and conditions of this authorisation.</u>	<u>Sections 1.2, 3, 4, 5, 6, 7</u>
18.3	<u>The final site layout map.</u>	<u>Section 2</u>
18.4	<u>An alien invasive management plan to be implemented during construction and operation of the facility. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken.</u>	<u>Appendix E</u>
18.5	<u>A plant rescue and protection plan which allows for the maximum transplant of conservation important species from areas to be transformed. This plan must be compiled by a vegetation specialist familiar with the site in consultation with the ECO and be implemented prior to commencement of the construction phase.</u>	<u>Appendix F</u>
18.6	<u>A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.</u>	<u>Appendix G</u>
18.7	<u>A traffic management plan for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted. This plan must include measures to minimize impacts on local commuters e.g. limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time and avoid using roads through densely populated built-up areas so as not to disturb existing retail and commercial operations.</u>	<u>Appendix J</u>
18.8	<u>A storm water management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. The plan must include the construction of appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water run-off.</u>	<u>Appendix K</u>
18.9	<u>An erosion management plan for monitoring and rehabilitating erosion events associated with the facility. Appropriate erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion.</u>	<u>Appendix K</u>
18.10	<u>An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems.</u>	<u>Appendix K</u>
18.11	<u>Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive</u>	<u>Appendix K</u>



No.	Condition	EMP Section
	<u>areas from construction impacts including the direct or indirect spillage of pollutants.</u>	
18.12	<u>An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.</u>	Section 2
18.13	<u>A map combining the final layout map superimposed (overlain) on the environmental sensitivity map. This map must reflect the proposed location of PV as stated in the EIR dated April 2012 and this authorisation.</u>	Section 2

The contents of the EMP must meet the requirements outlined in Section 24N (2) and (3) of NEMA (as amended) and Appendix 4 of the EIA Regulations, 2014, as amended. The EMP must address the potential environmental impacts of the proposed activity on the environment throughout the project life-cycle including an assessment of the effectiveness of monitoring and management arrangements after implementation. ~~The Department requires that the EMP be submitted together with the EIAR so that it can be considered simultaneously. Table 1 lists the requirements of an EMP as stipulated by Section 33 of the EIA Regulations R543.~~

The original EMP was compiled in line with the requirements Regulation 33 of the EIA Regulations, 2010. This updated EMP includes additional updates in order to align with the requirements of Appendix 4 of the EIA Regulations, 2014, as amended, and are specified in Table 2 below. ~~lists the requirements of an EMP as stipulated by Section 24N (2) and (3) of the NEMA (as amended).~~



Table 2: EMP Requirements in terms of Appendix 4 of the EIA Regulations, 2014

<u>Appendix 4 Reference</u>	<u>Description</u>	<u>Section in EMP</u>
<u>Appendix 4(1)(1)(a)</u>	<p><u>Details of –</u></p> <ul style="list-style-type: none"> (i) <u>The EAP who prepared the EMPR; and</u> (ii) <u>The expertise of that EAP to prepare an EMPR, including a curriculum vitae;</u> 	<p><u>Section 1.4</u> <u>Appendix A</u></p>
<u>Appendix 4(1)(1)(b)</u>	<u>A detailed description of the aspects of the activity that are covered by the EMPR as identified by the project description.</u>	<u>Section 2</u>
<u>Appendix 4(1)(1)(c)</u>	<u>A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;</u>	<u>Section 2</u>
<u>Appendix 4(1)(1)(d)</u>	<p><u>A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including –</u></p> <ul style="list-style-type: none"> (i) <u>Planning and design;</u> (ii) <u>Pre-construction activities;</u> (iii) <u>Construction activities;</u> (iv) <u>Rehabilitation of the environment after construction and where applicable post closure; and</u> (v) <u>Where relevant, operation activities;</u> 	<u>Sections 3, 4, 5, 6, 7</u>
<u>Appendix 4(1)(1)(f)</u>	<p><u>A description of proposed impact management actions, identifying the manner in which the impact management contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to –</u></p> <ul style="list-style-type: none"> (i) <u>Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</u> (ii) <u>Comply with any prescribed environmental management standards or practices;</u> (iii) <u>Comply with any applicable provisions of the Act regarding closure, where applicable; and</u> (iv) <u>Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;</u> 	<u>Sections 3, 4, 5, 6, 7</u>



<u>Appendix 4 Reference</u>	<u>Description</u>	<u>Section in EMP</u>
<u>Appendix 4(1)(1)(g)</u>	<u>The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);</u>	<u>Sections 3, 4, 5, 6, 7</u>
<u>Appendix 4(1)(1)(h)</u>	<u>The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);</u>	<u>Sections 3, 4, 5, 6, 7</u>
<u>Appendix 4(1)(1)(i)</u>	<u>An indication of the persons who will be responsible for the implementation of the impact management actions;</u>	<u>Sections 3, 4, 5, 6, 7, 8</u>
<u>Appendix 4(1)(1)(j)</u>	<u>The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;</u>	<u>Sections 3, 4, 5, 6, 7</u>
<u>Appendix 4(1)(1)(k)</u>	<u>The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);</u>	<u>Sections 3, 4, 5, 6, 7</u>
<u>Appendix 4(1)(1)(l)</u>	<u>A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;</u>	<u>Section 10</u>
<u>Appendix 4(1)(1)(m)</u>	<u>An environmental awareness plan describing the manner in which –</u> (i) <u>The applicant intends to inform his or her employees of any environmental risk which may result from their work;</u> <u>and</u> (ii) <u>Risks must be dealt with in order to avoid pollution or the degradation of the environment; and</u>	<u>Section 4.4</u>
<u>Appendix 4(1)(1)(n)</u>	<u>Any specific information that may be required by the competent authority.</u>	<u>Section 1.2</u>



The legislation hereby aims to ensure that effective environmental management is implemented throughout the life cycle of the project via the translation of EIA management actions into the LEMP.

Authorisation of the activity is subject to the conditions contained in this EMPr, which form part of the environmental authorisation and are binding on the holder of the authorisation (EA Condition 2).

Any amendments to the impact management outcomes or objectives of the EMPr must be approved by the Competent Authority (i.e. DFFE) prior to implementation (EA Condition 5), unless these are required to address an emergency situation in which case the Environmental Control Officer (ECO) in conjunction with the Contractor's Environmental Officer (EO) should be consulted.

The Department of Environmental Affairs & Development Planning (DEA&DP)'s¹ Guideline for Environmental Management Plans (2005) aims to inform and guide the preparation and implementation of EMPs. The guideline defines EMPs as:

“an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the project are enhanced”.

Section 24N (2) and (3) of the NEMA (as amended) listing the requirements of an EMP are given in Table 3 below.

Table 3: Section 24N (2) and (3) of the NEMA (as amended) listing the requirements of an EMP

24N.(2) the environmental management programme must contain-

- (a) *information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24(1A), including environmental impacts or objectives in respect of –*
 - (i) *planning and design;*
 - (ii) *pre-construction and construction activities;*
 - (iii) *the operation or undertaking of the activity in question;*
 - (iv) *the rehabilitation of the environment; and*
 - (v) *closure, where relevant.*
- (b) *details of –*
 - (i) *the person who prepared the environmental management programme; and*
 - (ii) *the expertise of that person to prepare an environmental management programme*
- (c) *a detailed description of the aspects of the activity that are covered by the draft environmental management plan;*
- (d) *information identifying the persons who will be responsible for the implementation of the measures contemplated in paragraph (a);*
- (e) *information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance.*
- (f) *as far as is reasonable practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and*
- (g) *a description of the manner in which it intends to-*
 - (i) *modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;*
 - (ii) *remedy the cause of pollution or degradation and mitigation of pollutants; and*

¹ Please note that DEA&DP's guideline is used even though the proposed project is based in the Northern Cape, as DEA has not compiled a guideline on EMPs.



- (iii) *comply with any prescribed environmental management standards or practices.*
- (3)** *the environmental management programme must, where appropriate-*
- (a) *set out time periods within which the measures contemplated in the environmental management programme must be implemented;*
- (b) *contain measures regulating responsibilities for any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of prospecting or mining operations or related mining activities which may occur inside and outside the boundaries of the prospecting area or mining area in question; and*
- (c) *develop an environmental awareness plan describing the manner in which-*
- (i) *the applicant intends to inform his or her employees of any environmental risk which may result from their work; and*
- (ii) *risks must be dealt with in order to avoid pollution or the degradation of the environment.*

The LEMP aims to meet the EMP requirements as legislated by the NEMA Regulations (as amended) as well as falling in line with the DEA&DP guideline document for an Environmental Management Plan². It should however be noted that no guideline or guidance exists in terms of best practice approach to LEMPs. This document should thus be seen in an iterative context allowing for amendments throughout the life-cycle of the project, allowing for adjustments as new information is made available.

1.3 Structure of the LEMP

As discussed above, the LEMP aims to address environmental management throughout the project life-cycle, from planning and design, through construction, to operation and potential decommissioning. The LEMP has been structured to include the following sections:

1. Discussion summarising environmental management influencing the planning and design of the proposed project (Chapter 3);
2. Construction EMP based on identified impacts and mitigation measures from the EIAR (Chapter 2);
3. Operational Framework based on identified impacts and mitigation measures from the EIAR (Chapter 5); and
4. Decommissioning Framework providing guidance on key considerations to be considered during decommissioning/closure (Chapter 7).

1.4 Expertise of Environmental Assessment Practitioners

Section (1)(1)(a) of Appendix 4 of EIA Regulations, 2014 and Section 24N (2) and (3) of the NEMA (as amended) requires that an EMP must include the details of the person(s) who prepared the EMP, and the expertise of that person to prepare an EMP. In this regard, the Curriculum Vitae of the Environmental Assessment Practitioners who compiled the LEMP are included in Appendix A.

² 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.



2 BACKGROUND INFORMATION

This section has been divided into subsections which outline how environmental considerations have informed and been incorporated into the planning and design phases of the proposed PV plant. Detailed design is usually undertaken as part of the pre-construction phase as it is a costly undertaking which is generally only costed for once all required authorisations have been obtained. Thus, the planning and design phases discussed are limited to those associated with the pre-authorisation phases. Mitigation measures have been recommended for the detailed design phase.

2.1 Project Description

Struisbult PV2 (Pty) Ltd proposes to construct a PV plant to generate approximately 100 MW (preferred alternative) ~~or 300 MW (alternative)~~ on the farm Struisbult (Farm No. 104 Portion 1), also known as Vogelstruisbult near Copperton in the Northern Cape. Struisbult Farm borders Copperton on the eastern side of the town and covers approximately 6 194 ha.

In terms of associated infrastructures, the following would be required:

- Upgrade of existing internal farm roads and construction of new roads to accommodate the construction vehicles and access the site.
- Construction of a 132 kV transmission line to connect the proposed PV plant with Eskom's grid via the Cuprum substation.
- Electrical fence to prevent illegal trespassing and the possible theft of panels, as well as keeping livestock from roaming between the solar arrays and causing accidental damage.
- Other infrastructure includes an office, connection centre and a guard cabin.

2.2 Summary of Alternatives

To summarise, the feasible alternatives assessed in the EIAR included the following:

- Location alternatives:
 - One location for the proposed Struisbult PV plant; and
 - Electricity distribution via a 4.2 km 132 kV connection to Cuprum substation.
- Activity alternatives:
 - Solar energy generation via a PV plant; and
 - "No-go" alternative to solar energy production.
- Site layout alternatives:
 - Two layout alternatives (100 MW with 300 ha footprint and 300 MW with 900 ha footprint).
- Technology alternatives:
 - Two technology alternatives in terms of the solar panel type (PV and CPV); and
 - Four foundation options.

The preferred site located on the farm Struisbult (Farm No. 104 Portion 1) near Copperton in the Northern Cape has been approved by the Competent Authority (EA Condition 1). 4. The activities authorised may only be carried out at the property as described above (EA Condition 4).

Sensitive ecological areas identified on site during the EIA are shown in Figure 2 and Figure 3.

