SOUTH AFRICA MAINSTREAM DROOGFONTEIN PV 3 (PTY) LTD

PROPOSED CONSTRUCTION AND OPERATION OF THE BATTERY ENERGY STORAGE SYSTEM (BESS) AND ASSOCIATED INFRASTRUCTURE FOR THE AUTHORISED DROOGFONTEIN 3 SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY LOCATED NEAR KIMBERLEY IN THE SOL PLAATJE LOCAL MUNICIPALITY, FRANCIS BAARD DISTRICT MUNICIPALITY, IN THE NORTHERN CAPE PROVINCE OF SOUTH AFRICA.

Draft Environmental Management Programme (EMPr)

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Document Title:	Proposed construction and operation of the Battery Energy Storage System (BESS) and associated infrastructure or the authorised Droogfontein 3 Solar Photovoltaic (PV) Energy Facility located near Kimberley in the Sol Plaatje Local Municipality, Francis Baard District Municipality, in the Northern Cape Province of South Africa.
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Revision Number:	1
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For:	SOUTH AFRICA MAINSTREAM DROOGFONTEIN PV 3 (PTY) LTD

CONFIDENTIALITY STATEMENT

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GLOSSARY OF TERMS

Construction Phase: The activities pertaining to the preparation for and the physical construction of the proposed development.

Contractor: Persons/organisations contracted by the Holder of the EA to carry out parts of the work for the proposed development.

Decommissioning: Means to take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily recommissioned.

Environmental Authorisation (EA): "the authorisation by a competent authority of a listed activity or specified activity in terms of section 24 of the National Environmental Management Act" (Act No. 107 of 1998) (NEMA).

Engineer (E) / Project Manager (PM): Person / organisation appointed by the Holder of the EA to oversee the work of all consultants, sub-developers, contractors, residents and visitors.

Environmental Control Officer (ECO): Person / organisation appointed by the Holder of the EA who will provide direction to the Project Manager concerning the activities within the Construction Zone, and who will be responsible for conducting the environmental audit of the project during the construction phase of the project according to the provisions of the Environmental Management Programme (EMPr).

Environmental Management Programme (EMPr): The EMPr is a detailed plan for the implementation of the mitigation measures to minimise negative environmental impacts during the life-cycle of a project. The EMPr contributes to the preparation of the contract documentation by developing clauses to which the contractor must adhere for the protection of the environment. The EMPr specifies how the construction of the project is to be carried out and includes the actions required for the Post-Construction Phase to ensure that all the environmental impacts are managed for the duration of the project's life-cycle.

Operational Phase (Post Construction): The period following the Construction Phase, during which the proposed development will be operational.

Pre-Construction Phase: The period prior to commencement of the Construction Phase, during which various activities associated with the preparation for the Construction Phase will be undertaken.

Rehabilitation: Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was in before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re-vegetation of a disturbed area and the insurance of a stable land surface. Re-vegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

Site Manager: The person, representing the Contractor, responsible for all the Contractor's activities on the site including supervision of the construction staff and activities associated with the Construction Phase. The Site Manager will liaise with the Project Manager in order to ensure that the project is conducted in accordance with the EMPr.

COMMON ABBREVIATIONS

AIA - Archaeological Impact Assessment
AEL - Atmospheric Emissions License
AP - Action Plan
API - American Petroleum Institute
APM - Archaeology, Palaeontology and Meteorites
ATNS - Air Traffic and Navigation Services Company Limited
AQIAr - Air Quality Impact Assessment Report
AQMP - Air Quality Management Plan
AQMS - Air Quality Monitoring Station
BA - Basic Assessment
BESS - Battery Energy Storage System
BID - Background Information Document
BLSA - BirdLife South Africa
CAA - Civil Aviation Act (Act No. 13 of 2009)
CARA - Conservation of Agricultural Resources Act (Act No. 43 of 1983)
CBA - Critical Biodiversity Area
CBD - Convention on Biodiversity
CEMS - Continuous Emissions Monitoring Systems
CO - Carbon Monoxide
CR - Critically Endangered
DBAR - Draft Basic Assessment Report
DEA - Department of Environmental Affairs
DEFF - Department of Environment, Forestry and Fishery
DM - District Municipality
DWS - Department of Water and Sanitation
EAP - Environmental Assessment Practitioner
ECA - Environmental Conservation Act (ECA) (Act No. 73 of 1989)
ECO - Environmental Control Officer
ED - Economic Development
EHS - Environmental, Health, and Safety
EIA - Environmental Impact Assessment
EMPr - Environmental Management Programme
EMI - Electromagnetic Interference
EN - Endangered
EP - Equator Principles
ERA - The Electricity Regulation Act No. 4 of 2006
ESA - Ecological Support Area
EAS - Early Stone Ages
ESMS - Environmental and Social Management System
EX - Extinct
FBAR - Final Basic Assessment Report
FBGF - Fuel-Based Generation Facility
EHS - Environmental, Health, and Safety
FBAR - Final Basic Assessment Report

GA - General Authorisation

GHG	- Green House Gases
GHI	- Global Horizontal Irradiation
GIS	- Geographic Information System
GMT	- Greenwich Meridian Time
GW	- Gigawatts
GWh	- Gigawatt Hours
HAZOP	- Hazard and Operability Study
HIA	- Heritage Impact Assessment
I&AP(s)	- Interested and/or Affected Party/Parties
IDP	- Integrated Development Plan
IEP	- Integrated Energy Plan
IFC	- International Finance Corporation
IKA	- Index of Kilometric Abundance
IPP(s)	- Independent Power Producers
IRP	- Integrated Resource Plan
IUCN	- International Union for the Conservation of Nature and Natural Resources
kPa	- Kilopascal
kV	- Kilo Volt
kW	- Kilowatts
LM	- Local Municipality
LED	- Local Economic Development
LSA	- Late Stone Age
m	- Metres
m^2	- Metres squared
m^3	- Metres cubed
MES	- Minimum Emission Standard
MHI	- Major Hazard Installation
MSA	- Middle Stone Age
MSL	- Mean Sea Level
MW	- Megawatt
NAAQS	- National Ambient Air Quality Standards
NAEIS	- National Atmospheric Emissions Inventory System
NDCR	- National Dust Control Regulations
NEA	- The National Energy Act (Act No. 34 of 2008)
NEMA	- National Environmental Management Act (Act No. 107 of 1998)
NEM:AQA	- National Environmental Management: Air Quality Act (Act No. 39 of 2004)
NEM:BA	- National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEM:PAA	- National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NFA	- The National Forest Act (Act No. 84 of 1998)
NFEPA	- National Freshwater Ecosystem Priority Areas
NFPA	- National Fire Protection Association
NHRA	- National Heritage Resources Act (Act No. 25 of 1999)
NO2	- Nitrogen Dioxide
NOx	- Nitrogen Oxides
NPAES	- National Protected Areas Expansion Strategy
NRTA	- National Road Traffic Act (Act No. 93 of 1996)
NT	- Near Threatened
NWA	- National Water Act (Act No. 36 of 1998)
OHSA	- Occupational Health and Safety Act (Act No. 85 of 1993)

PES	- Present Ecological Status
PIA	- Palaeontological Impact Assessment
PM10	- Particulate Matter (aerodynamic diameter equal to or size less than 10µm)
PM2.5	- Particulate Matter (aerodynamic diameter size equal to or less than 2.5µm)
PM	- Public Meeting
PPA	- Power Purchase Agreement
PPP	- Public Participation Process
ppm	- Parts Per Million
PV	- Photovoltaic
RA	- Risk Assessment
REDZ	- Renewable Energy Development Zone
REIPPPP	- Renewable Energy Independent Power Producer Procurement Programme
RE	- Renewable Energy
RMIPPPP	- Risk Mitigation Independent Power Producer Procurement Programme
SA	- South Africa
SAAQIS	- South African Air Quality Information System
SACAA	- South African Civil Aviation Authority
SAHRA	- South African Heritage Resources Agency
SAHRIS	- South African Heritage Resources Information System
SALA	- Subdivision of Agricultural Land Act (Act No. 70 of 1970)
SALT	- Southern African Large Telescope
SANBI	- South African National Biodiversity Institute
SANS	- South African National Standards
SDF	- Spatial Development Framework
SDS	- Safety Data Sheet
SEF	- Solar Energy Facility
SO_2	- Sulphur Dioxide
SOP	- Standard Operating Procedure
SPVs	- Special Purpose Vehicles
TL	- Terrain Loss
VIA	- Visual Impact Assessment
VU	- Vulnerable
WEF	- Wind Energy Facility
WMA	- Water Management Area
WUL	- Water Use License
WULA	- Water Use License Application

SECTION A: DETAILS OF THE ENVIRONMENTAL ASSESMENT PRACTITIONER

SiVEST SA (Pty) Ltd has been appointed by South Africa Mainstream Droogfontein PV 3 (Pty) Ltd as the independent EAP to undertake the BA process for the proposed construction and operation of the BESS and associated infrastructure and the inclusion of the additional listed activities for the authorised Droogfontein 3 Solar Photovoltaic (PV) Energy Facility. As per the requirements of the EIA Regulations 2014 (as amended 2017), the project team is provided in **Table 1** and the details and level of expertise of the persons who prepared the EMPr are provided in **Table 2** below.

Table 1: Project Team

Name	Organisation	Role
Tarryn Curtis	SiVEST	Divisional Manager (see **Annexure A** of EMPr)
Compilers		
Liandra Scott-Shaw	SiVEST	Project Coordinator / Environmental Assessment Practitioner (EAP) (see **Annexure A** of EMPr)
Stephan Jacobs	SiVEST	Environmental Consultant (see **Annexure A** of EMPr)
Specialist Input (see **Appendix 2 in Draft Basic Assessment Report** for copies of CV's of specialists)		
Kerry Schwartz	SiVEST	GIS, Mapping
Johann Lanz	-	Agriculture & Soils
Bruce Scott-Shaw	NatureStamp	Surface Water and Hydrology
Wouter Fourie	PGS	Heritage, Archaeology and Cultural Landscap
Elize Butler	Banzai	Palaeontology
Neville Bews	Dr Neville Bews & Associates	Socio-economic
Duan Swart	Gage	Geotechnical
Merchandt Le Maitre	SiVEST	Transportation
David Hoare	David Hoare Consulting	Terrestrial Ecology
Morne de Jager	EAR	Noise Specialist

Specialist assessments undertaken by SiVEST's in-house specialists. Based on recent correspondence with the DEFF, it was confirmed that assessments undertaken by in-house specialists do not need to be externally reviewed as a specialist permanently employed by an EAP is regarded as independent, provided he / she has no vested interest in the project and receives fair and normal remuneration for the work. An external peer review will be required should the Competent Authority have reason to believe that the EAP or specialist is not complying or has not complied with the requirements of Regulation 13 of the EIA regulations (as amended), in respect of the application. In addition, all specialists are required to sign a Declaration of Independence (DoI). Should the specialist be found not to be independent, then the process specified in Regulation 14 would apply, similar to when it relates to an EAP. It should be noted that the respective in-house specialists are deemed to be independent, have no vested interest in the project and receive fair and normal remuneration for the work, as confirmed as part of the signed specialist DoI, all of which have been submitted with the DBAR (Appendix 3 of the DBAR**). Refer to **Appendix 9B of the DBAR** for proof of this correspondence with the DEFF.*

Table 2: Expertise of the EAP

Lead Project Coordinator / Environmental Assessment Practitioner (EAP)	SiVEST SA (Pty) Ltd – Tarryn Curtis
Contact Details	tarrync@sivest.co.za