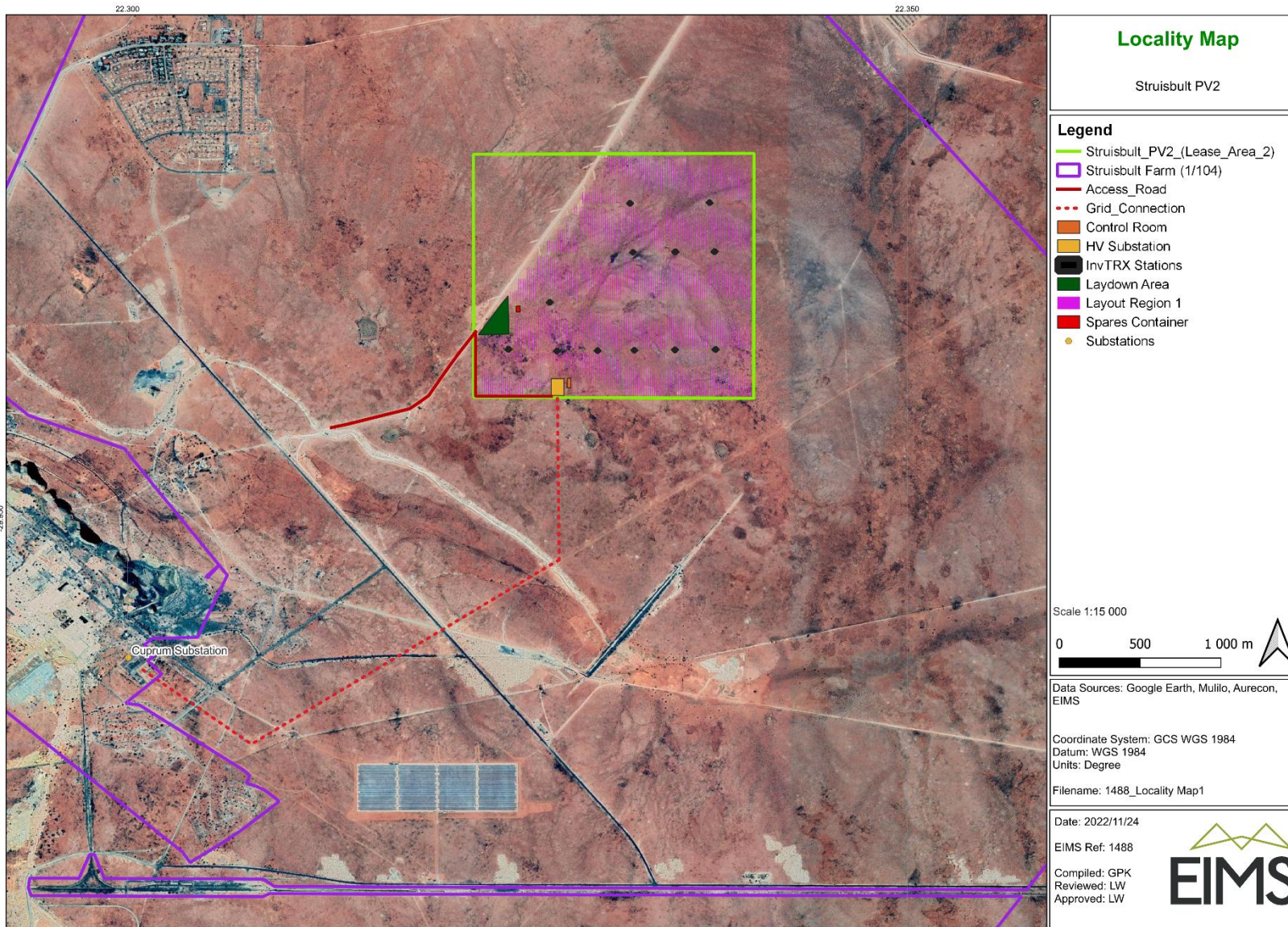


Figure 1: Final Layout Map

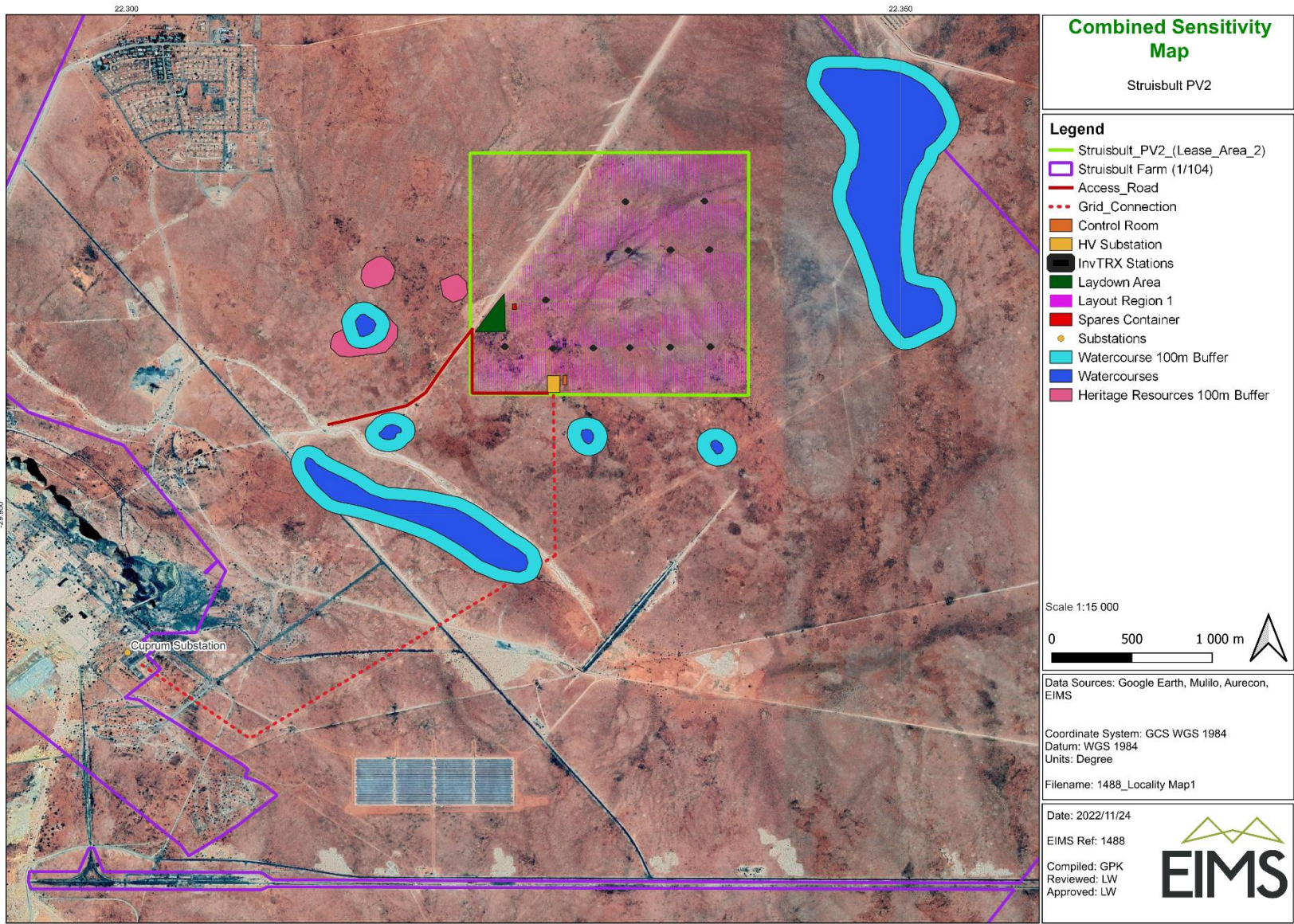


Figure 2: Sensitive ecological areas and the proposed project

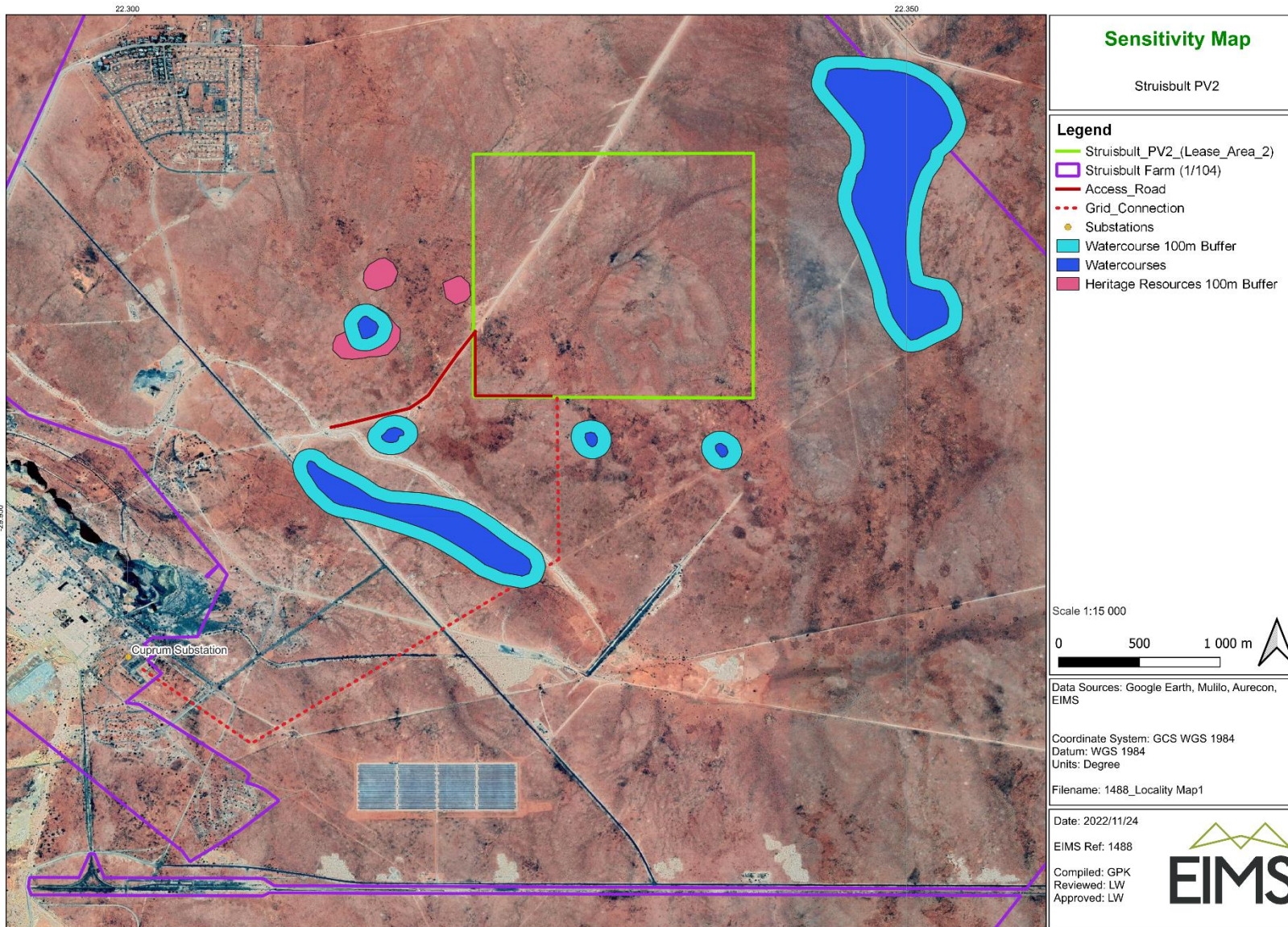


Figure 3: Sensitive ecological areas on site



2.3 Administrative Conditions of the Environmental Authorisation

The following administrative conditions of the EA (Appendix C) should be noted:

- This activity must commence within a period of three (3) years from the date of issue of this authorisation. If commencement of the activity does not occur within that period, the authorisation lapses and a new application for environmental authorisation must be made in order for the activity to be undertaken (EA Condition 6).
- Commencement with one activity listed in terms of this authorisation constitutes commencement of all authorised activities (EA Condition 7).
- The holder of an environmental authorisation must notify the competent authority of any alienation, transfer and change of ownership rights in the property on which the activity is to take place (EA Condition 8).
- The Department reserves the right to amend the EMPr should any impacts that were not anticipated or covered in the EIR dated April 2012 be discovered (EA Condition 16).
- Fourteen (14) days written notice must be given to the Department that the activity will commence. Commencement for the purposes of this condition includes site preparation. The notice must include a date on which it is anticipated that the activity will commence, as well as a reference number. This notification period may coincide with the Notice of Intent to Appeal period (EA Condition 29).
- Fourteen (14) days written notice must be given to the Department that the activity operational phase will commence (EA Condition 30).
- A copy of this authorisation and the approved EMPr must be kept at the property where the activity will be undertaken. The environmental authorisation as well as any amendment to the environmental authorisation and approved EMPr must be provided to any authorised official of the Department who requests to see it and must be made available for inspection by any employee or agent of the holder of the environmental authorisation who works or undertakes work at the property (EA Condition 64).
- The holder of the authorisation must notify both the Director: Integrated Environmental Authorisations and the Director: Compliance Monitoring at the Department, in writing and within 48 (forty-eight) hours, if any condition of this authorisation cannot be or is not adhered to. Any notification in terms of this condition must be accompanied by reasons for the non-compliance (EA Condition 65).
- National government, provincial government, local authorities or committees appointed in terms of the conditions of this authorisation or any other public authority shall not be held responsible for any damages or losses suffered by the holder or his successor in title in any instance where construction or operation subsequent to construction be temporarily or permanently stopped for reasons of non-compliance by the holder with the conditions of authorisation as set out in this document or any other subsequent document emanating from these conditions of authorisation (EA Condition 66).

The following administrative conditions of the EA (Appendix C) should be noted but have not been included in the main EMPr document: EA Condition 9, 10, 11, 26, 27 and 28.



3 PLANNING AND DESIGN

The design for the proposed development should respond to the identified environmental constraints and opportunities. The following mitigation measures related to the design for the proposed development have been recommended to reduce the environmental impacts.

3.1 Design of the Project

3.1.1 Botanical

- Before the clearing of the site, the appropriate permits must be obtained from the Department of Forestry, Fisheries and the Environment (DFFE) for the removal of plants listed in the National Forest Act 87 of 1998 and from the relevant provincial department for the destruction of species protected in terms of the specific provincial legislation (EA Condition 43);
- Locate the proposed project in such a way that the development footprint is minimized;
- Avoid shallow depressions, well defined pans and seasonal watercourses should be buffered by at least 50 m (see Figure 2 and Figure 3);
- Avoid sensitive areas indicated in Figure 2 and Figure 3;
- Avoid riparian areas due to high sensitivity;
- Site clearance should occur in sections as required for construction and not all at once;
- A site specific rehabilitation plan should be compiled with the aid of a suitably qualified rehabilitation specialist and adhered to;
- Mesquite trees and / or shrubs within 250 m of the boundary of the PV plant footprint and the power-line route should be eradicated by cutting and treating with herbicide to prevent coppicing (EA Condition 46);
- Should the alternative site be approved, the upland areas of calcrete and calcrete ridges should be avoided and considered to be no-go areas;
- Position access roads in such a way that no clearing within no-go areas is necessary and definite drainage areas are avoided; and
- Design the construction of access roads for minimal impact.

3.1.2 Fauna

- Allow small ground level openings, 20-30 cm in height, in the electrical fence to facilitate the movement of small mammals and reptiles through the site;
- Monitor both soil chemistry and erosion and mitigate if required;
- Should soil chemistry be affected (likely to be increase in salinity), the nature of the washing mixture could be changed, or acceptable waste treatment be employed; and
- Removal of perennial alien species such as Mesquite (Prosopis glandulosa) at sites disturbed or cleared, or where panel washing occurs.

3.1.3 Avifauna

- Implement planning and design mitigation measures for protection of avifauna based on the outcome of the comprehensive bird monitoring programme as per the guidelines provided in Section 6 of this LEMP;
- Reports regarding bird monitoring must be submitted to the Northern Cape Department of Environment and Nature Conservation (DENC), BirdLife South Africa, the Endangered Wildlife Trust (EWT) and this



Department on a quarterly basis. The report will assist all stakeholders in identifying potential and additional mitigation measures and to establish protocols for bird monitoring programmes for PV solar energy development in the country (EA Condition 34);

- Development must be excluded from within a 1 km radius of any occupied and active Martial Eagle nest site. This buffer area must remain undisturbed and undeveloped (EA Condition 35);
- Should above-ground power lines be used, bird-safe structures (ideally with critical air gaps greater than 2 m) should be used for above-ground power lines that exclude birds physically from high risk areas of live infrastructure and comprehensively insulate such areas to avoid bird electrocution;
- Power lines and cables should be below ground where reasonably practicable. Where it is possible, all new above-ground power lines and cables should be fitted with bird flight diverters;
- The length of any above-ground power lines should be minimised and all new lines should be marked with bird flight diverters; and
- Any sightings of nests to be reported to a bird specialist immediately.

3.1.4 Heritage

- A 100 m buffer zone should be implemented from the edge of the pans for sites situated alongside the pans and for transmission lines (see Figure 2 and Figure 3) (EA Condition 37);
- Test excavations around the pans that would be impacted on should be done before construction to check for buried archaeological material; and
- Archaeological sites impacted on by the proposed development should be mitigated by excavating and sampling of the sites before the start of construction (see Figure 2 and Figure 3).

3.1.5 Visual

- Careful consideration should be given to the visual implications of the siting of the construction camp and should be screened off;
- New structures should be placed where they are least visible to the greatest numbers of people, i.e. in places where the topography can offer shielding (where possible);
- Visibility of buildings and the local sub-station should be reduced by cladding the buildings in non-reflective colours and materials that would blend in with the natural environment. E.g. cladding with local stone or plaster and paint with earthy tones for paint colours, roofs should be grey and non-reflective and doors and window frames should reference either the roof or wall colours;
- All excess material shall be removed off-site, and the ground shall be returned to original levels/gradients as far as possible;
- Finishing materials for the infrastructure (including support structures) should be of colours that are non-reflective and in dark matte colours such as dark grey or charcoal;
- Information on the project should be provided to local people, such as through a poster at the entrance to the site; and
- The holder of the authorisation must consult a lighting engineer to assist in the planning and placement of light fixtures in order to reduce the impacts associated with glare and light trespass (EA Condition 40).

3.1.6 Socio-Economic

- Obtain a list of locally available labour and skills. Preference should be given to local communities for employment opportunities;
- Base recruitment on sound labour practices and with gender equality in mind; and



- Provide appropriate training, which would enable individuals to apply their skills to other construction and development projects in the region once construction is complete.

3.1.7 Surface Water

- A monitoring plan for soil chemistry and erosion should be implemented due to potential impacts resulting from panel cleaning;
- Shallow depressions and well defined pans shall be avoided and buffered by at least ~~50~~100 m.
- Low-lying depressions and watercourses should be avoided wherever possible;
- Install composting toilets that does not require water; no septic tanks / soak-aways shall be allowed in drainage areas;
- Channel runoff should be diverted in such a way as to minimise erosion and if necessary, soil stabilising techniques should be implemented in vulnerable areas;
- Stormwater channels and “mitre” chutes should be constructed to direct the stormwater flows and minimize and control erosion;
- The minor storm design period should be used to determine the size of the earth channels. A return period of 1:5 years is applicable which approximates to an average intensity of 30 mm/hour;
- The major storm occurrence (i.e. 1:25 year, 1:50 year & 1:100 year) should be used to calculate culverts in defined drainage lines and determine flood levels where necessary. The intensities for each occurrence are: 1:25 year – 47 mm/hour, 1:50 year – 56 mm/hour and 1:100 year – 64 mm/hour respectively;
- Where roads do intersect natural, defined drainage lines, suitably sized pipe culverts or drive through causeways should be installed or constructed;
- The holder of this authorisation must obtain a Water Use Licence from the Department of Water Affairs (DWA) prior to the commencement of the project should the applicant impact on any wetland or water resource. A copy of the license must be kept by the ECO on site (EA Condition 38); and
- Roads must be designed so that changes to surface water runoff are avoided, and erosion is not initiated (EA Condition 50).

3.1.8 Internal Roads

- Roads should be designed to have minimal impact on the environment;
- Gravel roads should be graded and shaped with a 2 % crossfall back into the slope, allowing stormwater to be channelled in a controlled manor towards the natural drainage lines;
- Where roads intersect natural, defined drainage lines, suitably sized pipe culverts or drive through causeways should be installed or constructed; and
- Where internal roads need to be realigned, these should not cross no-go areas or drainage lines (where possible).

3.1.9 Land use

- A detailed impact analysis should be undertaken together with the South African SKA Project Office (SASPO) to identify mitigation measures for the construction and operation of the PV facility;
- Potential interference with public safety communication systems (e.g. radio traffic related to emergency activities) must be avoided (EA Condition 55);
- The holder of the authorisation must ensure that any transmitters that are to be established or have been established at the site for the purposes of voice and data communication must comply with the



relevant AGA regulations concerning the restriction of use of the radio frequency spectrum that applies in the area concerned (EA Condition 56);

- The holder of the authorisation must ensure that the construction and operation activities of the PV facility do not pose any significant impact to the Meerkat and or SKA facilities (EA Condition 57);
- The holder of the authorisation must obtain a written permit or approval from the South Africa Civil Aviation Authority that the PV facility will not interfere with the performance of aerodrome radio Communication, Navigation and Surveillance (CNS) equipment especially the radar prior to commencement of the activity (EA Condition 58); and
- The holder of the authorisation must obtain a written approval from the South African SKA Project Office (SASPO), confirming that the operation of the PV facility will not result in detrimental radio frequency interference to the SKA (EA Condition 59).

3.1.10 Sedimentation and Erosion

- Dust generated, especially by earth moving machinery, must be minimized through wetting of the soil surface and putting up signs to enforce speed limits. Speed bumps must be built to force slow speeds; site speed limits of 30 km/h must be put in place to reduce erosion;
- Site clearance and earth moving activities should take place in the dry season as far as possible to prevent erosion and limit disturbances to surface areas;
- A stormwater management plan must be compiled and implemented;
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events and strong winds. This is to be done according to the Re-vegetation and Habitat Rehabilitation Plan; and
- Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces: No non-environmentally friendly suppressants may be used as this could result in the pollution of valuable water sources.

3.1.11 Heritage and Paleontology

- Archaeological sites should be mitigated by excavation and sampling of sites before the start of construction;
- Test excavations should be carried out around the pans to check for substances of archaeological significance which may require sampling;
- A buffer zone of 100 m from the edge of the pans should be employed; and
- In the event of accidental uncovering of graves or substantial fossil remains work must stop immediately and SAHRA should be notified.

3.1.12 Traffic

- Ensure that road junctions have good sightlines;
- Implement traffic control measures where necessary;
- Transport components overnight as far as possible; and
- Engage with the roads authorities prior to construction to ensure the necessary road upgrades, permits, traffic escorts etc are scheduled.



4 CONSTRUCTION PHASE EMP

The Construction EMP aims to address mitigation measures pertaining to the construction phase as identified during the course of the EIA. This section includes both General Specifications as well as ~~Draft~~ Specification Data, addressing general construction issues and issues that are not addressed by the General Specifications, respectively. It should be noted that the ~~Draft~~ Specification Data ~~should~~ be revised ~~as required~~ post authorisation to ensure that all relevant conditions of the EA have been addressed.

4.1 Construction EMP General Specifications

The complete General Specifications have been included in Appendix B and include the following sections:

- Scope
- Normative References
- Supporting Specifications
- Definitions
- Requirements
 - Material
 - Material handling, use and storage
 - Hazardous substances
 - Shutter oil and curing compound
 - Bitumen
 - Plant
 - Ablution facilities
 - Solid waste management
 - Contaminated water
 - Site structures
 - Noise control
 - Lights
 - Fuel (petrol and diesel) and oil
 - Workshop, equipment maintenance and storage
 - Dust
 - Methods and procedures
 - Environmental awareness training
 - Construction personnel information posters
 - Site clearance
 - Site division
 - Site demarcation
 - "No go" areas
 - Protection of natural features



- Protection of flora and fauna
- Protection of archaeological and paleontological remains
- Access routes/ haul roads
- Cement and concrete batching
- Earthworks
- Pumping
- Bitumen
- Fire control
- Emergency procedures
- Community relations
- Erosion and sedimentation control
- Aesthetics
- Recreation
- Access to site
- Crane operations
- Trenching
- Demolition
- Drilling and jack hammering
- Stockpiling
- Site closure and rehabilitation
- Temporary re-vegetation of the areas disturbed by construction
- Temporary site closure
- Compliance with requirements and penalties
 - Compliance
 - Penalties
 - Removal from site and suspension of Works
- Measurement and Payment
 - Basic principles
 - General
 - All requirements of the environmental management specification
 - Work "required by the Specification Data"
 - Billed items
 - Method Statements: Additional work
 - All requirements of the environmental management specification



4.2 Project Specifications

The following section provides the Draft Specification Data which, along with the General Specifications, will be included in all contract documentation associated with the proposed project and will accordingly be binding on the Contractor.

Scope: The general principles contained within this Specification Data: Environmental Management (SDEMA) shall apply to all construction related activities. All construction activities shall observe any relevant environmental legislation and in so doing shall be undertaken in such a manner as to minimise impacts on the natural and social environment.

Interpretations: This Specification contains clauses specifically applicable and related to the environmental requirements for the solar energy facility, near Copperton, Northern Cape.

Where any discrepancy or difference occurs between this SDEMA and the Specification: Environmental Management (Comprehensive), the provision of this Specification shall prevail.

Definitions: For the purposes of this Specification the following definitions shall be added:

- Working area:

The land and any other place on, under, over, in or through which the Works are to be executed or carried out, and any other land or place made available by the Employer in connection with the Works. The Working Area shall include the site office, construction camp, stockpiles, batching areas, the construction area, all access routes and any additional areas to which the Engineer permits access. The construction footprint must be kept to a minimum.

4.3 Specification Data: Environmental Management (SDEMA)

SDEM 4.3.1 Materials handling, use and storage (Subclause 4.1.1)

The Engineer shall be advised of the areas that the Contractor intends to use for the stockpiling of both natural and manufactured materials. No stockpiling shall occur outside of the working area (as designated by the engineer) and without the Engineer's prior approval of the proposed stockpiling areas. Imported material shall be free of litter, contaminants or exotic plant seed. The Contractor shall ensure that material is not stockpiled along the border of any water body (permanent or seasonal), including pans or within close proximity to no-go areas.

Location and treatment of material stockpiles shall take consideration of prevailing wind directions and dwellings. Stockpiles shall be stored so as to prevent erosion and run off during rainy periods.

Dust suppression measures shall be used particularly during dry periods of weather during the summer months. Appropriate dust suppression techniques must be implemented on all exposed surfaces to minimise and control airborne dust. Such measures must include wet suppression, chemical stabilization, the use of a wind fence, covering surfaces with straw chippings and re-vegetation of open areas (EA Conditions 52).

The holder of this authorisation, contractors and sub-contractors working on site must ensure that oil, fuel and chemicals are confined to specific and secured areas throughout the construction period. These materials must be stored in a bunded area with adequate containment for potential spills and leaks (EA Condition 63).

SDEM 4.3.2 Hazardous substances (Subclause 4.1.2)

Procedures detailed in the Materials Safety Data Sheets (MSDS) shall be followed in the event of an emergency situation.

Potentially hazardous substances shall be stored, handled and disposed of as prescribed by the Engineer.

SDEM 4.3.3 Shutter oil and curing compound (Subclause 4.1.2.1)

Shutter oil and curing compound shall be stored and dispensed within a bunded area, and not located closer than 32 m from riverbanks / water courses / drainage lines.