Qualifications	B.Sc. Geographical Science and B.Sc. (Hons) Environmental Management and Geography
Professional Affiliations	IAIAsa Membership Number: 3485
Expertise	Tarryn joined SiVEST in January 2011 in her capacity as Environmental Consultant. In May 2015, she was appointed as Divisional Manager for the Environmental Division, Pietermaritzburg Branch. In October 2018, Tarryn was appointed as Divisional Head for the Environmental Division nationwide. Tarryn has completed a Bachelor of Science Degree with a Geography Major (University of Natal, PMB), as well as a Bachelor of Science (Honours) in Environmental Management (University of Natal, PMB). Tarryn has been involved in consulting since 2007, which included scoping reports, environmental management plans, integrated management plans, basic assessment reports, environmental impact reports and auditing. Field of specialisation in Environmental Auditing, Environmental Project Management, Environmental Planning and Water Related Projects.
Lead Project Coordinator / Environmental Assessment Practitioner (EAP)	SiVEST SA (Pty) Ltd – Liandra Scott-Shaw
Contact Details	liandras@sivest.co.za
Qualifications	B.Sc. Biological Science and B.Sc. (Hons) Ecological Science
Professional Affiliations	SACNASP: 117442 IAIAsa Membership Number: 3624
Expertise	Liandra has approximately 8 years work experience specialising in undertaking and managing Environmental Impact Assessments (EIAs) and Basic Assessment (BAs), primarily related to energy generation and electrical distribution projects as well as Vegetation Ecology and Environmental Management. She has extensive experience in overseeing public participation and stakeholder engagement processes and has been involved in environmental baseline assessments, fatal flaw / feasibility assessments and environmental sensitivity analyses. She is responsible for the overall management of the SiVEST renewable energy projects and project management.
Environmental Consultant	SiVEST SA (Pty) Ltd - Stephan Jacobs
Contact Details	stephanj@sivest.co.za
Qualifications	B.Sc. Environmental Sciences (undergraduate) and B.Sc. (Hons) Environmental Management and Analysis
Professional Affiliations	IAIAsa Membership Number: 5736
Expertise	Stephan specialises in the field of Environmental Management and has been extensively involved in Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes for various types of projects / developments, in particular renewable energy projects. Stephan has extensive experience in undertaking public participation and stakeholder engagement processes. Stephan has also assisted extensively in the undertaking of field work and the compilation of reports for specialist studies such as Surface Water and Visual Impact

	Assessments. Stephan also has considerable experience in Environmental Compliance and Auditing and has acted as an Environmental Control Officer (ECO) for several infrastructure projects.

Please refer to attached CV's in **Appendix 2 of the DBAR and Annexure A in this EMPr** for more information. DoIs for each respective specialist are contained in **Appendix 3 of the DBAR**.

SECTION B: ACTIVITY INFORMATION

1 INTRODUCTION

South Africa Mainstream Droogfontein PV 3 (Pty) Ltd is proposing the construction and operation of Battery Energy Storage System (BESS) and associated infrastructure for the authorised Droogfontein 3 Solar Photovoltaic (PV) Energy Facility (12/12/20/2024/1/1), located near Kimberley in the Sol Plaatje Local Municipality, Francis Baard District Municipality, in the Northern Cape Province of South Africa (**Figure 1**) (**DEFF Ref No.:** To be Allocated). The need for a BESS stems from the fact that electricity is only produced by the Renewable Energy Facility while the sun is shining, while the peak demand may not necessarily occur during the day-time. Therefore, the storage of electricity and supply thereof during peak-demand will mean that the facility is more efficient, reliable and electricity supply more constant. The BESS will:

- Store and Integrate a greater amount of renewable energy from the Renewable Energy Facility into the electricity grid;
- This will assist with the objective to generate electricity by means of renewable energy to feed into the National Grid which will be procured under either the Renewable Energy Independent Power Producer Procurement Program (REIPPPP), other government run procurement programmes or for sale to private entities if required.

SiVEST Environmental Division (hereafter referred to as "SIVEST") has been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Basic Assessment (BA) process for the proposed construction and operation of the BESS and associated infrastructure. The BA will also include the additional listed activities for the authorised Droogfontein 3 Solar Photovoltaic (PV) Energy Facility.

This Draft Environmental Management Programme (EMPr) has been compiled in line with the recommendations in the above-mentioned BA, requirements of Appendix 4 of the NEMA EIA Regulations as well as from issues identified by SiVEST.

2 LEGISLATIVE REQUIREMENTS

2.1 Applicable Legislation, Development Strategies and Guidelines

Several pieces of legislation and regulations will be applicable to the development of the project. These include:

- Constitution of South Africa
- NEMA
- NEMA EIA Regulations, 2014 (as amended)

- National Energy Act (Act No. 34 of 2008)
- Electricity Regulation Act (Act No. 4 of 2006)
- National Heritage Resources Act (NHRA) (Act No. 25 of 1999)
- National Water Act (NWA) (Act No. 36 of 1998, as amended)
- National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004, as amended)
- National Environmental Management: Protected Areas Act (NEM: PAA) (Act No. 57 of 2003, as amended)
- National Forests Act (NFA) (Act No. 84 of 1998)
- Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983)
- Subdivision of Agricultural Land Act (SALA) (Act No. 70 of 1970, as amended
- National Road Traffic Act (NRTA) (Act No. 93 of 1996, as amended)
- Civil Aviation Act (CAA) (Act No. 13 of 2009)
- Nature and Environmental Conservation Ordinance 19 of 1974
- Astronomy Geographic Advantage Act (Act No. 21 of 2007)
- Renewable Energy Development Zones (REDZs)
- Occupational Health and Safety Act (OHSA) (Act No. 85 of 1993);
- Road Safety Act (Act No. 93 of 1996);
- National Road Traffic Regulations Act (Act No. 22 of 2000);
- National Environmental Management: Air Quality Act (NEM:AQA) (Act No. 39 of 2004);
- National Environmental Management: Waste Act (NEM:WA) (Act No. 59 of 2008, as amended);
- The National Environmental Management: Biodiversity Act, 2014 (Alien and Invasive Species Regulations, 2014);
- Development Facilitation (Act No. 67 of 1995);
- National Ports Act (Act No. 12 of 2005)
- The Hazardous Substances Act (Act No. 15 of 1973);
- Water Services Act (Act No. 108 of 1998);
- Electricity Regulation Act (ERA) (Act No. 4 of 2006, as amended);
- Municipal Systems Act (Act No. 32 of 2000);
- Mineral and Petroleum Resource Development Act (Act No. 28 of 2002, as amended); and
- Equator Principles (elaborated on below)

Refer to the BAR for a full overview of the legislation and applicability thereof.

2.1.1 The Polluter-Pays Principle

This principle provides for "*the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment*." The Polluter Pays Principle must be rigorously applied throughout the Construction Phase of this project.

2.1.2 Progressive Rehabilitation

Progressive rehabilitation must also be undertaken throughout the Construction Phase of the project with areas that have been impacted on. Rehabilitation should commence as soon as construction is completed in the specific area and not at the end of the entire project.

2.1.3 The Equator Principles

The Equator Principles (2013) are a financial industry benchmark for determining, assessing and managing social and environmental risk in project financing. A number of banks, exchanges and organisations worldwide have adopted the Principles as requirements to be undertaken for project funding on application and approval. Furthermore, certain funding institutions have not formally adopted the Principles, but require clients to be compliant with them in order to qualify for loans.

Under Principle 3, the Equator Principles establish the International Finance Corporations (IFC) Performance Standards, 2012 and associated General and Sector Specific EHS Guidelines as the applicable social and environmental standards that a project should comply with if the project is located in a non-OECD country or OECD country that is not designated as high income.

The social and environmental assessment that is undertaken for a project establishes whether or not the project is in compliance with the IFC Performance Standards[1].

[1] **NB** A project does not seek compliance with the Equator Principles per se but the standards that the EP refers to. A financial institution that has adopted the EP must ensure that any projects it is financing meet the standards referred to and that it adopts an appropriate risk management system to ensure this.

According to these principles, the performance standards relevant to the proposed development are summarised in **Table 3**.

Table 3: IFC 2012 Performance Standards

Performance Standard	Intent and objective	Requirements
Assessment and Management of Environmental and Social Risks and Impacts (1)	Underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders. **Objectives:** ▪ To identify and evaluate environmental and social risks and impacts of the project. ▪ To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment. ▪ To promote improved environmental and social performance of clients through the effective use of management systems. ▪ To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately. ▪ To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.	▪ Policy ▪ Identification of Risks and Impacts Management Programmes ▪ Organisational Capacity and Competency ▪ Emergency Preparedness and Response ▪ Monitoring and Review ▪ Stakeholder Engagement ▪ External Communication and Grievance Mechanism ▪ Ongoing Reporting to Affected Communities
Labour and Working Conditions (2)	▪ Looks at the working conditions by following these principles; ▪ To establish and maintain the worker- management relationship (including specifically a human resources policy). ▪ To promote fair treatment, non-discrimination and equal opportunity of employees (and some contractors) and meet national employment laws. ▪ To protect the workforce by addressing child labour and forced labour. ▪ To promote healthy and safe working conditions.	▪ Working Conditions and Management of Worker Relationship ▪ Protecting the Work Force ▪ Occupational Health and Safety ▪ Workers Engaged by Third Parties ▪ Supply Chain
Resource Efficiency and Pollution Prevention (3)	▪ To avoid and minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities. ▪ To promote the reduction of emissions that contributes to climate change.	▪ Resource Efficiency ▪ Pollution Prevention

Performance Standard	Intent and objective	Requirements
Community Health Safety and Security (4)	▪ To avoid or minimise risks to and impacts on the health and safety of the local community during the project life cycle from both routine and non-routine circumstances. ▪ To ensure that the use of security personnel is carried out in a legitimate manner that avoids or minimizes risks to the community's safety and security.	Community Health and Safety Security Personnel
Land Acquisition and Involuntary Resettlement (5)	▪ To avoid or at least minimize involuntary resettlement wherever feasible by exploring alternative project designs. ▪ To mitigate adverse social and economic impacts from land acquisition or restrictions on affected persons' use of land by; (i) providing compensation for loss of assets at replacement cost, and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. ▪ To improve or at least restore the livelihoods and standards of living of displaced persons. ▪ To improve living conditions among displaced persons through provision of adequate housing with security of tenure at resettlement sites.	Displacement Private Sector Responsibilities Under Government-Managed Resettlement
Biodiversity Conservation and Sustainable Management of Living Natural Resources (6)	▪ To promote and conserve biodiversity. ▪ To avoid the introduction of alien invasive species. ▪ To promote sustainable management and use of natural resources (NRM).	▪ Protection of Conservation of Biodiversity ▪ Management of Ecosystem Services ▪ Sustainable Management of Living Resources ▪ Supply Chain
Indigenous People (7)	▪ To foster full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of Indigenous Peoples (IP). ▪ To avoid impacts or where avoidance is not feasible, minimize, mitigate and compensate in a culturally appropriate fashion and within the framework of successful good faith negotiation (a form of stakeholder engagement requiring approval of both parties). ▪ To establish and maintain effective relationships with IPs over the course of the project.	▪ Circumstances Requiring Free, Prior and Informed Consent ▪ Mitigation and Development Benefits ▪ Private Sector Responsibilities where Government is Responsible for Managing Indigenous Peoples Issues ▪
Cultural Heritage (8)	▪ To protect cultural heritage from adverse impacts of project activities and support its preservation. ▪ To promote the equitable sharing of benefits from the use of cultural heritage in business activities.	▪ Protection of Cultural Heritage in Project Design and Execution ▪ Project's Use of Cultural Heritage