4.4 Requirements

SDEM 4.4.1 Ablution facilities (Subclause 4.2.1)

A sufficient number of chemical toilets shall be provided by the Contractor in the construction camp area and at appropriate locations approved by the Engineer. Temporary / portable toilets shall not be located within 32 m from the top of the river banks / water courses / drainage lines. The ratio of ablution facilities for workers shall not be less than that required by the Construction Regulations of 2014 of the Occupational Health and Safety Act. All temporary/ portable toilets shall be secured to the ground to prevent them from toppling due to wind or any other cause.

SDEM 4.4.2 Solid Waste Management (Subclause 4.2.2)

Hazardous wastes (if any) shall only be sent to landfill sites registered for hazardous wastes. Burying or burning of solid waste shall be prohibited on site. A waste management system shall be established to ensure regular waste removal.

An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate. Any solid waste shall be disposed of at a landfill licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No. 59 of 2008). Copies of all waste disposal certificates must be kept on site (EA Condition 41).

SDEM 4.4.3 Contaminated Water (Subclause 4.2.3)

The Contractor shall prevent the discharge of any pollutants, such as soaps, detergents, cements, concrete, lime, chemicals, hydrocarbons, glues, solvents, paints and wastewater into the surrounding terrestrial and aquatic environment. Should any discharge be necessary it will require the Engineer's approval prior to discharging any contaminated water into a lined sump, which will allow sediment particles to settle. Surface contaminants shall be separated by skimming off the surface. Dried particulates collected from the sump and skimmed pollutants such as oils and petrochemicals shall be collected and disposed of at a registered landfill site. The remaining water shall then be drained into an unlined drainage pond where the water can filter into the ground. The pond shall be located in an area approved by the (Environmental Control Officer (ECO) and Engineer. To excavate the pond the top 300 mm of soil shall be removed and stored separately. Once construction is complete the pond shall be backfilled and the top material replaced to cover the area for rehabilitation.

SDEM 4.4.4 Site Structures (Subclause 4.2.4)

No site structures shall be located within 32 m from the top of the river banks / water courses / drainage lines. Careful consideration should be given to the visual implications of the siting of the construction camp. Construction yards should be restricted in extent as far as possible and should be screened by visually impermeable material.

Ensure the camp is neat and tidy at all times. Site offices, if required, should be limited to single storey and should be sited carefully using temporary screen fencing to screen from the wider landscape.

The holder of this authorisation must provide sanitation facilities within the construction camps and along the road so that workers do not pollute the surrounding environment. These facilities must be removed from the site when the construction phase is completed as well as associated waste to be disposed of at a registered waste disposal site (EA Condition 61).

The holder of this authorisation must take note that no temporary site camps will be allowed outside the footprint of the development area as the establishment of such structures might trigger a listed activity as defined in the Environmental Impact Assessment Regulations, 2010 (EA Condition 62).

SDEM 4.4.5 Fuel (Petrol and Diesel) and oil (Subclause 4.2.7)

Fuels in the form of diesel and petrol shall not be stored within 32 m from the top of the river banks/water courses / drainage lines.



SDEM 4.4.6 Equipment Maintenance and Storage (Subclause 4.2.8)

Wastewater generated from construction or the washing of vehicles shall not be permitted to enter water courses, either directly or via a stormwater system.

SDEM 4.4.7 Stormwater Erosion Control (Add Section 4.2.10)

The Contractor shall take reasonable measures to control the erosive effects of stormwater runoff. Any runnels or erosion channels developed during the construction period or during the maintenance period shall be backfilled and compacted to limit the impacts of sediment deposition into the surrounding aquatic environment.

Establish the stormwater system as a priority, so that all runoff is led to the designated drainage from the site.

Construction activities shall be scheduled to take place in the dry season (winter) as far as possible.

SDEM 4.4.8 Method Statements (Subclause 4.3.1)

The following additional method statements shall be provided by the Contractor within 14 days of the receipt of the Letter of Acceptance and prior to the activity covered by the Method Statement being undertaken:

- Logistics for the environmental awareness course for all the Contractors employees.
- Emergency procedures for fire, accidental leaks and spillages of hazardous materials including:
 - who shall be notified in the event of an emergency, including contact numbers for the relevant local authority,
 - where and how any hazardous spills will be disposed of,
 - the size of spillage which the emergency procedures could contain,
 - location of all emergency equipment and an indication of how regularly the emergency equipment will be checked to ensure that it is working properly.
- Location and layout of the construction camp in the form of a plan showing offices, stores for fuels, hazardous substances, vehicle parking, access point, equipment cleaning areas and staff toilet placement.
- Location, layout and preparation of cement / concrete batching facilities including the methods employed for the mixing of concrete and the management of runoff water for such areas. An indication shall be given of how concrete spoil will be minimised and cleared.
- Method of undertaking earthworks, including spoil management, erosion, dust and noise controls.
- Method of undertaking blasting (if required).
- Management measures to be undertaken in instances where traffic flows may be interrupted.
- Extent of areas to be cleared, the method of clearing and the preparation for this clearing so as to ensure minimisation of exposed areas.
- Measures to be put in place during temporary closure periods, e.g. December holidays.
- Measures to be put in place to limit sediment deposition into the surrounding terrestrial and aquatic environment.

SDEM 4.4.9 Site Clearance (Subclause 4.3.4)

The site shall be cleared in sections as required for construction and not all at once. The Contractor shall strip the top material and root material of cleared vegetation (top 100-150 mm layer), for subsequent use during rehabilitation and re-vegetation. Top material shall be stripped from all areas of the Working Area where topsoil will be impacted by construction activities, including areas for temporary facilities, as directed by the Engineer. The Contractor shall not make use of herbicides or other chemical methods to clear the proposed site especially



near the identified water courses. In order to limit erosion the Contractor shall retain original groundcover, as far as practically possible, adjacent to the aquatic environment and to the trenching line.

Vegetation clearing must be limited to the required footprint. Mitigation measures must be implemented to reduce the risk of erosion and the invasion of alien species (EA Condition 42). Surface material should be conserved and used for rehabilitation. All site operatives should receive training in awareness of issues such as the use of fires and contaminants and litter on site.

SDEM 4.4.10 No go areas (Subclause 4.3.7)

All works to be undertaken shall be within the boundary of the site. A “no go” area shall extend on either side of the working area i.e. all areas outside of the defined working area and designated access roads. The working area shall be demarcated in an appropriate manner determined by the Engineer pre-construction. The “no-go” area shall be demarcated by a semi- permanent fence to prevent workers from entering the undisturbed areas before construction commences (EA Condition 48).

Based on the ecological importance, all construction activities shall remain outside of all aquatic environments, with special efforts implemented to maintain a 50 m buffer between construction related activities and any rivers / water courses / drainage lines identified as no-go areas. These no go areas shall stay in place until construction of the infrastructure within the buffer area must commence.

A 100 m buffer shall be maintained around heritage resources (see Figure 2) and demarcated as “no go” areas. Construction activities shall remain outside these designated areas.

No equipment associated with earthworks shall be allowed outside of the site and defined access routes, or within “no go” areas, unless expressly permitted by the Engineer.

Access roads should be positioned in such a way that no clearing within no-go areas is required, and definite drainage areas should be avoided. Should additional access roads be required, these should be built with culverts to prevent the impediment of water movement.

SDEM 4.4.11 Flora, avifauna and fauna (Subclause 4.3.9)

A vegetation rehabilitation plan shall be compiled and implemented with the aid of a suitably qualified rehabilitation specialist, for inclusion in the Construction EMP. The rehabilitation specialist shall recommend species to be used in rehabilitation as well as any special measures required, e.g. shade-netting and alien vegetation removal. Furthermore, ground shall be returned as far as possible to original levels / gradients and any excess material shall not be left in piles, but shall be removed off-site.

Topsoil (100 -150 mm) from construction areas where vegetation clearing is required shall be removed and stockpiled for rehabilitation purposes as per the requirements of the Rehabilitation Plan. The site shall be cleared in sections as required for construction and not all at once. Rehabilitation shall start immediate in accordance with the rehabilitation plan. Furthermore, perennial alien species such as *Prosopis glandulosa* shall be removed from areas disturbed or cleared during construction and disposed of in an appropriate manner to prevent re-establishment and / or spreading of these species.

Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but should be temporarily stored in a demarcated area (EA Condition 44). Removal of alien invasive species or other vegetation and follow-up procedures must be in accordance with the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (EA Condition 45).

The construction phase shall be closely monitored by an Environmental Control Officer who shall identify areas that require rehabilitation in the post-construction phase. The restoration of those areas must follow the construction phase.

No flora shall be removed or damaged, outside of the designated working area, without specialist botanical input. The collection of firewood by construction workers is prohibited.

Any snakes found on site shall be removed from site and released into an area away from the site, without harm.



Anti-collision devices such as bird flappers must be installed where powerline crosses avifaunal corridors, as recommended by the avifaunal specialist (EA Condition 60). The input of an avifaunal specialist must be obtained for the fitting of the anti-collision devices onto specific sections of the line once the exact positions of the towers have been surveyed and pegged (EA Condition 36).

The contractor shall ensure that the time a trench is left exposed is kept to a minimum, and that open trenches are inspected on a daily basis for animals which may have fallen or become trapped. Any animals found trapped in any trenches shall be freed without harm.

In all cases construction of access roads should be designed for minimal impact. All construction should take place within the footprint of the proposed PV plant.

A rehabilitation plan for the site should be compiled with the aid of a rehabilitation specialist and adhered to. Compile and implement a vegetation rehabilitation plan with the aid of a rehabilitation specialist, for inclusion in the Construction EMP. The specialist is to recommend species to be used in rehabilitation as well as any special measures for rehabilitation such as shade-netting and alien vegetation removal.

Demarcate no-go areas identified during pre-construction monitoring. Low-lying depressions and watercourses should be avoided wherever possible. A buffer zone of 50m must be maintained from the drainage areas and endorheic pans which have been identified as no-go area in the Aquatic Specialist Report dated January 2012 (EA Condition 47). The site should be cleared in sections as required for construction and not all at once.

SDEM 4.4.12 Protection of archaeological and paleontological remains (Subclause 4.3.10)

Should substantial fossil remains be exposed during construction, these should be safeguarded by the ECO, preferably in situ, and the South African Heritage Resources Association (SAHRA) should be notified by the ECO immediately so that appropriate mitigation can be undertaken.

The no-go areas and their buffer zones must be cordoned off during the construction phase.

The engineer shall be briefed on the recording requirements by the archaeologist before excavations are done. This report must be submitted to the consultant archaeologist for dissemination to SAHRA to aid others in the development of a broader understanding of the Pleistocene landscape of this area.

Archaeological sites should be mitigated by excavation and sampling of sites before the start of construction (red dots in Figure 4.9 of the EIAR). Test excavations around pans impacted on by the PV plant shall be done before construction to check for buried archaeological material. If avoiding sensitive archaeological sites is not feasible, sampling and recording of the archaeological site before its destruction must be undertaken.

From a heritage and visual perspective, a smaller footprint is preferable. A buffer zone of 100 m from the edge of the pans should be employed.

In the event of accidental uncovering of graves or substantial fossil remains (e.g. vertebrate bones and teeth, large blocks of petrified wood), work must stop immediately and SAHRA should be notified. An archaeologist / palaeontologist should be involved to assist with the investigation and procedures to address the situation (EA Condition 51).

SDEM 4.4.13 Access routes/ haul roads (Subclause 4.3.11)

The contractor shall ensure that all regulations relating to traffic management are observed and local traffic officials are informed of the proposed construction activities. As far as possible, attempts shall be made to ensure that high construction related road usage coincides with low traffic flow periods. Transport components overnight as far as possible.

Signage and safety measures during the construction of the access roads shall comply with the guidelines as set out in the latest issue of the SADC Road Traffic Signs Manual. Standard "construction ahead" warning signs should be placed on all relevant roads in the area. Ensure access roads are kept clean and storage of materials is screened and that that all road junctions have good sightlines, and measures are taken to minimise dust from construction traffic on gravel roads.



SDEM 4.4.14 Cement and concrete batching (Subclause 4.3.12)

No cement and / or concrete batching shall occur within the “no-go” areas or within 32 m from the top of river banks/water courses/drainage lines. Reasonable measures shall be implemented to limit contaminated surface run-off into the surrounding vegetation.

SDEM 4.4.15 Earthworks (Subclause 4.3.13)

Any blasting is to be executed by a suitably qualified person.

Controlled blasting techniques shall be employed to minimise dust and fly rock during blasting.

Prior to blasting the Contractor shall notify the relevant occupants / owners of surrounding land and address any concerns. Buildings within the potential damaging zone of the blast shall be surveyed preferably with the owner present, and any cracks or latent defects pointed out and recorded either using photographs or video. All Local Authority regulations are to be adhered to and all service infrastructures are to be located prior to commencement of blasting activities.

Blasting or drilling shall take place during normal working hours. The Contractor shall notify emergency services, in writing, a minimum of 24 hours prior to any blasting activities commencing on site. Adequate warning must be issued to all personnel on site prior to blasting activities taking place. All legally required signals are to be clearly indicated. The Engineer shall be issued daily updates of the days intended blasting activities.

The Contractor shall prevent damage to special features and the general environment, which includes the removal of flyrock. Damage caused by blasting / drilling shall be repaired to the satisfaction of the Engineer.