(Source; IFC Guidelines, 2012)

2.2 Legislative Requirements for Droogfontein BESS and associated infrastructure

Table 4: Compliance with National Environmental Management Act, 1998 (Act No. 107 of 1998) and Environmental Impact Regulations (2017) Content of Environmental Management Programmes (Appendix 4)

Requirements of Appendix 4 – GN R326 EIA Regulations of 7 April 2017	Section of Report
1. (1) An EMPr must comply with section 24N of the Act and include— (a) details of– (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Details of the EAP and full project team are in **Section A** and EAP's CV is included in **Annexure A** of this EMPr.
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Detailed descriptions of the aspects of the activities that are covered by the EMPr can be found in **section 3.**
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	This map can be found in **section 3, Figure 1**. It shows 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;
(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including— (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Descriptions 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 can be found in **section 6.**
(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to — (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and	Descriptions of proposed impact management actions, identifying the manner in which the impact management outcomes above are contemplated can be found in **section 6** and in **section 8.**

Requirements of Appendix 4 – GN R326 EIA Regulations of 7 April 2017	Section of Report
(iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	
(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Refer to **section 6** and **section 8** which outline High Level monitoring methods.
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Refer to **section 6** and **section 8** which outline High Level monitoring methods including the frequency monitoring is to be implemented.
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	Refer to **section** Error! Reference source ot found. which outlines the roles and responsibilities for the proposed Energy Facility.
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Refer to **section 6** and **section 8** which outline the time periods monitoring is to be implemented
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Refer to **section 6** and **section 8** which outline methods for monitoring compliance.
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Refer to **section 6** and **section 8** which outline methods for reporting on compliance
(m) 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; and	This plan can be found in **section 8.13** and addresses all risks associated with the proposed development.
(n) any specific information that may be required by the competent authority.	All High Level plans that may be requested are included in **section 8.**
(2) Where a government notice *gazetted* by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	Noted.

3 PROJECT DETAILS

South Africa Mainstream Droogfontein PV 3 (Pty) Ltd is proposing the construction and operation of Battery Energy Storage System (BESS) and associated infrastructure for the authorised Droogfontein 3 Solar Photovoltaic (PV) Energy Facility (12/12/20/2024/1/1), located near Kimberley in the Sol Plaatje Local Municipality, Francis Baard District Municipality, in the Northern Cape Province of South Africa. The need for a BESS stems from the fact that electricity is only produced by the Renewable Energy Facility while the sun is shining, while the peak demand may not necessarily occur during the day-time. Therefore, the storage of electricity and supply thereof during peak-demand will mean that the facility is more efficient, reliable and electricity supply more constant. The BESS will:

- Store and Integrate a greater amount of renewable energy from the Renewable Energy Facility into the electricity grid;
- This will assist with the objective to generate electricity by means of renewable energy to feed into the National Grid which will be procured under either the Renewable Energy Independent Power Producer Procurement Program (REIPPPP), other government run procurement programmes or for sale to private entities if required.

The key technical details and infrastructure required are presented in the table below (**Table 5**). Please see Error! Reference source not found. for the layout of the proposed development.

Table 5: Droogfontein BESS summary of key components

PROJECT	DEFF REFERENCE	FARM NAME AND AREA
Droogfontein BESS	To be Allocated	▪ Remainder of the Farm Droogfontein No. 62 Application Site = approximately 5**ha** Development/Buildable Area Site = approximately **2ha**
TECHNICAL DETAILS OF ASSOCIATED INFRASTRUCTURE		

BESS Specifications	
BESS Footprint	Up to 2Ha
BESS Capacity	Up to 200MWh
BESS Technology	Lithium Ion
BESS Type Alternative- Solid State Batteries	Containerised systems assembled within shipping containers and delivered to the project site. Dimensions are approximately 17 m long x 3.5 m wide x 4 m high. Containers will be placed on a raised concrete plinth (30 cm) and may be stacked on top of each other to a maximum height of approximately 15 m. Additional instrumentation, including inverters and temperature control equipment, may be positioned between the battery containers.

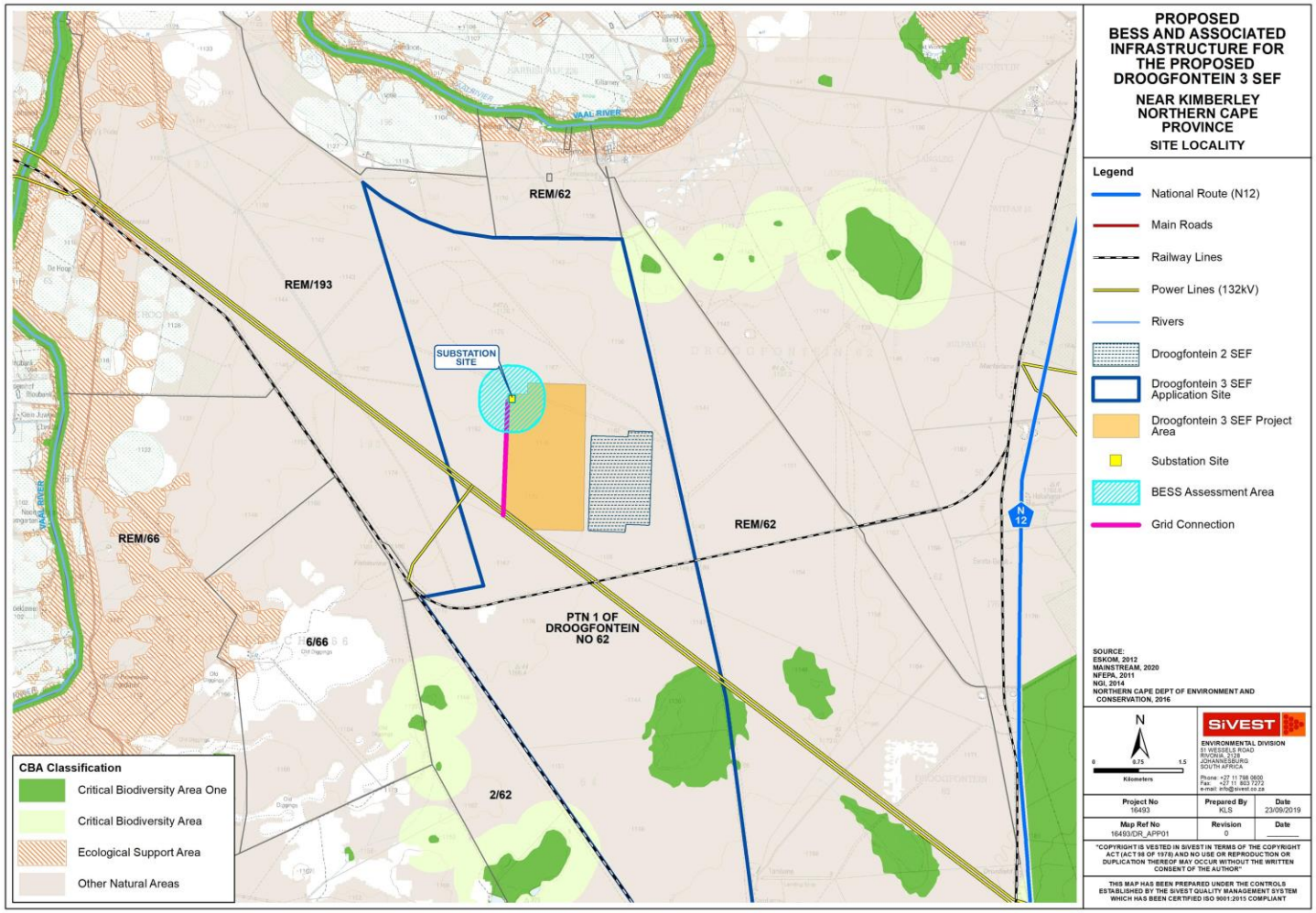

Figure 1: Regional Context Map

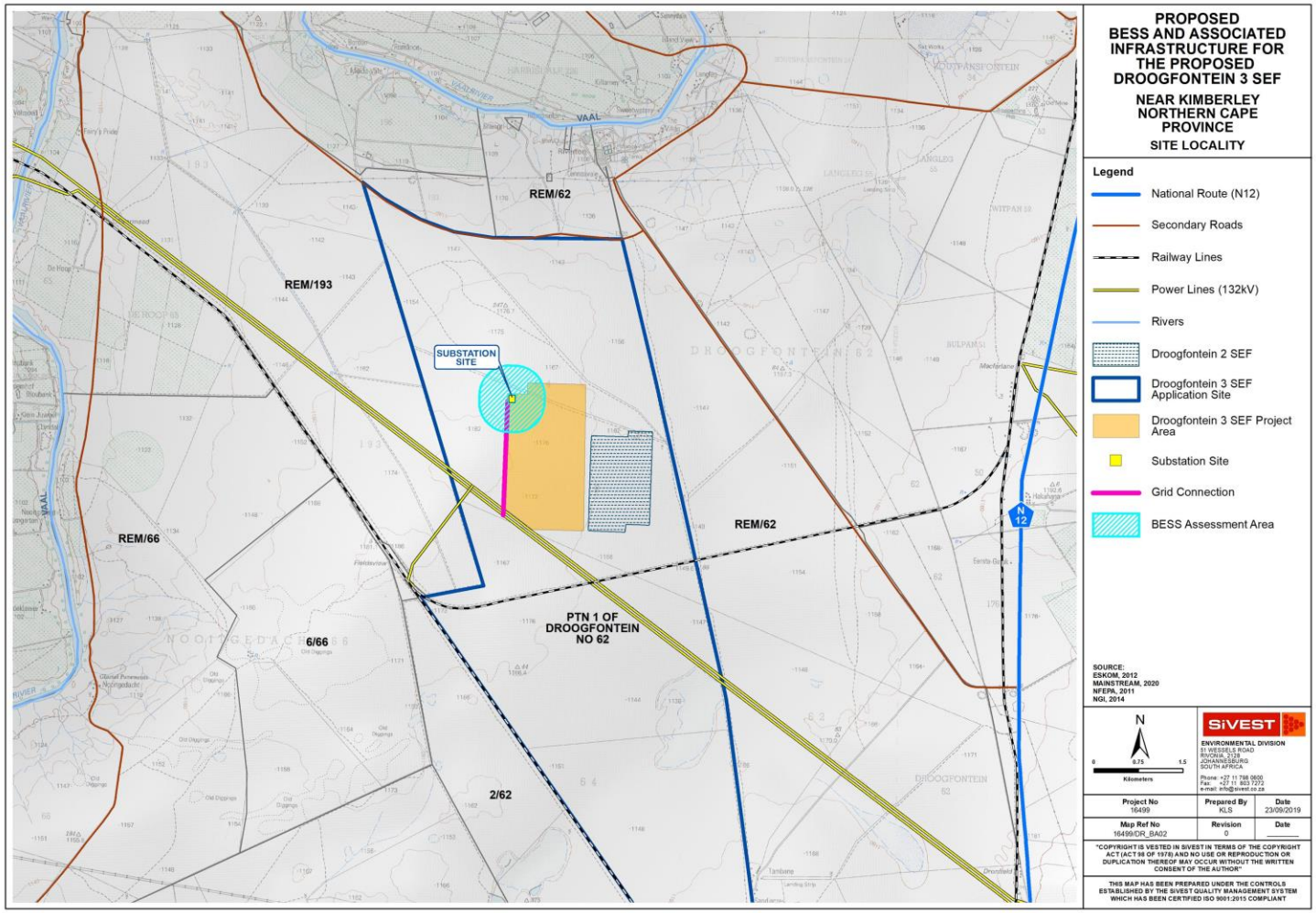

Figure 2: Site Locality Map

3.1 Site Description

Generally speaking, the study area is characterised by a relatively flat, topographically featureless landscape which slopes down gradually in a north-westerly direction towards the Vaal River Valley. The generally flat nature of the southern part of the site is indicated by the presence of a number of pans which only occur where the topography is too flat for surface drainage to flow away from the area. The area is generally gently undulating or flat grassy plains with hills seldom rising more than 130m above the surrounding flats.