Minimise areas disturbed at any one time and protect exposed soil against wind erosion, e.g. by dampening with water or covering with hessian.

SDEM 4.4.16 Community relations (Subclause 4.3.18)

Appropriate training shall be provided for workers, which would enable the individuals to apply their skills to other construction and development projects in the region once the construction phase is completed.

Maintain a register that shall contain details of the measures taken to resolve complaints and the details of the communication of these measures to the person who raised the complaint.

SDEM 4.4.17 Erosion and sedimentation control (Subclause 4.3.19)

Where necessary, sedimentation barriers shall be laid between the Work Area and the “no-go” areas to limit sediment deposition. The sedimentation barrier shall consist of a geotextile fabric stretched across and attached to supporting posts and stabilised with sandbags. The barrier shall be inspected daily and any damage shall be repaired immediately. Sediment deposits shall be removed once they reach half the height of the barrier.

The use of erosion control measures to minimise erosion at excavation / clearing sites or aggregate storage sites is necessary and earth moving construction activities should take place in the dry season as far as possible.

Erosion and loss of soil must be prevented by minimizing the construction site exposed to surface water run-off. Where necessary erosion stabilizing actions such as gabions or re-vegetation must be implemented to prevent further habitat deterioration (EA Condition 53).

SDEM 4.4.18 Site closure and rehabilitation (Subclause 4.3.28)

All construction debris found within the disturbed areas shall be removed and disposed of at a registered landfill site.

A vegetation rehabilitation plan shall be compiled with the aid of a rehabilitation specialist, for inclusion in the Construction EMP. The plan shall recommend species to be used in rehabilitation as well as any special measures for rehabilitation such as shade-netting and alien vegetation removal. The construction footprint associated with the activity shall be re-vegetated with indigenous vegetation, as directed by the rehabilitation plan. Disturbed



areas shall be rehabilitated as soon as possible after construction. No exotic plants may be used for rehabilitation purposes. Only indigenous plants of the area may be utilised (EA Condition 39).

SDEM 4.4.19 Labour requirements (Add Subclause 4.3.32)

Recruitment shall be based on sound labour practices and with gender equality in mind. Obtain a list of locally available labour and skills. Preference shall be given to local communities.

Appropriate training shall be provided to enable individuals to apply their skills to other construction and development projects in the region once the construction phase is completed. Base recruitment on sound labour practices and with gender equality in mind.

SDEM 4.4.20 Environmental Awareness Training (Subclause 4.3.2)

All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area (watercourses) and to inform contractors and site staff of the presence of red-listed faunal species, their identification, conservation status and importance, biology, habitat requirements and management requirements in line with the Environmental Authorisation and within the EMPr.

The avoidance and protection of the high sensitivity areas must be included in a site induction. Contractors and employees must all undergo the induction and be made aware of the “no-go” areas to be avoided. Construction activities must be restricted to demarcated areas to restrict impact on vegetation, birds and animals. Contractors and construction workers must be clearly informed of the no-go areas (EA Condition 49). The holder of this authorisation must train safety representatives, managers and workers in workplace safety. All applicable safety standards and regulations, including for subcontractors must be enforced (EA Condition 54).

SDEMA 5 Compliance With Requirements and Penalties

SDEM 5.1 Penalties (Subclause 5.2)

Stop order works will be issued for the transgressions listed below. Stop order works may be issued per incident at the discretion of the Engineer.

- a) Any employees, vehicles, plant, or thing related to the Contractor’s operations operating within the designated boundaries of a “no-go” area.
- b) Any vehicle driving in excess of designated speed limits.
- c) Persistent and unrepaired oil leaks from machinery.
- d) Persistent failure to monitor and empty drip trays timeously.
- e) The use of inappropriate methods for refuelling.
- f) Litter on site associated with construction activities.
- g) Deliberate lighting of illegal fires on site.
- h) Employees not making use of the site ablution facilities.
- i) Failure to implement specified noise controls
- j) Failure to empty waste bins on a regular basis.
- k) Inadequate dust control.
- l) A spillage, pollution, fire or any damage to any watercourse/ wetland resulting from negligence on the part of the Contractor.
- m) Any act, that in the reasonable opinion of the Engineer, constitutes a deliberate contravention of the requirements of these Specifications



The Engineer will determine what constitutes a transgression in terms of this clause, subject to the provisions of Clause 57(1) of the General Conditions of Contract. In the event that transgressions continue the Contractor's attention is drawn to the provisions of Sub-clause 55(1) of the General Conditions of Contract 2004 under which the Engineer may cancel the Contract.

SDEM 5.2 Environmental Audit Report

The holder of the authorisation must submit an environmental audit report to the Director: Compliance Monitoring of the Department within 30 days of completion of the construction phase (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities (EA Condition 24).

The environmental audit report must (EA Condition 25):

- Be compiled by an independent environmental auditor;
- Indicate the date of the audit, the name of the auditor and the outcome of the audit;
- Evaluate compliance with the requirements of the approved EMPr and this environmental authorisation;
- Include measures to be implemented to attend to any non-compliances or degradation noted;
- Include copies of any approvals granted by other authorities relevant to the development for the reporting period;
- Highlight any outstanding environmental issues that must be addressed, along with recommendations for ensuring these issues are appropriately addressed;
- Include a copy of this authorisation and the approved EMPr.
- Include all documentation pertaining to this authorisation.
- Include evidence of adherence to the conditions of this authorisation and the EMPr where relevant such as training records and attendance records.



5 OPERATIONAL FRAMEWORK EMP

This section contains the Operational Framework EMP table which constitutes the Operational Framework EMP. It is important to note that this Framework OEMP has been ~~compiled prior~~ updated subsequent to authorisation of the ~~proposed~~ project and ~~will~~ has been updated to include the conditions of the EA ~~that will be~~ issued by DEA as part of the EA.

The information is summarised in tabular format illustrating the activity, aspect, impact, mitigation measure, performance indicators, resources, schedule and verification. These criteria are listed and explained below:

The following components are identified/ described:

- **Activity:** component/ activity of the project for which the impact has been identified;
- **Aspect:** the aspect of the above activity which will be impacted;
- **Impact:** the environmental impact identified and to be mitigated;
- **Mitigation measure:** measures identified for implementation in terms of environmental management to reduce, rectify or contain the identified environmental impact – mitigation is divided into the following:
- **Objective:** desired outcome of mitigation measure,
- **Mechanism:** method of achieving the objective;
- **Performance indicators:** outcomes that will indicate achievement of objective/s;
- **Responsibility:** party or parties identified for implementation of mitigation measure/s;
- **Resources:** available resources to aid implementation of mitigation;
- **Schedule:** timeframe in which identified impact and mitigation measure is anticipated to occur; and
- **Verification:** party or parties identified as responsible for review and assessment of final outcome.



5.1 Specification Data: Environmental Management (SDEMA)

Table 4: Operational Framework Environmental Management Programme

No	Aspect	Impact	Mitigation Measure (objective and mechanism)	Performance Indicator	Responsibility	Schedule	Verification
1.	Environmental management documentation and procedures	No framework within which to locate the management of the operational phase. No procedures against which to assess environmental performance during the operational phase and thus no measure of compliance.	Objective: To ensure that the operation of the PV facility does not result in avoidable impacts on the environment, and that any impacts that do occur are anticipated and managed. Mechanism: 1) Appoint a suitably qualified ECO to monitor compliance (either independent or in-house). 2) Audit the compliance with the requirements of the environmental specification contained within the OEMP.	Environmental impacts effectively monitored and managed during the operational phase. Comprehensive record of compliance and remedial actions available to Plan 8 and the authorities	ECO and Mulilo	Twice in the 1 st three years and then once every five years	ECO and Mulilo
2.	Environmental management of the operational phase	Positive impacts on socioeconomic environment during operation	Objective: To ensure that the operation of the PV facility maximises positive impacts on the socio-economic environment. Mechanism: 1) Train local people for operation and maintenance of facility. 2) Employ local labour for the operational phase, where possible, and particularly for day-to-day operations and maintenance.	Consult annual skills and training records, employment records and proof of staff residency in the area prior to employment	ECO Mulilo	During Operational Phase (full lifetime) when the need arise to employ people.	DEA Mulilo
3.	Protection of fauna, flora and avifauna	Constructing a PV facility may have impacts on the vegetation. The site will be cleared of all vegetation and this area could become	Objective: To prevent unnecessary disturbance to natural vegetation. Mechanism: 1) A rehabilitation plan for the site should be compiled with the aid of a rehabilitation specialist and adhered to;	No animals are injured. No employees enter the no-go areas. No alien vegetation establishment.	ECO, Contractor	<u>Life of Operation</u>	ECO



No	Aspect	Impact	Mitigation Measure (objective and mechanism)	Performance Indicator	Responsibility	Schedule	Verification
		prone to alien species.	2) Shallow depressions and well defined pans (see Figure 2) should be avoided, with buffer zones of at least 50 m around pans; 3) Remove perennial alien species such as <i>P. glandulosa</i> at sites disturbed or cleared, or where panel washing occurs. These should be disposed of in an appropriate manner to prevent future re-infestation and / or spreading of alien vegetation; 4) <i>P. glandulosa</i> trees and / or shrubs within 250 m of the boundary of the PV plant footprint and the power-line route shall be eradicated by cutting and treating with herbicide to prevent coppicing. 5) <u><i>P. glandulosa</i> trees are treated as Category 1b in riparian areas and as such the river/drainage line and wetland sections should be considered priority areas for control.</u> 6) The small ground level openings in the electrical fence, 20-30 cm in height, should be kept clear to allow for small mammals and reptiles to move through the site; 7) <u>Minimize the footprint of the development to the actual area required for the development;</u> 8) Minimize noise and disturbance associated with maintenance activities at the plant once it becomes operational; 9) Use bird-safe structures (ideally with critical air gaps greater than 2 m) for above-ground power lines that exclude birds physically from high risk areas of live infrastructure and comprehensively insulate such areas to avoid bird electrocution;	Invasive alien vegetation monitoring programme implemented.			



No	Aspect	Impact	Mitigation Measure (objective and mechanism)	Performance Indicator	Responsibility	Schedule	Verification
			<p>10) <u>Power lines and cables should be below ground. Where this is not possible, all new aboveground lines should be fitted with bird flight diverters and marked along their entire length. Recommendations from bird monitoring could indicate high risk areas to remain marked in the future; and</u></p> <p>11) <u>Instituting a comprehensive impact monitoring scheme, and using the results of this scheme to inform and refine a dynamic approach to mitigation.</u></p> <p>12) <u>Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible.</u></p> <p>13) <u>Clearing of vegetation should be minimized and avoided where possible.</u></p> <p>14) <u>Any protected plant that may be present needs a relocation or destruction permit for any individual that may be removed or destroyed due to the development. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program. All protected and red-list plants should be relocated, along with as many other geophytic species as possible (including the observed <i>Ledebouria</i> spp.). Refer to the Plant Rescue and Protection Plan in this regard.</u></p> <p>15) <u>Sensitive area (drainage lines) must be avoided and access roads, and a no-go buffer of 20 m, must be applied around them.</u></p>				



No	Aspect	Impact	Mitigation Measure (objective and mechanism)	Performance Indicator	Responsibility	Schedule	Verification
			<p>16) <u>Disturbed areas and the drainage lines must be monitored every three (3) months within the first two years of operation, in order to control reoccurrence and therefore minimise the long-term cover of AIPs</u></p> <p>17) <u>The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments: Signs must be put up to enforce this.</u></p> <p>18) <u>Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals.</u></p> <p>19) <u>All laydown, chemical toilets etc. should be restricted to outside of the project area.</u></p>				
4.	Stormwater runoff, erosion, and pollution of surface water and groundwater resources.	Contamination of stormwater runoff can impact on the surface and groundwater resources. The mismanagement of stormwater can furthermore result in erosion.	<p>Objective: Prevent stormwater from eroding the land and becoming contaminated.</p> <p>Mechanism:</p> <ol style="list-style-type: none"> 1) Monitor both soil chemistry and erosion and mitigate if required; 2) Should soil chemistry be affected (this is likely to be an increase in salinity), the nature of the washing mixture could be changed, or acceptable waste treatment employed; 3) Channel runoff should be diverted in such a way as to minimise erosion and if necessary, soil stabilising techniques should be implemented in vulnerable areas; 4) <u>Removal of perennial alien species such as <i>Prosopis glandulosa</i> at sites disturbed or cleared, or where panel washing occurs;</u> 	<p>Stormwater not contaminated by construction activities.</p> <p>Stormwater control measures are effective at regulating runoff from the site and erosion channels do not develop.</p> <p>Freshwater ecosystems are not unduly disturbed by construction activities within the drainage channels.</p>	ECO and contractor ECO to inspect soils for erosion at regular intervals.	ECO and Contractor ECO to inspect soils for erosion at regular intervals.	ECO



No	Aspect	Impact	Mitigation Measure (objective and mechanism)	Performance Indicator	Responsibility	Schedule	Verification
			<p>5) <u>Monitoring, together with the development of an operational environmental management plan should be implemented;</u></p> <p>6) <u>No septic tanks / soak-aways should be allowed in drainage areas;</u></p> <p>7) <u>Stormwater channels and “mitre” chutes should be constructed to direct the stormwater flows and minimize and control erosion;</u></p> <p>8) Gravel roads should be graded and shaped with a 2 % crossfall back into the slope, allowing stormwater to be channelled in a controlled manor towards the natural drainage lines;</p> <p>9) <u>Where roads intersect natural, defined drainage lines, suitably sized pipe culverts or drive through causeways should be installed or constructed;</u></p> <p>10) <u>The minor storm design period should be used to determine the size of the earth channels. A return period of 1:5 years is applicable which approximates to an average intensity of 30 mm/hour; and</u></p> <p>11) <u>The major storm occurrence (i.e. 1:25 year, 1:50 year and 1:100 year) should be used to calculate culverts in defined drainage lines and determine flood levels where necessary. The intensities for each occurrence are: 1:25 year – 47 mm/hour, 1:50 year – 56 mm/hour and 1:100 year – 64 mm/hour respectively.</u></p>				
5.	Visual Impact	The proposed site is visible to the public and a construction site might have a negative visual	<p>Objective: To protect the sense of place.</p> <p>Mechanism:</p> <p>1) <u>Roads and hard-standings would be constructed as part of the works;</u></p>	No complaints from the public.	ECO, Engineer and Contractor	<u>Life of Operation</u>	ECO



No	Aspect	Impact	Mitigation Measure (objective and mechanism)	Performance Indicator	Responsibility	Schedule	Verification
		impact on the sense of place.	2) <u>The first 150 mm of naturally occurring substrate should be retained and then spread over finished areas;</u> 3) All excess material shall be removed off-site, and the ground shall be returned to original levels / gradients as far as possible; 4) New structures should be placed where they are least visible to the greatest numbers of people, in places where the topography can offer shielding, where possible; 5) Non-reflective colours and materials that would blend in with the natural environment should be used for all buildings. E.g. cladding with local stone or plaster and paint with earthy tones for paint colours, roofs should be grey and nonreflective and doors and window frames should reference either the roof or wall colours; 6) Finishing materials of the infrastructure (including support structures) should be of colours that are non-reflective and in dark matte colours such as dark grey or charcoal; and 7) <u>Information on the project should be provided to local people, such as through a poster at the entrance to the site.</u>				
6.	Impacts on local Economy (employment) and social conditions	The activity might impact on the economy (local shops, restaurants, and Guest Houses, etc.)	Objective: To ensure on-going sustainability of the local tourism / hospitality industry. Mechanism: 1) Give preference to local communities for employment opportunities; and 2) Base recruitment on sound labour practices and with gender equality in mind.	Contribute to local Community upliftment	Contractor, ECO, Engineer	<u>Life of Operation</u>	ECO



No	Aspect	Impact	Mitigation Measure (objective and mechanism)	Performance Indicator	Responsibility	Schedule	Verification
7.	Land Use	Based on the distance to the nearest Square Kilometre Array (SKA) station the proposed development could potentially impact on the SKA project.	<p>Objective: To prevent electromagnetic interference generated from the power generation equipment and prevent the facility from acting as secondary transmitters.</p> <p>Mechanism:</p> <ol style="list-style-type: none"> 1) Implement measures recommended in the modelling study, as agreed to with SKA. 	No interference with the SKA project.	Engineer	<u>Life of Operation</u>	ECO
8.	<u>Vegetation and Habitats</u>	<u>Construction of a PV facility may have impacts on the vegetation and habitat</u>	<p>Objective: <u>To prevent unnecessary disturbance to natural vegetation.</u></p> <p>Mechanism:</p> <ol style="list-style-type: none"> 1) <u>Sensitive area (drainage lines) must be avoided and access roads, and a no-go buffer of 20 m, must be applied around them.</u> 2) <u>Clearing of vegetation should be minimized and avoided where possible. All activities must be restricted to flat areas as far as possible. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon. All disturbed footprints to be rehabilitated and landscaped after installation is complete. Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to the project area vegetation type.</u> 	<p><u>Avoidance of sensitive areas.</u></p> <p><u>No excessive vegetation clearance.</u></p>	<u>ECO and Contractor</u>	<u>Life of Operation</u>	<u>ECO</u>
9.	<u>Waste Management</u>	<u>Management and handling of waste material.</u>	<p>Objective: <u>To ensure adequate management and handling of waste.</u></p> <ol style="list-style-type: none"> 1) <u>Waste management must be a priority and all waste must be collected and stored effectively.</u> 	<p><u>Proper storage of waste.</u></p> <p><u>No litter observed.</u></p>	<u>ECO & Health and Safety Officer</u>	<u>Life of Operation</u>	<u>ECO & Health and Safety Officer</u>



No	Aspect	Impact	Mitigation Measure (objective and mechanism)	Performance Indicator	Responsibility	Schedule	Verification
			<p>2) <u>Litter, spills, fuels, chemical and human waste in and around the project area must be cleared and safely/appropriately stored immediately.</u></p> <p>3) <u>A minimum of one toilet must be provided per 10 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area.</u></p> <p>4) <u>A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the presence of faunal SCC in the area.</u></p> <p>5) <u>Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site or stored in pits.</u></p> <p>6) <u>Refuse bins will be emptied and secured. Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days.</u></p>	<p><u>Toilets provided as per the ratio.</u></p> <p><u>Pest control measures.</u></p> <p><u>Proper waste disposal.</u></p>			
10.	<u>Heritage resources (including palaeontology) impacts</u>	<u>Impacts on Heritage and Palaeontological Features</u>	<p>Objective: <u>to ensure protection of heritage and palaeontological features.</u></p> <p>Mechanism:</p> <p>1) <u>From a heritage and visual perspective, a smaller footprint is preferable;</u></p> <p>2) <u>Archaeological sites should be mitigated by excavation and sampling of sites before the start of construction;</u></p>	<u>No disturbances to heritage and archaeological sites</u>	<u>ECO</u>	<u>Life of Operation</u>	<u>ECO</u>



No	Aspect	Impact	Mitigation Measure (objective and mechanism)	Performance Indicator	Responsibility	Schedule	Verification
			<p>3) <u>Test excavations should be carried out around the pans to check for subsurface archaeology which may require sampling;</u></p> <p>4) <u>A buffer zone of 100 m from the edge of the pans should be employed; and</u></p> <p>7) <u>In the event of accidental uncovering of graves or substantial fossil remains (e.g. vertebrate bones and teeth, large blocks of petrified wood), work must stop immediately and SAHRA should be notified. An archaeologist / palaeontologist should be involved to assist with the investigation and procedures to address the situation.</u></p>				
11.	<u>Hazardous material and storage</u>	<u>Hazardous material contamination</u>	<p>Objective: <u>To prevent hazardous material spillages and pollution of the receiving environment.</u></p> <p>Mechanism:</p> <p>1) <u>Comply with the various pieces of legislation controlling the use of hazardous substances at a construction site.</u></p> <p>2) <u>A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment to take place within the project area unless necessary. All contaminated soil/yard stone shall be treated in situ or removed and placed in containers. Appropriately contain any diesel or oil</u></p>	<u>Limit hazardous material spills</u>	<u>ECO</u>	<u>Life of Operation</u>	<u>ECO</u>



No	Aspect	Impact	Mitigation Measure (objective and mechanism)	Performance Indicator	Responsibility	Schedule	Verification
			<p><u>storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them from leaking and entering the environment. Construction activities and vehicles could cause the spillage of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the project area.</u></p> <p>3) <u>A fire management plan needs to be complied and implemented to restrict the impact that fire might have on the surrounding areas.</u></p>				
12.	<u>Transport and Traffic</u>	<u>Impact on the traffic to the site.</u>	<p>Objective: <u>To ensure that the transportation of construction vehicles have a minimal impact on the traffic and on site.</u></p> <p>Mechanism:</p> <ol style="list-style-type: none"> 1) <u>Ensure that road junctions have good sightlines;</u> 2) <u>Implement traffic control measures where necessary;</u> 3) <u>Transport components overnight as far as possible; and</u> 4) <u>Engage with the roads authorities prior to construction to ensure the necessary road upgrades, permits, traffic escorts etc. are scheduled</u> 	<u>Traffic management</u>	<u>ECO & Traffic Official</u>	<u>Life of Operation</u>	<u>ECO & Traffic Official</u>



6 MONITORING PROGRAMMES

6.1 Avifaunal Monitoring Programme

~~A suitable qualified avifaunal specialist shall be appointed to develop a monitoring programme that meets the requirements of the avifaunal specialist study undertaken as part of the EIA phase for this project. This programme shall be included in this section and considered to be part of the LEMP.~~

EA Condition 32 required that a 12 month pre- and post-construction avifauna monitoring programme must be implemented to document the effect of the operation of the PV solar facility on avifauna. The monitoring programme must be in terms of the methodology as recommended on pages 19-20 of the Avifauna Impact Assessment Report which forms part of the EIA dated April 2012.

The monitoring programme included in Appendix I has been extracted from the Avifauna Impact Assessment Report compiled by Avisense Consulting as per the requirement of the EA and should be the basis of the pre- and post-construction avifaunal monitoring. The results of the pre- and post-construction avifauna monitoring programme must inform the final layout and the construction schedule of the PV solar facility (EA Condition 33).



7 DECOMMISSIONING

The Power Purchase Agreement for the Struisbult PV plant is only valid for a period of 20 years after which the plant would most likely be decommissioned and the site rehabilitated. Should the PV plant be decommissioned, materials and infrastructure that could not be recycled would need to be disposed of at an approved landfill site. Infrastructure should be removed and disturbed areas rehabilitated in accordance to the specifications of a suitably qualified rehabilitation specialist during decommissioning.

Since the proposed PV plant comprises of inert materials (mostly concrete), the residual risks associated with decommissioning would be negligible. Should the need arise to decommission the PV plant a decision would need to be made as to whether the infrastructure would be removed or left in situ. Roads which are no longer required after decommissioning should be scarified and the areas rehabilitated with the assistance of a rehabilitation specialist.

Materials will be recycled where appropriate, and any hazardous substances shall be removed and disposed of in terms of the requirements of the relevant legislation (e.g. Hazardous Substances Act, 1973 (Act No. 15 of 1973) and SANS specifications.

Should the activity ever cease or become redundant, the holder of this authorisation shall undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements administered by any relevant and competent authority at that time (EA Condition 31).



8 ROLES AND RESPONSIBILITIES

Prior to the commencement of construction and operation of the project a suitably qualified and experienced ECO shall be appointed by the proponent to ensure that the mitigation rehabilitation measures and recommendations referred to in the EA are implemented and to ensure compliance with the provisions of the LEMP, thereby ensuring that identified environmental considerations are efficiently and adequately taken into account during all stages of development.

8.1 Client

Mulilo shall:

- The holder of the authorisation is responsible for ensuring compliance with the conditions contained in this environmental authorisation. This includes any person acting on the holder's behalf, including but not limited to, an agent, servant, contractor, sub-contractor, employee, consultant or person rendering a service to the holder of the authorisation (EA Condition 3).
- Assume overall responsibility for the administration and implementation of the LEMP through an identified Project Manager or Engineer;
- Appoint or engage a suitably qualified Project Manager or Engineer; and
- Appoint or engage a suitably qualified independent Environmental Control Officer (ECO) to monitor compliance with the LEMP and undertake monthly and close out audits of compliance with the requirements of the LEMP and provide a copy of the audit reports to the Department of Environmental Affairs (DEA) and the Contractor.

8.2 Project Manager

The Project Manager or Engineer shall:

- Have overall responsibility for the environment;
- Have the authority to stop works and issue fines, as necessary;
- Receive reports from the ECO and shall report to Mulilo; and
- Support the ECO in his/her roles and responsibilities.

The duties of the Project Manager during the operation phase will include:

- i) Liaison with the Client and DEA;
- ii) Monitoring of the operation of the project for compliance with the various environmental requirements contained in the Framework Operational EMP;
- iii) Ensuring the proactive and effective implementation and management of environmental protection measures; and
- iv) Monitoring of compliance with the EA related to the operational phase as issued by DEA as well as other relevant environmental legislation.

8.3 ECO

The holder of this authorisation must appoint a suitably experienced independent Environmental Control Officer (ECO) for the construction phase of the development that will have the responsibility to ensure that the conditions referred to in this authorisation are implemented and to ensure compliance with the provisions of the EMP (EA Condition 19).

The ECO shall be appointed before commencement of any authorised activity (EA Condition 20). Once appointed, the name and contact details of the ECO must be submitted to the Director: Compliance Monitoring of the Department (EA Condition 21). The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is ready for operation (EA Condition 22).



The ECO shall:

- Oversee and monitor compliance with and implementation of the construction phase EMP, Operational Phase EMP and Rehabilitation Plan, including compliance with the relevant conditions contained in the EA.