The dominant vegetation unit in the study area is Kimberley Thornveld, which is characterised by a well-developed tree and shrub layer with an underlaying grass layer (Mucina and Rutherford, 2006). The study area has a semi-arid continental climate with a summer rainfall regime i.e. most of the rainfall is confined to summer and early autumn. Mean Annual Precipitation (MAP) is approximately 392mm per year and without some form of supplementary irrigation natural rainfall is generally insufficient to produce sustainable harvests for cultivated crops. This is reflected in the limited dry land crop production within the study area. Precipitation usually takes the form of infrequent thundershowers. Average daily temperatures range from 25°C in summer to 10 °C in winter. Average night time temperatures drop to around 0.3 °C during winter

Most of the natural vegetation has been cleared from the proposed site and replaced by grassy plains used as grazing land for cattle. The surrounding area has been partly transformation by urban and suburban environments, with the town of Riverton directly to the north-east of the site along the Vaal River and the community of Roodepan situated to the south-west of the site. Intensive commercial agriculture occurs adjacent to the Vaal River, in and to the north of the site and mining activities which belong to the De Beers Consolidated Mines Ltd mostly occur to the south-east. Kimberley is the largest urban area and is located approximately 7km to the south of the site.

According to the 1:1250 000 scale geological map 2824 KIMBERLY, the bedrock geology beneath the Droogfontein PV 3 Solar Energy Facility comprises of basaltic andesite lavas of the Allanridge Formation (designated Ra), which is the upper-most formation of the Ventersdorp Supergroup. The Ventersdorp Supergroup is a volcano-sedimentary sequence which contains the most widespread sequence of volcanic rocks in southern Africa (Johnson, et.al. 2006) The bedrock is overlain by extensive deposits of aeolian sands, described as “Sand: red and grey aeolian dune sand” on the geological map (designated Qs). While these deposits blanket the bedrock over a large proportion of the general area, the Allanridge Formation is shown to occur

3.2 Alternatives for Infrastructure

One (1) of the aims of the BA process was to identify alternatives for detailed assessment (as was discussed in **section 3.3** of the DBAR). The selection of alternatives helped to focus investigations, both in terms of the environmental investigations required and the scope of the public participation process. No layout alternatives for the BESS have been identified or assessed as this has been informed by the identified environmental sensitive and/or ‘no-go’ areas. Limited location alternatives exist as the BESS is required to be situated close to the authorised sub-station to reduce electrical losses.

3.2.1 Layout alternatives

Design and layout alternatives are being considered and assessed as part of this BA process. The alternatives are described below.

- BESS

  To reduce electrical losses, the BESS must be in close proximity to the on-site 33/132kV substation. BESS areas alternatives were considered by the EAP and specialists.

- Battery Types

  1. BESS Type Alternative - Solid State Batteries
     a. Conventional battery
     b. All Solid state battery
  2. BESS Type Alternative - Redox flow Batteries

3.2.2 'No-go' alternative

The 'no-go' alternative is the option of not constructing and operating a BESS in support of the authorised Renewable Energy (RE) facility. This alternative would result in no additional environmental impact other than that assessed during the EIA for the RE facility The 'no-go' option is an option; however, this would prevent the Droogfontein BESS from contributing to the environmental, social and economic benefits associated with the development of the renewables sector. The above-mentioned alternatives (including 'no-go' alternative) were assessed by the appointed specialists as part of the BA process. All the above-mentioned location alternatives will be informed by the identified environmental sensitive and/or 'no-go' areas (i.e. status quo). The respective alternatives being considered as part of the BA process for the proposed development will also be comparatively assessed.

3.3 Findings of the Basic Assessment (BA)

The BA report together with the specialist studies provide a detailed assessment of the potential impacts that may result from the development of the Droogfontein BESS.

No environmental fatal flaws were identified in the detailed specialist studies conducted, provided that the recommended mitigation measures are implemented. These measures include, amongst others, the avoidance of sensitive features within the development footprint and the undertaking of the construction and operational monitoring and mitigation set forward by the specialists. Summaries of the impacts identified by the specialist are detailed below.

The development footprint was designed by the Holder of the EA in order to respond to and avoid the sensitive features located within the project site. Therefore, it is concluded that the development footprint is suitable and appropriate from an environmental perspective for the proposed Energy Facility and all detrimental or adverse impacts on sensitive features were avoided, reduced and/or mitigated.

TABLE 6: A summary of the findings for each identified environmental impact evaluated in the context of the proposed development

Specialist Assessment	Key Findings	Impacts	Mitigation	Conclusion
Agricultural Compliance Statement	▪ The aridity of the area is a significant agricultural constraint that seriously limits the level of agricultural production (including grazing) which is possible across the site. ▪ Shallow soils on underlying rock or carbonate hardpan are a further agricultural limitation. As a result of these limitations, the study area is unsuitable for cultivation and agricultural land use is limited to grazing.	▪ loss of agricultural land use ▪ land degradation, but both are of low significance.	▪ Implementation of an effective system of storm water run-off control; ▪ maintenance of vegetation cover; ▪ stripping, stockpiling and re-spreading of topsoil.	The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. The proposed development is therefore acceptable. This is substantiated by the facts that the land is of limited agricultural potential, that the actual amount of agricultural land loss is small, and that the proposed development poses a low risk in terms of causing soil degradation. **From an agricultural impact point of view, it is recommended that the proposed development be approved.**
Hydrological Impact Assessment	▪ Through the impact assessment, the risks identified during construction have the highest impact although it would still be considered to be of low risk. ▪ The construction and operation phase associated impacts of the access roads, PV modules, substation, maintenance building and power lines have already been approved by the respective authorities. ▪ Therefore, the addition of the BESS to the existing proposed development will have a minimal impact as it falls within the original developable area and is relatively small. ▪ The location of the proposed BESS has been strategically placed to be situated away from watercourses. ▪ There is a risk of groundwater contamination in the event of leaks from the batteries. However, if solid state batteries are used, this risk will be reduced.	▪ Change in impervious surface preventing infiltration and harvesting of rainwater/groundwater abstraction ▪ Increase in Storm Water ▪ General spills/Leaks ▪ Battery Spills/Leaks during Operation	▪ The development must recycle water on site and reuse it for plant maintenance but stay within catchment limits. ▪ The development must follow suitable contamination measures to ensure no contamination occurs. ▪ Storm water structures should promote infiltration to ensure the recharge of the groundwater aquifer. ▪ Existing boreholes should be used in order to not over utilize groundwater resources. ▪ The mitigation measures required relates to the development and implementation of an adequate storm water management plan to be designed by an appropriate engineer. ▪ The engineer should account for both natural run-off (that which can be released into the natural landscape with no detrimental effect) and excess artificial run-off generated by the proposed BESS development structures. ▪ Attenuation dams and evaporation ponds are examples that can contain storm water run-off. Other structures that may be considered are semi-permeable surfaces that can absorb artificial run-off but releases a certain amount into the landscape. Energy dissipating structures can also be used. ▪ Such structures can reduce the amount and rate of excess run-off generated by the proposed development entering wetlands and thereby prevent the onset of erosion. ▪ The development must stay outside of the 1:100 year flood extent. ▪ All vehicles will need to be checked for leakage before and after entering the construction area. ▪ Areas where fuels are either kept or transferred will need to be bunded so as to contain spillage. ▪ Cement mixing sites will also need to be strategically positioned and bunded to prevent spillage. ▪ Ablution facilities must be provided to prevent workers urinating near or in the wetlands. ▪ Ablution facilities must be positioned at least 100metres away from the wetland areas and buffer zones. ▪ Soakaways must be located away from any active boreholes.	The proposed BESS has been strategically placed to be more than 500 meters from surface water resources. This location has taken cognisance of alternative locations and “no go” areas and is deemed to be the best possible location. The is a risk for groundwater contamination in the event of battery spillage. However, in this area, given the low water use requirement on-site and adherence to specialist recommendations, the site is of low risk of negative groundwater impacts during construction and operation. Furthermore, should solid state batteries be used rather than redox flow, this risk would be significantly lowered as redox flow batteries use vanadium electrolyte solution which is potentially hazardous to groundwater. **The previously approved specialist reports and the subsequent environmental authorisation (EA) are still relevant and these studies covered the proposed BESS footprint. NatureStamp strongly confirms that the hydrological impacts associated with the BESS would be minimal and acceptable and hence the EA should be granted to include the BESS.**

Geotechnical Impact Assessment	▪ The assessment area is underlain by unconsolidated aeolian sands and andesite bedrock. ▪ Some geotechnical constraints have been identified, including the presence of potentially collapsible sands and shallow bedrock.	▪ Disturbance/ displacement/ removal of soil and rock Soil ▪ Erosion	▪ Design facility layout to minimise earthworks and levelling ▪ Correct topsoil and spoil management 1) Temporary berms and drainage channels to divert surface runoff where needed ▪ Landscape and rehabilitate disturbed areas timeously (e.g. regrassing) ▪ Correct engineering design of road and site drainage ▪ Use designated access and laydown areas only to minimise disturbance to surrounding areas1) Maintain drainage channels ▪ Monitor for erosion and remediate and rehabilitate timeously	This desktop geotechnical specialist study was undertaken for the installation of a BESS on the Droogfontein 3 Solar Photovoltaic (PV) Energy Facility. The assessment area is underlain by unconsolidated aeolian sands and andesite bedrock. Some geotechnical constraints have been identified, including the presence of potentially collapsible sands and shallow bedrock. These constraints may be mitigated via standard engineering design and construction measures. Shallow spread footings are suitable to support the structures, provided soil improvement is undertaken in areas underlain by collapsible sands. No fatal flaws have been identified that would render the proposed BESS site unsuitable from a geological and geotechnical perspective. The proposed BESS is assessed to have a "Negative Low impact - the anticipated impact will have negligible negative effects and will require little to no mitigation". The recommended mitigation measures provided to minimise the impacts relate to the appropriate engineering design of earthworks and site drainage, erosion control and topsoil and spoil material management. These do not exceed civil engineering and construction best practice. Further intrusive geotechnical investigations should be undertaken to confirm the engineering recommendations provided in this report. **From a geotechnical and geological perspective, no fatal flaws, sensitivities, or areas to be avoided have been identified within or close to the BESS assessment area. It is therefore recommended that the proposed activity be authorised.**
Terrestrial Ecology Impact Assessment	▪ The study area (as described by Koch, 2012) occurs on flat and gently undulating topography. The study area is characterised by large areas of natural vegetation, covered by grasslands within the Kimberley Thornveld regional vegetation type. The site is classified as "natural" having relatively little human infrastructure on it and is used as grazing land for cattle and sheep herds. Open grazing land is interspersed with three relatively large ephemeral pans in the southern part of the study area. The prominent plant of concern within the study area is the Camel thorn (Acacia erioloba) which is common throughout the area. This is a protected tree species in terms of the National Forests Act No 84 of 1998 as amended. Several of these trees are present on the site. ▪ Sensitive spots were identified outside the proposed PV site.. The pans present near the site are considered sensitive and no go zones from a biodiversity perspective. These pans provide essential habitat for certain species such as the bullfrog and birds. These provide an important ecological function in the greater study area. Their linkage also remains important in the greater context. ▪ The stands of Camel thorn (Acacia erioloba) and small hills within the study area are also considered to be sensitive. Large parts of the site have been transformed	▪ Clearing of natural vegetation that is habitat for plant and animal species.	▪ The loss of vegetation is inevitable and necessary for the proposed development to take place. Sensitive areas have been identified outside the proposed PV site. These relate to pans, intact vegetation and rivers. These features will not be affected by the development and will therefore also not be affected by the BESS. The approved footprint will not result in losses of Camel Thorn trees as the development area is largely devoid of the species. Some small specimens might emerge prior to construction and the relevant permits for removal must be undertaken if required. The large stand of Camel Thorns present in the wider study area will not be affected by the development. Mitigation measures primarily will relate to the protection of sensitive species and habitats, appropriate rehabilitation, and observation of buffer zones.	**It is the opinion of the Ecologist that the overall impact of the Droogfontein BESS, on the terrestrial biodiversity and plant species resources, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised**