The duties of the ECO during construction phase will include:

- i) Liaison with the Client, Project Manager or Engineer and DEA;
- ii) Monitoring of all the Contractor's activities for compliance with the various environmental requirements contained in the construction Specification;
- iii) Monitoring of compliance with the EA related to the construction phase as issued by DEA as well as other relevant environmental legislation;
- iv) Reviewing of the Contractor's environmental Method Statements;
- v) Ensuring that the requisite remedial action is implemented in the event of non-compliance;
- vi) Ensuring the proactive and effective implementation and management of environmental protection measures;
- vii) ~~Ensuring that a register of public complaints is maintained by the Contractor and that any and all public comments or issues are appropriately reported and addressed~~ Keep and maintain a detailed complaint register on site indicating how these issues were addressed and what preventative measures were implemented to avoid re-occurrence of complaints (EA Condition 23.2);
- viii) Routine recording and reporting of environmental activities on a weekly and monthly basis (EA Condition 23.7); ~~and~~
- ix) Recording and reporting of environmental incidents (including spillage of bitumen, fuels, chemicals, or any other material) in the form of a register on site indicating how these incidents were addressed, what rehabilitation measures were taken and what preventative measures were implemented to avoid re-occurrence of incidents (EA Condition 23.2);
- x) Keep record of all activities on site, problems identified, transgressions noted and a schedule of tasks undertaken by the ECO (EA Condition 23.1);
- xi) Keep and maintain a daily site diary (EA Condition 23.3);
- xii) Keep copies of all reports submitted to the Department (EA Condition 23.4);
- xiii) Keep and maintain a schedule of current site activities including the monitoring of such activities (EA Condition 23.5); and
- xiv) Obtain and keep record of all documentation, permits, licences and authorisations required by this facility (EA Condition 23.6).



9 ENVIRONMENTAL MANAGEMENT APPROACH

The compilation of an EMPr for an activity which is likely to result in significant environmental impacts is typically compiled at the culmination of a thorough investigation into the receiving environment and the identification and assessment of likely environmental impacts (i.e. EIA). This EMPr forms part of a Basic Assessment process. This EMPr aims to comply with the requirement of Appendix 4 of the EIA Regulations, 2014. These requirements are systematically addressed in the subsequent sections of this report. The primary objectives of the EMPr are as follows:

- To promote sustainability and describe an action programme to mitigate negative impacts as far as possible;
- To be a practical document that sets out both the goals and actions required in mitigation. Though the term “mitigation” can be broad in definition, it means in this context to “allay, moderate, palliate, temper or intensify.” Mitigation of a negative impact means that its effect is reduced. Mitigation of a positive impact means that its effect is increased or optimised; and
- To indicate responsibilities for the implementation of these action items within the EMPr.

This EMPr shall be deemed to have contractual standing on the basis that its contents and specifically objectives are a detailed expansion of the environmental risks and consequent requirements of the EA (if, and when issued). Where relevant the Applicant is responsible for delegating responsibility for compliance to designated parties (internal or external). Such delegation must be legally binding to the extent relevant.

The objectives and targets in this EMPr are further guided by the NEMA, and specifically by the EIA Regulations, 2014. Thus, the underlying principles of sustainable development are the ultimate objectives and target of this report. The EMPr has included measures to ensure the development activity complies with the following principles, as instilled in the NEMA, amongst others:

- That the disturbance of ecosystems and loss of biological diversity are minimised and remedied;
- That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- That waste is avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner;
- That a risk-averse and cautious approach is applied, which considers the limits of current knowledge about the consequences of decisions and actions; and
- That negative impacts on the environment and on people’s environmental rights be anticipated, prevented and remedied.

9.1 Environmental Management Principles

NEMA establishes a general framework for environmental law, in part by prescribing national environmental management principles that must be applied when making decisions that may have a significant impact on the environment. These principles are briefly summarised below:

9.1.1 Holistic Principle

The Holistic principle, as defined by NEMA (Section 2(4) (b)) requires that environmental management must be integrated, acknowledging that all elements of the environment are linked and inter-related and it must take into account the effect of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option (defined below in Section 9.1.2). Holistic evaluation does not mean that a project must be looked at as a whole. It rather means that it must be accepted that there is a whole into which a project introduced. If the indications are that the project could have major adverse effects, the project must be reconsidered and where appropriate re-planned or relocated to avoid an adverse impact or to ensure a beneficial impact.



9.1.2 Best Practicable Environmental Option

When it is necessary to undertake any action with environmental impacts, the different options that could be considered for the purpose must be identified and defined. The Best Practicable Environmental Option (BPEO) is defined in NEMA as “the option that provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term.” Other guidelines typically used for environmental management in terms of other legislation include: BPM which is the Best Practicable Means and BAT which is the Best Available Technology.

9.1.3 Sustainable Development

The concept of sustainable development was introduced in the 1980’s with the aim to ensure that the use of natural resources is such that our present needs are provided without compromising the ability of future generations to meet their own needs. The constitution of South Africa is built around the fact that everyone has the right to have the environment protected through reasonable legislative and other measures that secure ecologically sustainable development. The National Environmental Principles included in the NEMA require development to be socially, environmentally and economically sustainable.

9.1.4 Preventative Principles

The preventative principle is fundamental to sustainable development and requires that the disturbance to ecosystems and the pollution, degradation of the environment and negative impacts on the environment be avoided, or, where they cannot be altogether avoided, are minimised and remedied.

9.1.5 The Precautionary Principle

The precautionary principle requires that where there is uncertainty, based on available information, that an impact will be harmful to the environment, it is assumed, as a matter of precaution, that the said impact will be harmful to the environment until such time that it can be proven otherwise. The precautionary principle requires that decisions by the private sector, governments, institutions and individuals need to allow for and recognise conditions of uncertainty, particularly with respect to the possible environmental consequences of those decisions. In South Africa, the DHSWS (then DWAF) adopted a BPEO guideline in 1991 for water quality management and in 1994 in the Minimum Requirements document for waste management.

In terms of DWAF Minimum Requirements for the Handling and Disposal of Hazardous Waste, 1994, the precautionary principle is defined as, “Where a risk is unknown; the assumption of the worst-case situation and the making of provision for such a situation.” Here the precautionary principle assumes that a waste or an identified contaminant of a waste is “both highly hazardous and toxic until proven otherwise.”

In the context of the EIA process in South Africa, the precautionary principle also translates to a requirement to provide sound, scientifically based, information that is sufficient to provide the decision-making authority with reasonable grounds to understand the potential impacts on the environment, the extent thereof and how impacts could be mitigated. If such information is not adequate for this purpose, the relevant authority cannot be satisfied as is required and then the authority should require that further information be collected and provided.

9.1.6 Duty of Care and Cradle to Grave Principle

In terms of the NEMA Section 28, “Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.”

By way of example, the principle of “duty of care” in terms of waste management emphasises the responsibility to make sure that waste is correctly stored and correctly transported, as it passes through the chain of custody to final point of disposal. This means that waste must always be stored safely and securely. The company removing and disposing of waste also holds the responsibility to hold the relevant licenses, and that waste is transported alongside the necessary paperwork.



“Cradle to Grave” refers to the responsibility a company takes for the entire life cycle of a product, service or program, from design to disposal or termination. In terms of the DWAF Minimum Requirements for the Handling and Disposal of Hazardous Waste, 1994, “any person who generates, transports, treats or disposes of waste must ensure that there is no unauthorised transfer or escape of waste from his control. Such a person must retain documentation describing both the waste and any related transactions. In this way, he retains responsibility for the waste generated or handled.” This places responsibility for a waste on the Generator and is supported by the “Cradle to Grave” principle, according to which a “manifest” accompanies each load of Hazardous Waste until it is responsibly and legally disposed. This manifest is transferred from one transporter to the next along with the load, should more than one transporter be involved. Once the waste is properly disposed of at a suitable, permitted facility, a copy of the manifest must be returned to the point of origin.” Duty of Care offers one strategy to implement sustainable development.

9.1.7 Polluter Pays Principle

The “polluter pays principle” holds that the person or organisation causing pollution is liable for any costs involved in cleaning it up or rehabilitating its effects. It is noted that the polluter will not always necessarily be the generator, as it is possible for responsibility for the safe handling, treatment or disposal of waste to pass from one competent contracting party to another. The polluter may therefore not be the generator but could be a disposal site operator or a transporter. Through the ‘duty of care’ principle, however, the generator will always be one of the parties held accountable for the pollution caused by the waste. Accordingly, the generator must be able to prove that the transferral of management of the waste was a responsible action. The polluter pays principle acceding to NEMA dictates that “the cost of remedying pollution, environmental degradation and consequent adverse effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.”

9.2 Duty of Care Responsibilities

Section 28 of the NEMA makes provision for duty of care, and remediation of environmental damage. The binding principles are described below:

1. Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.
 - (1A) Subsection (1) also applies to a significant pollution or degradation that-
 - a) occurred before the commencement of this Act;
 - b) arises or is likely to arise at a different time from the actual activity that caused the contamination; or
 - c) arises through an act or activity of a person that results in a change to pre-existing contamination.
2. Without limiting the generality of the duty in subsection (1), the persons on whom subsection (1) imposes an obligation to take reasonable measures, include an owner of land or premises, a person in control of land or premises or a person who has a right to use the land or premises on which or in which-
 - a) any activity or process is or was performed or undertaken; or
 - b) any other situation exists, which causes, has caused or is likely to cause significant pollution or degradation of the environment.
3. The measures required in terms of subsection (1) may include measures to-
 - a) investigate, assess and evaluate the impact on the environment;



- b) inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment;
- c) cease, modify or control any act, activity or process causing the pollution or degradation;
- d) contain or prevent the movement of pollutants or the cause of degradation;
- e) eliminate any source of the pollution or degradation; or
- f) remedy the effects of the pollution or degradation.

9.3 **Failure to Comply with Environmental Considerations**

Within the provisions of the relevant environmental legislation, there are a number of penalties for non-compliance or offences. Below a few extracts are presented for information purposes, however these must not be read in isolation and the reader is reminded that there are other Acts, or sections of Acts, that may be applicable to the relevant project:

- NEMA Section 49B(1): A person convicted of an offence in terms of section 49A(1)(a), (b), (c), (d), (e), (f) or (g) is liable to a fine not exceeding R10 million or to imprisonment for a period not exceeding 10 years, or to both such fine or such imprisonment- this includes commencing with a listed activity without an EA or the non-compliance with conditions of any EA and associated EMPr;
- NEMA Section 49B(2): A person convicted of an offence in terms of section 49A(1)(i), (j) or (k) is liable to a fine not exceeding R5 million or to imprisonment for a period not exceeding 5 years, and in the case of a second or subsequent conviction to a fine not exceeding R10 million or to imprisonment for a period not exceeding 10 years, and in both instances to both such fine and such imprisonment;
- NEMA Section 49B(3): A person convicted of an offence in terms of section 49A(1)(h), (l), (m), (n), (o) or (p) is liable to a fine or to imprisonment for a period not exceeding one year, or to both a fine and such imprisonment;
- NWA Section 151 (1c): No person may fail to comply with any condition attached to a permitted water use under this Act;
- NWA Section 151 (2): Any person who contravenes any provision of subsection (1) is guilty of an offence and liable, on the first conviction, to a fine or imprisonment for a period not exceeding five years, or to both a fine and such imprisonment and, in the case of a second or subsequent conviction, to a fine or imprisonment for a period not exceeding ten years or to both a fine and such imprisonment;
- NEM:BA Section 102 (1): A person convicted of an offence in terms of section 101 is liable to a fine not exceeding R10 million, or an imprisonment for a period not exceeding ten years, or to both such a fine and such imprisonment;
- NEM:WA Section 68 (1): A person convicted of an offence referred to in section 67(1)(b), (c), (d), (e), (f), (i), (j), (k) or (l) or section 67(2)(a), (b), (c), (d) or (e) is liable to a fine not exceeding R5 000 000 or to imprisonment for a period not exceeding five years, or to both a fine and such imprisonment, in addition to any other penalty or award that may be imposed or made in terms of the National Environmental Management Act;
- NEM:WA Section 68 (2): A person convicted of an offence referred to in section 67(1)(b), (c), (d), (e), (f), (i), (j), (k) or (l) or section 67(2)(a), (b), (c), (d) or (e) is liable to a fine not exceeding R5 000 000 or to imprisonment for a period not exceeding five years, or to both a fine and such imprisonment, in addition to any other penalty or award that may be imposed or made in terms of the National Environmental Management Act;
- NEM:WA Section 68 (3): Any person convicted of an offence referred to in section 67(1)(m) is liable to a fine or to imprisonment for a period not exceeding six months or to both a fine and such imprisonment;
- NEM:WA Section 68 (4): A person who is convicted of an offence in terms of this Act and who persists after conviction in the act or omission that constituted the offence commits a continuing offence and is liable on conviction to a fine not exceeding R1 000 or to imprisonment for a period not exceeding 20



days, or to both such fine and such imprisonment, in respect of each day that person persists with that act or omission;

It is recommended that a procedure for non-compliances (i.e. incentives or disincentives for conformance and non-conformance with the EMPr requirements) must be employed to ensure that the EMPr is adequately implemented. The system to be used must be determined before construction commences, included in the tender documents and contracts, and made clear to all project workers. The system may include that the independent Environmental Control Officer (ECO) can be authorized to impose spot fines on the Contractor and/or his subcontractors for any of the defined transgressions. Such fines should be issued in addition to any remedial costs incurred as a result of non-compliance with the environmental specifications and or legal obligations.

10 ENVIRONMENTAL MANAGEMENT SYSTEM

The purpose of this EMPr is to ensure that the environment is properly considered during the design, construction, operations, and decommissioning, and that negative impacts are minimised or prevented, and positive impacts enhanced. At the same time the EMPr should provide a logical extension of the EIA, specialist studies, or any other technical planning and assessment documentation, to ensure that recommendations are implemented, and that the project does not deviate from the environmental profile that formed the basis of the assessment.