	by cattle grazing activities and it is within these areas that the authorised infrastructure is being placed. The PV site is located away from sensitive areas identified within the original terrestrial ecology study (Koch 2012). ▪ Through the interrogation of various databases, imagery and the previous ecological assessment, it is clear that no sensitive features are present within or near the proposed footprint, with the possible exception of juvenile camelthorn trees, which tend to sprout in previously disturbed areas. As such, it is hereby confirmed that the site should be considered to have Low Sensitivity.			
Heritage Impact Assessment	▪ The completed and approved HIA (Fourie, 2012) has shown that the possibility of archaeological finds in the general vicinity of the Droogfontein PV3 does exist. ▪ The fieldwork conducted for the evaluation of the possible impact of the new BESS as part of the Droogfontein 3 PV plant has revealed no heritage resources.	▪ Impact on archaeological and historical heritage resources	▪ Include heritage chance finds procedure in EMP for project development	The completed and approved HIA (Fourie, 2012) has shown that the possibility of archaeological finds in the general vicinity of the Droogfontein PV3 does exist. However, the probability is seen as very low. The current study has confirmed this finding and with the implementation of a chance finds procedure as part of the EMPr will mitigate possible impacts on unidentified heritage resources. In the event that heritage resources are discovered during site clearance, construction activities must stop in the vicinity, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures. **The overall impact of the Droogfontein BESS, on the heritage resources, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.**
Paleontology Impact Assessment	▪ The proposed development is underlain by Late Cenozoic Superficial Sediments as well as the Allanridge Formation of the Ventersdorp Group. According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Late Cenozoic Superficial Sediments is low, but locally high and that of the Allanridge Formation is moderate (Almond and Pether; 2009). ▪ Usually impacts on palaeontological heritage only occur during the construction phase of the development. ▪ As the Authorized Droogfontein PV 3 was originally assessed in a Palaeontological Impact Assessment and as the proposed project falls in the same area the Palaeontological Significance of the BESS and associated infrastructure is low. It is thus considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. ▪ It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.	▪ Loss of fossil heritage	▪ Include fossil heritage chance finds procedure in EMP for project development	It is thus considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. **The overall impact of the Droogfontein BESS, on the paleontological resources, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.**
Social Impact Assessment	▪ The BESS will be located adjacent to the approved Droogfontein PV substation associated with the approved Droogfontein PV.	▪ Increased business confidence	▪ Ensure that the appropriate agreements are in place to enforce performance and availability compliance.	Considering all social impacts associated with the project, it is evident that the positive elements outweigh the negative and that the project carries with it significant social benefits.

	▪ Consequently, it is most unlikely that the proposed project will result in an increase in significance of any of the impacts identified and assessed by MasterQ Research; or in any additional impacts. ▪ It is clear, however, that the project has the potential to increase the efficiency, reliability and consistency of the electricity delivered by the Doorgfontein PV Facility. ▪ This will in turn have a positive impacts in respect of business confidence, public health and safety and the nuisance factor associated with frequent electricity outages.	▪ Reduced health and safety risks ▪ A reduction in the nuisance factors	▪ Attach noncompliance penalties to encourage reliability of supply.	In addition, the project fits with international and governmental policy and legislation. **Consequently, the proposed installation of a BESS at the authorised Droogfontein 3 Solar Photovoltaic (PV) Energy Facility is supported at the social level.**
Surface Water Impact Assessment	▪ The site is low sensitivity in an aquatic context. ▪ The proposed location of the BESS is the best possible location on the site. ▪ The site is flat, located on sparse vegetation and is a significant distance from wetlands/watercourse. This is confirmed by Taylor (2012) who's study covered the whole BESS area.	▪ Clearing of vegetation ▪ Increase in Storm WaterSpills/Leaks during Construction ▪ Battery Spills/Leaks during Operation	▪ Manage the invasive alien plants at any disturbed or spoil areas ▪ Ensure appropriate storm water infrastructure is installed to dissipate flow and direct away from concentrated paths. ▪ Manage the invasive alien plants around the BESS during operation ▪ Ensure drip trays are used under vehicles/machinery and that impervious floor surfaces are constructed to ensure chemicals and waste do not enter the sub-surface ▪ Where practical, plant obligate wetland species or dissipation structures in drains around the BESS. ▪ Ensure drip trays are used under vehicles/machinery and erosion control measures are implemented. ▪ Ensure a spill contingency plan is put into place. ▪ Completely lined infrastructure (concrete bunded area), with the capacity to contain 120% of the total amount of chemicals stored within the BESS. ▪ Spills must be completely removed from the site. ▪ Fire extinguisher equipment installed within the BESS. ▪ Temperature of battery systems monitored continually. ▪ Ensure air circulation to prevent the buildup of chemicals. ▪ Implement the storm-water management plan and ensure appropriate water diversion systems are put in place. ▪ Compile (and adhere to) a procedure for the safe handling of battery cells. ▪ Compile an emergency response plan and implement should an emergency occur. ▪ Ensure that spill kits (if appropriate) are available on site for clean-up of spills and leaks. ▪ Drip-trays or containment measures must be placed under equipment that poses a risk when not in use. ▪ Immediately clean up spills and dispose of contaminated soil at a licensed waste disposal facility. ▪ Dispose of waste appropriately to prevent pollution of soil and groundwater. ▪ Install monitoring systems to detect leaks or emissions. ▪ On-site battery maintenance should be done over appropriate drip trays/containment measures and any hazardous substances must be disposed of appropriately. ▪ Record and report all fuel, oil, hydraulic fluid or electrolyte	Recent technology upgrades and enclosed nature of solid state batteries reduces the risk of contamination. Thus it is recommended that the solid state Li-ion battery be considered as the preferred choice of battery due to its lower risk in comparison to Redox flow technologies. **However, the overall impact of the Droogfontein BESS, on the aquatic resources, is seen as acceptably low after the recommendations for have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.**

			▪ spills to the PM / Engineer / ERP so that appropriate clean-up measures can be implemented.	
Transport Impact Assessment	▪ The additional Traffic generated as a result of the development of BESS, will be added to the already approved access approval by SANRAL and the Environmental Authorization (EA).	▪ Increase in Traffic ▪ Increase of Incidents with pedestrians and livestock ▪ Increase in Dust from gravel roads ▪ Increase in Road Maintenance ▪ New / Larger Access points	▪ Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus. ▪ Reduction in speed of vehicles ▪ • Adequate enforcement of the law ▪ • Implementation of pedestrian safety initiatives ▪ • Regular maintenance of farm fences, access cattle grids ▪ Implement a road maintenance program under the auspices of the respective transport department. ▪ Enforce a maximum speed limit on the development ▪ Use of dust suppressant techniques ▪ Adequate watering by means of water bowser ▪ Adequate road signage according to the SARTSM ▪ Approval from the respective roads department	**With reference to this report, the previously approved 'Transportation Impact Assessment' and the subsequent EA. SiVEST Civil Engineering Division is of the opinion that the impacts of the BESS would be minimal and acceptable and hence the EA should be granted for this EIA process.**
Noise Impact Assessment	▪ This report determines, using administrative means, whether the proposed development could have any significant acoustical implications considering a questionnaire as proposed by SANS 10328:2008. ▪ As all the questions are negative, it is unlikely that the planned development will present a noise disturbance. ▪ As recommended by SANS 10328:2008, a scoping investigation and an environmental noise impact investigation will not be required.	N/A	N/A	Considering the location where the potential BESS is proposed, the proposed system would be further than 500 m from any potential NSD. It is therefore the opinion of the author that there exists an insignificant potential for a noise impact and that no further Scoping or other acoustical studies would be required for the proposed BESS. No specific mitigation measures regarding noise or additional noise measurements are recommended. No additional conditions regarding noise are recommended for inclusion in the EMPr. **It is therefore recommended that the Droogfontein BESS project be approved from a noise perspective.**

3.4 Activities and Components associated with the BESS

Table 7: Activities associated with Planning, Construction, Operation and Decommissioning of the Droogfontein 3 BESS Facility

Planning Phase	
Requirements	Conduct technical surveys prior to initiating construction.
Activities to be undertaken	
Conduct surveys	Including, but not limited to: a geotechnical survey, site survey and confirmation of the BESS micro-siting footprint.
Construction Phase	
Requirements	No on-site labour camps. Employees to be accommodated in the nearby towns
	Overnight on-site worker presence would be limited to security staff.
	General waste will be collected and temporarily stockpiled in skips in a designated area on site and thereafter removed, emptied into trucks, and disposed at a registered waste disposal facility on a regular basis by an approved waste disposal Contractor (i.e. a suitable Contractor). Any hazardous waste will be removed off site by a suitable service provider for safe disposal at a registered hazardous waste disposal facility. Waste disposal slips and waybills will be obtained for the collection and disposal of the general and hazardous waste. These disposal slips (i.e. safe disposal certificates) will be kept on file for auditing purposes as proof of disposal. The waste disposal facility selected will be suitable and able to receive the specified waste stream (i.e. hazardous waste will only be disposed of at a registered / licenced waste disposal facility). The details of the disposal facility will be finalised during the contracting process, prior to the commencement of construction. Where possible, recycling and re-use of material will be encouraged. Waste management is further discussed in the EMPr. During the operational phase of the proposed Facility, waste generation will be minimal and will be disposed of a licensed landfill site.
	In terms of electricity supply for the construction phase, the applicant will utilise a combination of generators and solar systems.
	During the construction phase a temporary water supply for construction will need to be installed that will make use of existing or new boreholes and will comprise of over-ground water pipelines and tanks to the construction camp. Approval for any additional water requirements will form part of a separate water use authorization approvals process.
Activities to be undertaken	
Conduct surveys prior to construction	Including, but not limited to: a geotechnical survey, site survey and confirmation of the micro-siting footprint.
Establishment of access roads to the Site	Access / haul roads and internal access roads within the site will be established at the commencement of construction.
	Existing access roads will be utilised where possible to minimise impact, and upgraded where required.
	Access roads to the site will have a width of up to 8m.
	Access roads to be established between the PV arrays for construction and/or maintenance activities within the development footprint.
	Internal service road alignment will be approximately 8m wide.
	Including the clearance of vegetation for establishment of the BESS

Undertake site preparation	Stripping of topsoil to be stockpiled, backfilled, removed from site and/or spread on site.
	To be undertaken in a systematic manner to reduce the risk of exposed ground being subjected erosion.
	Include search and rescue of floral species of concern (where required) and the identification and excavation of any sites of cultural / heritage value (where required).
Establishment of laydown areas and batching plant on site	A laydown area for the storage of BESS components.
	The laydown area will also accommodate building materials and equipment associated with the assembly of BESS.
	No borrow pits will be required.
	A temporary concrete batching plant to facilitate the concrete requirements for foundations.
Transport of components and equipment to and within the site	Transportation will take place via appropriate National and Provincial roads, and the dedicated access / haul road to the site.
	Components considered as abnormal loads in terms of Road Traffic Act (Act No 29 of 1989) due to dimensional limitations and load limitations may require a permit for the transportation of the abnormal loads on public roads.
	Civil engineering construction equipment to be brought to the site for the civil works (e.g. excavators, trucks, graders, compaction equipment, cement trucks etc.).
Battery Energy Storage Systems (BESS)	Total footprint of up to approximately **2ha**
	Located next to on-site 33/132kV substation
Establishment of ancillary infrastructure	A workshop, contractor's equipment camp, temporary storage areas and a construction compound will be required.
	Service buildings for site offices, storage and safe refueling areas are also required.
	Establishment will require the clearing of vegetation, levelling and the excavation of foundations prior to construction.
Connect battery and substation to the power grid	On-site substation to connect the PV Facility
	Connection via an overhead 132kV power line (located within a 32m servitude) in order to evacuate the generated electricity (to be undertaken as a separate Basic Assessment process).
Undertake site rehabilitation	Commence with rehabilitation efforts once construction is completed in an area, and all construction equipment is removed.
Operation Phase	
Requirements	Duration will be approximately 20 years.
	Requirements for security and maintenance of the facility.
	Employment opportunities relating mainly to operation activities and maintenance. Up to 20 full-time employment opportunities will be available.
	Current land-use activities, i.e. farming activities, being undertaken within the project site can continue during the operation of the Energy Facility.
Activities to be undertaken	
Operation and Maintenance	Full time security, maintenance and control room staff.
	Energy Facility will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities.

	Energy Facility to be subject to periodic maintenance and inspection.
	Disposal of waste products (e.g. oil) in accordance with relevant waste management legislation.
	Areas which were disturbed during the construction phase to be utilised should a laydown area be required during operation.
Decommissioning Phase	
Requirements	Decommissioning of the Facility infrastructure at the end of its economic life.
	Potential for repowering of the facility, depending on the condition of the facility at the time.
	AAExpected lifespan of approximately 20 years (with maintenance) before decommissioning is required.
	Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	
Site preparation	Confirming the integrity of site access to accommodate the required equipment
	Preparation of the site
	Mobilisation of decommissioning equipment.
Disassemble and remove Batteries	Components to be reused, recycled, or disposed of in accordance with regulatory requirements.
	All parts that can be recycled/reused will be.
	Concrete will be removed to a depth of ~1m and rehabilitated.
	Cables will be excavated and removed, as may be required.
Components to be disposed of or recycled.	Batteries

4 ENVIRONMENTAL COMPLIANCE

4.1 Compliance with the EMPr

The Contractor/s is/are deemed not to have complied with the EMPr if:

- Within the boundaries of the site, site extensions and access roads there is evidence of contravention of clauses;
- If environmental damage ensues due to negligence;
- The contractor fails to comply with corrective or other instructions issued by the ECO or Authorities within a specified time;
- The Contractor fails to respond adequately to complaints from the public; and
- Contravention of or deviation from any condition stipulated in the EA.

The Holder of the EA is deemed not to have complied with the EMPr if:

- Within the construction footprint there is evidence of contravention of clauses;
- If environmental damage ensues due to negligence or failure to implement conditions of the EMPr;
- They fail to respond adequately to complaints from the public; and

- Contravention of or deviation from any condition stipulated in the EA.

4.1.1 Environmental Monitoring

A monitoring programme will be implemented for the duration of the lifecycle of proposed development. This programme will include:

- Monthly Audits During the Construction Phase
- According to the EMPr, EA and permit conditions which will be conducted by the ECO. These audits can be conducted randomly and do not require prior arrangement with the project manager.
- Compilation of an audit report with a rating of the compliance with the EMPr. This report will be submitted to the relevant authorities.
- Audits conducted during the Operational Phase
- Undertaken by the ECO.

The ECO must keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage must be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage should be directed to the ECO for appraisal. A register must be kept of all complaints from the landowners and/or community. All complaints / claims must be handled immediately to ensure timeous rectification / payment by the responsible party.

The EMPr will be made binding on all contractors operating on the site and must be included within the Contractual Clauses. Those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventative measures to reduce or prevent further pollution and/or environmental damage (the polluter pays principle).

4.1.2 Non-Conformance Report (NCR)

A NCR will be issued to the Contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This will be issued to the Contractor in writing. Preceding the issuing of the NCR, the Contractor will be presented with an opportunity to rectify the outstanding issue in a timely manner.

Preceding requirements to the submitting of the NCR will entail an issue that has been highlighted to the Contractor in the audits for corrective action. Should this issue not be corrected or completed to the satisfaction of the Holder of the EA and ECO, the issue is escalated to an NCR.

Should the ECO assess an incident / issue and find it to be significant (e.g. non-repairable damage upon the environment), it will be reported to the DEFF and immediately escalated to the level of an NCR. This will be done in consultation with the Holder of the EA. The following information should be recorded in the NCR:

- Details of non-conformance;
- Any plant or equipment involved;
- Any chemicals or hazardous substances involved;
- Work procedures not followed;
- Any other physical aspects;

- Nature of the risk;
- Actions agreed to by all parties following consultation that should adequately address the identified non-conformance. This may take the form of specific control measures and should take the hierarchy of controls into account. This must accompany the NCR for filing purposes;
- The agreed timeframe by which the Contractor should have implemented the actions documented in the NCR; and
- The ECO should verify that the agreed actions have taken place on or soon after the agreed completion date. Where the actions are complete, the ECO and Contractor should sign the Close Out portion of the Non-Conformance Form and file it with the contract documentation.

4.1.3 Environmental Emergency Response

The Contractor's environmental emergency procedures must ensure that there will be an appropriate response to unexpected or accidental actions or incidents that could cause environmental impacts. Such incidents may include but are not limited to:

- Accidental discharges to water (i.e. into a water resource) and land;
- Accidental spillage of hazardous substances (e.g. oil, petrol, and diesel);
- Accidental toxic emissions into the air;
- Specific environmental and ecosystem effects from accidental releases or incidents;

The Environmental Emergency Response Plan is separate to the Health and Safety Plan as it is aimed at responding to environmental incidents and must ensure and include the following:

- Construction employees must be adequately trained in terms of incidents and emergency situations;
- Details of the organisation (manpower) and responsibilities, accountability and liability of personnel;
- A list of key personnel and contact numbers;
- Details of emergency services (e.g. the fire department, spill cleanup services) must be listed;
- Internal and external communication plans, including prescribed reporting procedures;
- Actions to be taken in the event of different types of emergencies;
- Incident recording, progress reporting and remediation measures to be implemented; and
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.

The Contractor(s) will comply with the environmental emergency preparedness and incident and accident-reporting requirements, as required by the Occupational Health and Safety Act (Act No. 85 of 1993), the National Environmental Management Act (Act No. 107 of 1998), the National Water Act (Act No. 36 of 1998), and/or any other relevant legislation.

4.1.4 Non-compliance

Non-conformance will be issued to the Contractor for incidents of non-compliance. The Contractor (through the Environmental Officer) must also take the necessary steps (e.g. training) to prevent a recurrence of the infringement. The Contractor is also advised that the imposition of non-conformance does not replace any legal proceedings the authorities, landowners and/or members of the public may institute against the Contractor. The Contractor must be required to make good any damage caused as a result of the

infringement at his own expense. A preliminary list of infringements for which non-conformance will be imposed is as follows:

- Using areas outside the working areas without permission / accessing “no-go areas”;
- Clearing and/or leveling area outside of the working areas;
- Littering on the site and surrounds;
- Burying / burning waste on site and surrounds;
- The undertaking of informal ablutions
- Making fires on site;
- Spillage onto the ground or water bodies of oil, diesel, or any other potential pollutants;
- Picking/damaging plant material, especially that from the residual areas of natural bush on the site;
- Damaging/killing wild or domestic animals/birds;
- Discharging effluent and/or storm water onto the ground or into surface water;
- Repeated contravention of the specification or failure to comply with instruction;
- Mixing cement directly on soil or bare ground outside designated batching plant; and
- Keeping animals as pets on site.

The Senior Site Supervisor, on recommendation from the ECO, may also order the Contractor to suspend part or all the works if the Contractor repeatedly causes damage to the environment by not adhering to the EMPr (i.e. more than 3 cases of infringements). The suspension will be enforced until such time as the offending actions, procedure or equipment is corrected. No extension of time will be granted for such delays and all costs will be borne by the Contractor.

Penalty Fines

Where environmental damage is caused or a pollution incident, and/or failure to comply with any of the environmental specifications contained in the EMPr, the Contractor shall be liable to pay a penalty fine. The following transgressions should be penalised:

- Hazardous chemical / oil spill;
- Damage to sensitive environments;
- Damage to cultural and historical sites;
- Unauthorised removal / damage to indigenous trees and other vegetation, particularly in identified sensitive areas;
- Uncontrolled / unmanaged erosion;
- Unauthorised blasting activities; and
- Violation of environmental authorisation conditions.

Spot Fines

These activities, along with the appropriate guidelines to determining fines, shall be agreed to by Droogfontein 3 Solar PV Energy Facility, the Project Manager and Contractor, and will be included within the final EMPr. In addition to penalties, the Project Manager has the power to remove from site any person who is in contravention of the EMPr, and if necessary, the engineer can suspend part of or all of the works, as required.

The ESO and ECO shall be authorised to impose spot fines for any of the transgressions detailed below:

- Littering on site;
- Lighting of illegal fires on site;

- Any persons, vehicles or equipment related to the contractor's operations found within the designated 'no-go' areas (especially for significant cultural resources such as nearby graves etc.);
- Creating dust or noise;
- Possession or use of intoxicating substances or weapons on site;
- Trapping, hunting or trading of fauna and / or plants on site;
- Any vehicles being driven in excess of designated speed limits;
- Unauthorised removal and/or damage to fauna, flora or cultural or heritage objects on site; and
- Urination and defecation anywhere other than using the toilet facilities that have been provided.

These activities, along with the appropriate guidelines to determining the fines, shall be agreed to by Droogfontein 3 Solar PV Energy Facility, the Project Manager and the Contractor. Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the environmental specifications and or legal obligations. Droogfontein 3 Solar PV Energy Facility will inform the contractor of the contravention and the amount of the fine.

4.1.5 Training and Awareness

The Main Contractor is to take responsibility for the management of their staff and subcontractors on the project site during the construction and decommissioning phase and supervise them closely at all times. The onus is on the Contractor to make sure that all their staff and subcontractors fully comprehend the contents of the EMPr. The Contractor must organise environmental awareness training programmes, which should, be targeted at the two (2) levels of employment: management and labour.

4.1.6 Training of Construction Workers

The construction workers must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must be informed of how to recognise historical / archaeological artefacts that may be uncovered. They must also be appraised of the EMPr's requirements. Environmental awareness training programmes need to be formulated for these levels and must comprise:

- A record of all names, positions and duties of staff to be trained;
- A framework for the training programmes;
- A summarised version of the training course(s); and
- An agenda for the delivery of the training courses.