10.1 Document Control

A formal document control system should be established. The document control system must provide for the following requirements;

- Documents are approved for adequacy prior to use;
- Review and update documents as necessary and re-approve documents;
- Ensure that changes and the current version status of documents are identified;
- Ensure that relevant versions of applicable documents are available at points of use;
- Ensure that documents remain legible and readily identifiable;
- Ensure that documents of external origin necessary for the EMPr are identified and their distribution controlled; and
- Prevent unintended use of obsolete documents and apply suitable identification to them if they are retained for any purpose.

The responsibility for establishing a suitable document control system rests with the Project Manager.

10.2 Record Keeping

It is essential that an official procedure for control of records be developed to ensure records required to demonstrate conformity to environmental standards are maintained. The Applicant, or the Project manager (if assigned) is therefore required to develop and maintain a procedure for the identification, storage, protection, retrieval, retention and disposal of records as part of the EMPr. Records must be legible, identifiable and traceable.

10.3 Auditing and Reporting Procedures

Reporting procedures must be developed at the start of the project, for conveying information from the compliance monitoring activities and to ensure that management is able to take rapid corrective action should certain thresholds be exceeded. Different reporting procedures may include:

- Inspections;
- Accidents and emergencies;



- Measuring performance indicators and interpreting and acting on the indicators;
- Records of monitoring activities to test the effectiveness of mitigation measures and impact controls, as well as for compliance auditing purposes; and
- Training programmes and evidence of appropriate levels/amount of skills/capacities created.

All monitoring and auditing must be accompanied by applicable records and evidence (e.g. delivery slips, photographic records, etc.). All reports must be retained and made available for inspection by the ECO, the Applicant and /or the Relevant Competent Authorities. All reports shall be signed by the relevant parties to ensure accountability. The Applicant must use the audit report findings to continually ensure that environmental protection measures are working effectively on site through a system of self-checking. The EMPr should be viewed as a dynamic document aimed at continual environmental performance improvement.

The following auditing and reporting shall be required throughout the construction phase:

- Daily Environmental Diary: These reports must be prepared by the contractors' EO and must aim to monitor and report on day-to-day activities so as to ensure compliance with the relevant authorisations, licences and permits, the approved EMPr, and environmental method statements;
- Monthly Compliance Reports (EO): These reports must be prepared by the contractors' EO and must aim to provide a concise monthly performance report, including copies of relevant documents (e.g. waste manifests, incident registers, consultation registers, etc);
- Monthly Audit Reports: The ECO must compile monthly compliance reports (audits) which are to be submitted to the Applicant for review and correction of non-compliance issues. It is the responsibility of the ECO to report any non-compliance, which is not correctly rectified. Depending on the outcome of the permitting processes it may be a requirement to submit these to the relevant authorities.

10.4 Responding to Non-Compliances

Non-compliance will be identified and managed through the following four key activities including:

- Inspections of the site and activities across the site;
- Monitoring of selected environmental quality variables;
- Audits of the site and relevant documentation as well as specific activities; and
- Reporting on a monthly basis.

An environmental non-conformance and incident register must be prepared and maintained by the ECO throughout the construction phase in order to track and monitor environmental concerns, incidents, and non-conformances. The register must include details of date, location, description of the NC or Incident, applicable environmental commitment/standard, corrective action taken, adequacy of corrective action, date rectified, etc.

Non-compliance with the EMPr or any other environmental legislation, specifications or standards shall be recorded by the ECO in the non-conformance register. This register shall be maintained by the ECO and will be sent to the Applicant and Contractor on a regular basis (monthly), and the Applicant shall ensure that the responsible party takes the necessary corrective actions. Non-conformances may only be closed out in the register by the ECO upon confirmation that adequate corrective action has been taken and/or documented proof provided. The register should be utilised to measure overall environmental performance.

10.5 Environmental Incidences

For the purposes of this project, an environmental incident can be divided into three levels, i.e. major, medium and minor. All Major and Medium environmental incidents shall be recorded in the ECO's non-conformance and incident register. Minor incidents shall be recorded by the contractor, and by the Applicant (operational phase) in their own incident register. Definitions and examples of environmental incidents are provided in Table 5.

Table 5: Description of incidents and non-conformances for the purpose of the project



<p><u>Non-Conformance</u></p>	<p><u>Any deviation from work standards, practices, procedures, regulations, management system performance etc. that could either directly or indirectly lead to injury or illness, property damage, damage to the workplace environment, legal transgression or a combination of these.</u></p>
<p><u>Major Environmental Incident</u></p>	<p><u>An incident or sequel of incidents, whether immediate or delayed, that results or has the potential to result in widespread, long-term, irreversible significant negative impact on the environment and/or has a high risk of legal liability.</u></p> <p><u>A major environmental incident usually results in a significant pollution and may entail risk of public danger. Major environmental incidents usually remain an irreversible impact even with the involvement of long-term external intervention i.e. expertise, best available technology, remedial actions, excessive financial cost etc. Major environmental incidents may be required to be reported to the authorities. The ECO shall make the final decision as to whether a particular incident should be classified as a Major incident.</u></p> <p><u>An example of a Major environmental incident would be a significant spillage (e.g. 500 litres) of fuel into a watercourse.</u></p>
<p><u>Medium Environmental Incident</u></p>	<p><u>An incident or sequel of incidents, whether immediate or delayed, that results or has the potential to result in widespread or localised, short term, reversible significant negative impact on the environment and/or has a risk of legal liability.</u></p> <p><u>A medium environmental incident may be reported to the authorities, can result in significant pollution or may entail risk of public danger. The impact of medium environmental incidents should be reversible within a short to medium term with or without intervention. The ECO shall make the final decision as to whether a particular incident should be classified as a Medium incident.</u></p> <p><u>An example of a Medium environmental incident would be a large spill of fuel (e.g. >50 litres) onto land.</u></p>
<p><u>Minor Environmental Incident</u></p>	<p><u>An incident or sequel of incidents, whether immediate or delayed, where the environmental impact is negligible immediately after occurrence and/or once-off intervention on the day of occurrence.</u></p> <p><u>An incident where there is unnecessary wastage of a natural resource is also classified as a minor environmental incident. An example would be leaking water pipes that result in the wastage of water.</u></p> <p><u>A minor environmental incident is not reportable to authorities. An example of a minor incident is day to day spills of fuel or oil onto the ground where the spill is less than five (5) litres.</u></p>

The following incident reporting procedures shall apply to this project:

- All environmental incidents shall be reported to Contractor's EO, and the ECO, and shall be recorded in the contractors' respective incident registers;
- The ECO shall record the incident in the non-conformance and incident register and advise on the appropriate measures and timeframes for corrective action;
- An incident report shall be completed by the relevant party responsible for the incident for all medium and major incidents and the report shall be submitted to the Project Manager and ECO within 5 calendar days of the incident;
- The EO shall investigate all incidents and identify any required actions to prevent a recurrence of such incidents; and



- In the event of an emergency incident (unexpected sudden occurrence), including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed, the Applicant shall notify the relevant authorities in accordance with Section 30(3) of the NEMA. The Applicant shall engage the ECO who shall assess all major incidents and shall advise the Applicant when any such incident must be reported to the authorities as per the above requirement.

11 REVIEW AND REVISION OF THE EMPr

It is important to note that this EMPr is made legally binding on the Applicant through the EA and the approval of the EMPr by the decision-making authority. It is important to consider that the EMPr is a dynamic document which may require such alteration and /or amendment as the project evolves. Conditions under which the EMPr would require revision include:

- Changes in legislation;
- Occurrence of unanticipated impacts or impacts of greater intensity, extent and significance than predicted;
- Inadequate mitigation measures (i.e. where environmental performance does not meet the required level despite the implementation of the mitigation measure);
- Secondary impacts occur as a result of the mitigation measures; and
- Instances where the implementation of the specified management, as a result of changes in circumstances, may become impractical or unreasonable to implement.

The Applicant in consultation with the ECO should be responsible for ensuring that the registration and updating of all relevant EMPr documentation is carried out. It shall be the responsibility of the Applicant, in consultation with the ECO, to ensure that all personnel are performing according to the requirements of the document control procedure, and to initiate the revision of controlled documents, when required by changes in process or operations.

The ECO must undertake a risk assessment of any proposed changes to the EMPr. This risk assessment must be included in the applicable monthly audit report, and where applicable supported by the necessary proof of public consultation. It is important to note that if alterations and/or amendments are required; these may only be affected with written approval from the competent authority and in accordance with the relevant legal processes.

12 EMERGENCY RESPONSE PLAN

The Applicant must identify potential emergencies and develop procedures for preventing and responding to them. There are several options for dealing with high priority impacts and risks, as the paradigm has two components, probability and consequence. The design of control measures rests on understanding the cause and effect. Best practise is to intervene with the ultimate factors where feasible, rather than treat the outcomes. Emergency response therefore has the option of reducing probability or reducing the consequence while reducing the probability is the preferred option. Below are some common emergency preparedness approaches:

- Threat consequence if a risk eventuates, when the risk becomes an issue;
- Combine reducing the probability and treating the consequence;
- Offset environmental losses by investing in other assets;
- Not manage some of the risks because there are too many; and
- Make provision to manage residual impacts or issues that arise because of shortcomings in risk identification and rating, avoidance and mitigation or because a rare event has occurred.

Residual impacts are those impacts that despite reducing the probability and consequence might still occur. In these cases, parties will have to be compensated, pollution cleaned up and damage to the environment remediated.



The Applicant shall be required to develop and implement an Emergency Preparedness and Response Plan prior to commencing work. The Applicant must ensure that the Emergency Preparedness and Response Plan makes provision for environmental emergencies, including, but not limited to:

- Fire Prevention;
- Fire Emergency Response;
- Spill prevention;
- Spill Response;
- Contamination of a water resource;
- Accidents to employees; and
- Use of hazardous substances and materials, etc.

The Applicant and Contractor must ensure that lists of all emergency telephone numbers/contact persons (including fire control) are kept up to date and that all numbers and names are posted at relevant locations throughout the lifespan of the project.

12.1 Spill Response Procedure

The Contractor must ensure that all employees, staff and labourers are informed and instructed regarding implementation of spill prevention measures and spill response procedures. In the event of a spill, the following general requirements shall apply, and the detailed spill procedure must cater for these requirements:

- Immediately reporting of spills by all employees and/or visitors to the relevant supervisor and EO (this requirement must be including in induction training);
- Take immediate action to contain or stop the spill where it is safe to do so;
- Contain the spill and prevent its further spread (e.g. earth berm or oil absorbent materials for spill to land or by deploying booms and/or absorbent material for a spill to water);
- Dispose of any contaminated soil or materials according to appropriate waste disposal procedure. Note: Waste from spills of hazardous materials shall be disposed of as hazardous waste at a suitably licensed waste disposal facility;
- The Contractor's EO shall record details of the spill in their respective incident registers;
- Photographic evidence shall be obtained of the spill clean-up.

In the case of large spills, the services of a specialist spill response agency shall be required, who shall advise on appropriate clean-up procedures and follow-up monitoring (if required). The incident procedures as defined in Section 10.5 shall also apply.

The Applicant must also, (as per Section 30 of the NEMA) notify the Director-General (DHSWS, Competent Authority, DEFF), South African Police Services, Provincial Environmental Authority, the Local Municipality, and any persons whose health may be affected of the nature of an incident including:

- Any risks posed to public health, safety and property,
- Toxicity of the substance or by products released by the incident and
- Any step taken to avoid or minimise the effects of the incident on public health and the environment

12.2 Measures to Control or Remedy any Causes of Pollution or Degradation

The broad measures to control or remedy any causes of pollution or environmental degradation as a result of the proposed activities taking place on the project are provided below:

- Limit the size of the area to be disturbed as far as is practically possible;



- Ensure that the environmentally sensitive areas are adequately demarcated throughout the construction phase;
- Ensure topsoil, subsoil and rock dumps are provided with adequate storm water runoff measures;
- Contain potential pollutants and contaminants (where possible) at source;
- Handling of potential pollutants and contaminants (where possible) must be conducted in bunded areas and on impermeable substrates;
- Ensure the timeous clean-up of any spills;
- Implement a waste management system for all waste streams present on site;
- Investigate any I&AP claims of pollution or contamination as a result of the project activities; and
- Rehabilitate the site in line with the requirements of the rehabilitation plan.



13 CONCLUSION

In conclusion it should be noted that the LEMP should be regarded as a living document and changes should be made to the LEMP as required by project evolution, while retaining the underlying principles and objectives on which the document is based.

The compilation of the LEMP has incorporated impacts and mitigation measures from the EIAR, the EA, as well as incorporating principles of best practice in terms of environmental management.



Appendix A: Curriculum Vitae of Environmental Assessment Practitioners



Appendix B: Construction EMP General Specifications (Comprehensive)



Appendix C: Environmental Authorisation



Appendix D: Environmental Impact Assessment Report



Appendix E: Alien Invasive Plants Management Plan



Appendix F: Plant Rescue and Protection Plan



Appendix G: Rehabilitation Management Plan



Appendix H: Ecological Walkdown Report



Appendix I: Avifaunal Monitoring Programme



Appendix J: SMEC Traffic Management Plan



Appendix K: Storm Water and Erosion Control Management Plan



Appendix L: Wetland Baseline & Risk Assessment and
Hydrogeological Statement