Such programmes will set out the training requirements, which need to be conducted prior to any construction works occurring and will include:

- Acceptable behaviour with regard to flora and fauna;
- Management and minimising of waste, including waste separation;
- Maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants, cement, mortar and other chemicals;
- Responsible handling of chemicals and spills;
- Environmental emergency procedures and incident reporting; and
- General code of conduct towards I&APs.

The ECO may be requested to provide additional training (in a first language) on-site regarding environmental aspects that are unclear to the construction personnel. A translator may be required and requested to assist in this additional training. The cost for the translator will be borne by the Contractor.

4.1.7 Contractor Performance

The Main Contractor must ensure that the conditions of the EMPr are adhered to. Should the Main Contractor require clarity on any aspect of the EMPr, the Main Contractor must contact the ECO for advice.

5 PROJECT RESPONSIBILITIES

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Holder of the EA; Project Manager (PM); Contractor Project Manager (CPM), Main Contractor (MC), Safety, Health and Environment Quality Representative (SHEQ); Environmental Control Officer (ECO) and Community Liaison Officer (CLO) for the construction phase of this BESS are as detailed below. **Figure 3** below provides an organogram indicating the organizational structure for the implementation of the EMPr.

Although the exact terminology of the respective roles may differ, the structure below outlines the intended hierarchy in terms of reporting to ensure successful implementation of the EMPr. Similar reporting and responsibility protocols or improved structures are also allowed.

Basic Organogram:

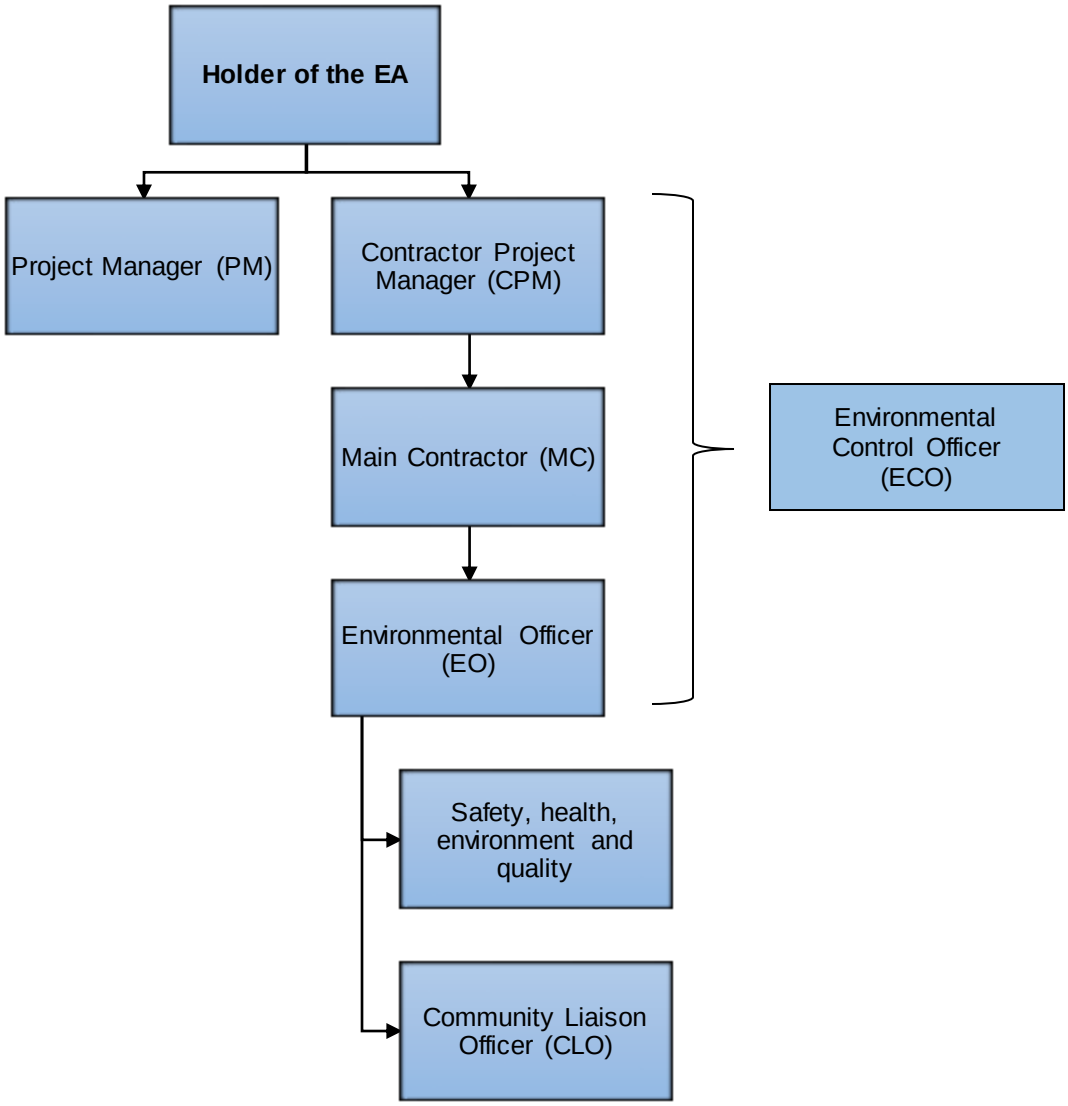

Figure 3: Organogram indicating the organisational structure

Holder of the EA will:

- Ensure all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these;
- Ensure that South Africa Mainstream Droogfontein PV 3 (Pty) Ltd and its Contractor(s) are made aware of all stipulations within the EMPr;
- Ensure that the EMPr is correctly implemented throughout the project by means of site inspections and meetings. This must be documented as part of the site meeting minutes;
- Be fully conversant with the BA for the project, the EMPr, the conditions of the EA (once issued), and all relevant environmental legislation; and
- Be fully knowledgeable with the contents of all relevant licences and permits.

Project Manager (PM) will:

- Be fully knowledgeable with the contents of the BA and risk management;

- Be fully knowledgeable with the contents and conditions of the EA (once issued);
- Be fully knowledgeable with the contents of the EMPr;
- Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these;
- Have the overall responsibility of the EMPr and its implementation;
- Conduct audits to ensure compliance to the EMPr;
- Ensure there is communication with the Contractors, the ECO, and relevant discipline engineers on matters concerning the environment;
- Be fully knowledgeable with the contents of all relevant licences and permits;
- Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site; and
- Confine activities to the demarcated construction site.

An independent ECO must be appointed by the project developer prior to the commencement of any authorised activities and will be responsible for monitoring, reviewing and verifying compliance by the EPC Contractor with the environmental specifications of the EMPr and the conditions of the EA. Accordingly, the ECO will:

- Be fully knowledgeable with the contents with the BA, conditions of the EA (once issued), and contents of the EMPr;
- Be fully knowledgeable of all relevant environmental legislation, licenses and permits issued to the site;
- Ensure that the contents of this document are communicated to the Contractor site staff and that the Site Manager and Contractor are constantly made aware of the contents through discussion;
- Ensure that the compliance of the EMPr, EA and the legislation is monitored through regular and comprehensive inspection of the site and surrounding areas;
- Ensure that if the EMPr, EA and/or the legislation conditions, regulations or specifications are not followed then appropriate measures are undertaken to address any non-compliances (for example an ECO may cease construction or an activity to prevent a non-compliance from continuing);
- Monitoring and verification must be implemented to ensure that environmental impacts are kept to a minimum, as far as possible;
- Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements;
- Ensure that activities on site comply with all relevant environmental legislation;
- Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMPr;
- Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO;
- Ensure that the compilation of progress reports for submission to the Holder of the EA, with input from the Site Manager, takes place on a regular basis, including a final post-construction audit;
- Ensure that there is communication with the Site Manager regarding the monitoring of the site;
- Ensure that any non-compliance or remedial measures that need to be applied are reported; and
- Submit independent reports to the DEFF and other regulating authorities regarding compliance with the requirements of the EMPr, EA and other environmental permits.

The ECO must be present for the site preparation and initial clearing activities to ensure the correct demarcation of no-go areas, to facilitate environmental induction with construction staff and supervise any flora relocation and faunal rescue activities that may need to take place during the site clearing (i.e. during site establishment, and excavation of foundations). The developer should appoint a designated

Environmental Officer (EO) to be present on-site to deal with any environmental issues as they arise. The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site handed over for operation.

Contractors and Service Providers: It is important that contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The contractor's obligations in this regard include the following:

- Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment;
- A copy of the EMPr must be easily accessible to all on-site staff members;
- Employees must be familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the Energy Facility;
- Prior to commencing any site works, all employees and sub-contractors must have attended an environmental awareness training course which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented; and
- Staff will be informed of environmental issues as deemed necessary by the ECO.

All contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

- Ensuring adherence to the environmental management specifications;
- Ensuring that Method Statements are submitted to the Site Manager (and ECO) for approval before any work is undertaken;
- Any lack of adherence to the above will be considered as non-compliance to the specifications of the EMPr;
- Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to;
- Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting;
- Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO;
- Ensuring that a register of all public complaints is maintained; and
- Ensuring that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute towards the successful implementation of the EMPr (i.e. ensure their staff are appropriately trained as to the environmental obligations)

The EO must be appointed by the Main Contractor and is responsible for managing the daily onsite implementation of the EMPr, and for the compilation of weekly environmental monitoring reports. In addition, the EO must act as liaison and advisor on all environmental and related issues, seek advice from the ECO when necessary, and ensure that any complaints received from I&APs are duly processed and addressed and that conflicts are resolved in an acceptable manner and timely manner. The EO must be a full time dedicated member of the Main Contractor's team and must be approved by the Holder of the EA.

5.1 Responsible Parties and Auditing Process

Table 8: Responsible Parties and Auditing Process

TITLE	PARTY	ROLE DURING CONSTRUCTION	ROLE DURING OPERATION	ROLE DURING DECOMMISSIONING
Holder of the EA	South Africa Mainstream Droogfontein PV 3 (Pty) Ltd	Assume ultimate responsibility	Assume ultimate responsibility	Assume ultimate responsibility
Project Manager	To be appointed by Holder of the EA	Construction management	N/A	Decommissioning management
Contractor's Project Manager	To be appointed by Holder of the EA	Project management	N/A	Project management of decommissioning
Main Contractor/s	There will be multiple contracts placed and managed by the Contractor's Project Manager for the construction phase. These may cover civil earthworks and concrete, structural mechanical and electrical / instrumentation. Then there could also be the construction camp management contract.	Main Contractor will undertake day to day construction activities covering aspects such as civil earthworks and concrete, structural mechanical and electrical / instrumentation.	O&M	Main Contractor will undertake day to day decommissioning activities.
Environmental Officer	To be appointed by Main Contractors	Day to day environmental responsibility, point of contact for ECO	N/A	Day to day environmental responsibility, point of contact for ECO
Environmental Control Officer	To be appointed by Holder of the EA	Monthly audits	Annual audits	Day to day environmental responsibility, point of contact for ECO

Unless otherwise stated, the EMPr will be adhered to as follows:

- The EO will be the responsible party for all daily compliance of this EMPr during the construction phase;
- The monitoring party will be the ECO;
- Method of record keeping will be monthly audits undertaken by the ECO; and
- Audit Technique will be the review of records and documentation (including EMPr / EA / permits) that will be kept on site by the EO and/or site inspections.

The Holder of the EA will bear ultimate responsibility during the construction, operational and decommissioning phase.

6 MANAGEMENT PROGRAMME

6.1 Planning and Design Phase

- Makes sure that the design of the Energy Facility responds to the identified environmental constraints and opportunities.
- Makes sure that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- Makes sure that adequate regard has been taken of identified environmental sensitivities, as well as any landowner and community concerns and that these are appropriately addressed through design and planning (where applicable).
- Permits construction activities to be undertaken without significant disruption to other land uses and activities in the area.
- Makes sure that the best environmental options are selected for the Energy Facility.
- The EMPr specifies mitigation measures for the following environmental aspects:
    - Site Preparation
    - Consultation
    - Site clearing

6.1.1 Site Preparation

This section deals with the preparation of the site and actions that need to be implemented before construction commences.

Table 9: Site preparation

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Site preparation: Failure to appoint construction team and suitable manager	1. Carefully plan to minimize the construction period and avoid construction delays. 2. Appoint an Environmental Control Officer (ECO) and Environmental Liaison Officer (ELO). The ELO is appointed on the contractor's behalf while the ECO is appointed on the Holder of the Environmental Authorisation's (EA's) behalf. 3. The Contractor must draw up method statements for relevant construction activities. The ECO must approve all of the method statements before they become operational.	Holder of the EA	Avoid construction delays. Ensure the EMPr is adhered to.	Once-off

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Site preparation: Site demarcation and compliance	4. Increase permeability of the fences to medium-to-small wildlife and wildlife-friendly designs. This will allow for wildlife to either jump over or crawl under the fence without causing harm to the animal. Smooth wire, instead of barbed wire should be used to avoid damage to the animal. Dimensions should allow for small to medium sized mammals and reptiles to pass underneath without causing harm. 5. The contractor and ECO must ensure compliance with conditions described in the EA. 6. Records of compliance / non-compliance with the conditions of the authorisation must be kept and be available on request. 7. Records of all environmental incidents must be maintained and a copy of these records be made available to provincial department on request throughout the project execution. 8. All waste must ultimately be disposed at registered landfill sites registered to receive the type of waste generate (general vs hazardous waste). 9. All waybills and disposal slips (e.g. safe disposal certificates, waste manifests) must be retained for a minimum period of five (5) years for the disposal activities associated with the construction and decommissioning of the proposed facility, per regulation 8(1) of the NEM:WA, 2008 Waste Classification and Management Regulations published in GN No. R. 634 of 23 August 2013. 10. Where new water course crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion	Holder of the EA	Ensure safety of the public and prevent loss/ damage equipment. Ensure the conditions of the EA are adhered to. Compliance to all legislative requirements.	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	(erosion protection) as well minimise the loss of riparian vegetation (reduce footprint as much as possible).			
Site preparation: Labour	11. Unskilled labourers must be drawn from the local market and where possible use must be made of local semi-skilled and skilled personnel where possible.	Holder of the EA	Fair employment practices in place Maintain a locals first recruitment policy as far as possible, reduced social impact from development	Ongoing
Site preparation: Training of site staff	12. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts. 13. In the event of a significant spill or leak of hazardous substances (e.g. petrol and diesel), such incident(s) must be reported to all relevant authorities, including the Directorate: Pollution and Chemicals Management of the NC DENC, in accordance with section 30(1)(c) of the NEMA, 1998 pertaining to the control of incidents. 14. Project Manager must ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks. 15. Staff operating equipment (such as loaders, etc.) must be adequately trained and sensitised to any potential hazards associated with their tasks. 16. No operator must be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager.	Holder of the EA	All staff members are aware of the EMPr requirements relevant to them All waste managed according to approved Method Statement	ECO Induction: Once off Toolbox talks: Weekly

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	17. Staff must be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training. 18. Staff must be trained in the hazards and required precautionary measures for dealing with these substances 19. Spillage packs must be available at construction areas.			
Consultation	20. Provide a mechanism through which information could be exchanged between the Holder of the EA and stakeholders. 21. Identify relevant stakeholders and engage them at applicable stages of the construction process. 22. Inform the public about the proposed construction process. 23. Surrounding communities must be kept informed, through the identified and agreed consultation channels, of the commencement of construction. 24. Solicit views and concerns from the public and allow them to suggest mitigations and enhancement measures.	Holder of the EA	Clear communication channels established	At applicable stages through the project process

6.2 Construction Phase

- Makes sure that construction activities are properly managed in respect of environmental aspects and impacts.
- Makes sure construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, farming practices, traffic and road use, and effects on local residents.
- Minimises the impact on the indigenous natural vegetation, protected tree species, and habitats of ecological value.
- Minimises impacts on fauna using the site.
- Minimises the impact on heritage sites should they be uncovered.

6.2.1 Site Clearing

This section deals with site clearing and actions that need to be implemented before construction commences

Table 10: Site Clearing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Site Clearing	1. The area cleared must be as small as feasibly possible. 2. Site clearing must take place in a phased manner, as and when required. 3. Areas which are not to be constructed on within two (2) months must not be cleared to reduce erosion risks. 4. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 5. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site. 6. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent.	Holder of the EA	Site establishment undertaken in line with the requirement of the EMPr Pre-construction walk-through conducted, sensitive areas identified. Erosion plan implemented and hydrological measures in place. Appropriate stormwater structures incorporated in final design. Key sensitive areas avoided	Once off

6.2.2 Construction Camp

This section deals with construction camp and actions that need to be implemented during construction

Table 11: Construction Camp

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Construction Camp Site of construction camp	1. The Construction camp position and associated impact mitigation has been determined by the Environmental Authorisation for the authorised Droogfontein 3 Solar Photovoltaic (PV) Energy Facility (12/12/20/2024/1/1).	Holder of the EA	Ensure the conditions of the EA (12/12/20/2024/1/1) are adhered to. Compliance to all legislative requirements. Impacts avoided or managed as per specialist recommendations.	Once off

6.2.3 Documentation

This section deals with the preparation and storage of documents essential for the duration of the project.

Table 12: Site documentation

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Site documentation: Documents to be kept and updated on site for the duration of the contract	1. The following documents are to be kept in an Environmental File in the site camp: ▪ Final EMPr once approved by the DEFF; ▪ EA issued by the DEFF; ▪ Relevant permits; ▪ Environmental Policy of the Contractor; ▪ Environmental method statements compiled by the Contractor; ▪ Weekly environmental monitoring records;	Holder of the EA	All relevant documentation will be up to date and available for inspection by Key Stakeholders and the Public. Ensure the EA and EMPr is adhered to.	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	▪ Minutes and record of attendance of all environmental meetings; ▪ Environmental incident book; ▪ Communications register; ▪ Register of audits; ▪ Non-conformance reports; and ▪ Waste manifests.			
Site documentation: Method Statements for approval prior to commencement of construction	2. A method statement including the following information where applicable: ▪ The type of construction activity; ▪ Timing and location of the activity; ▪ Construction procedures; ▪ Materials and equipment to be used; ▪ Transportation of the equipment to and from site; ▪ How the equipment / material will be moved while on site; ▪ Location and extent of construction site office and storage areas; ▪ Identification of impacts that might result from the construction activity; ▪ Population impacts; ▪ Community / institutional arrangements; ▪ Conflicts between local residents and newcomers; ▪ Individual and family level impacts; ▪ Community infrastructure needs; ▪ Intrusion impacts; ▪ Methodology and/or specifications for impact prevention or containment and for environmental monitoring;	Holder of the EA Contractor will be accountable for all actions taken in non-compliance of approved method statements	Detailing the process of how particular activities will be carried out. Dangers and risks associated with certain activities are highlighted by the Contractor Contractor must keep all method statements and subsequent revisions on file, copies of which must be distributed to all relevant personnel for implementation. Ensure the EMPr is adhered to.	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	▪ Emergency / disaster incident and reaction procedures (required to be demonstrated); and ▪ Rehabilitation procedures and continued maintenance of the impacted environment. 3. A Method Statement is a document detailing how a particular process will be carried out. It must detail the possible dangers / risks associated with the particular part of the project and the methods of control to be established and to show how the work will be managed in a safe and environmentally responsible manner.			
Site documentation: Communications register / environmental complaints register	4. All complaints or communications that are received from I&APs or any other stakeholder must be recorded in a communications register, which must include the following information: ▪ Record the time and date of the complaint/communication; ▪ A detailed description of the complaint/communication; ▪ Action and resources used to correct the complaint; ▪ Photographic evidence of the complaint (where possible); ▪ A written response to the complainant indicating rectification of the complaint; and ▪ Information regarding the relevant authority that was contacted or notified in writing where applicable (person, time and date). 5. Complaints and communications must be brought to attention of the Holder of the EA, whereupon it must be investigated and a	Holder of the EA	All environmental incidents and community complaints are adequately dealt with. Ensure effective communication with the community and Key Stakeholders	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	response to the Complainant, I&APs or stakeholder must be given within ten (10) days. 6. Relevant authorities include: ▪ Department of Human Settlements Water and Sanitation (DHSWS) (e.g. for any incidents involving the contamination of water resources). ▪ Department of Environment, Fisheries and Forestry (DEFF) (e.g. for any significant incident of pollution of the soil and air). ▪ Department of Agriculture, Forestry and Fisheries (DAFF) (e.g. uses of appropriate herbicides for eradication of alien invasive species, and permits for trees of special concern). ▪ Department of Health (e.g. for incidents such as contamination of water resources, accidental spill of hazardous substances). ▪ Department of Transport (e.g. for the diversion of traffic due to construction activities). ▪ Department of Environmental Affairs and Development Planning (DEADP) ▪ Northern Cape Heritage Resources Authority.			
Site documentation: Photographic record for all phases of the project	7. Compile photographic record (dated) of all activities on site prior to start of construction related activities, during construction process and on completion of construction related works. This photographic record must include: ▪ A pre-construction site record ▪ Monthly environmental audit reports;	Holder of the EA	The state of the environment in pre-construction, construction, rehabilitation and operation phases are captured for effective documentation of the environment. To ensure EMPr is adhered to.	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	▪ Corrective action; ▪ Progress of environmental works; and ▪ Incidences of non-conformance.		All waste managed according to approved Method Statement	
Site documentation: Waste manifests	8. The Contractor must ensure that all solid (including any hazardous) waste removed from site is disposed of at a registered landfill site or nearby waste transfer station with capacity to accept the project generated waste. 9. Waste manifest must be kept on record for auditing purposes. All waybills and disposal slips (e.g. safe disposal certificates, waste manifests) must be retained for a minimum period of five (5) years for the disposal activities associated with the construction and decommissioning of the proposed facility.	Holder of the EA	All waste is disposed of in the correct manner and accounted for. To ensure EMPr is adhered to.	Ongoing
Site documentation: Good housekeeping	10. Contractor must practice good housekeeping. This must eliminate disputes about responsibility, facilitate efficient and timeous running of the project. Over and above practicing accepted construction methods in accordance with SANS 10120, this must include measures to preserve the environment inside the work area. 11. Records of such actions taken to ensure the maintenance and management of housekeeping must be recorded. 12. Contractor must record and report upon environmental management measures undertaken to mitigate assessed impacts upon the environment.	Holder of the EA	All waste is disposed of in the correct manner and accounted for. Housekeeping is attended to timeously. To ensure EMPr is adhered to.	Ongoing
Site documentation:	10. Contractor must implement environmental management in a reasonable manner and	Holder of the EA	Appointment of a responsible EO to implement the EMPr, EA and	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Management and control	should such management not prove effective, must implement measures to satisfaction of the Holder of the EA. Appropriate measures must include: ▪ Appointment of necessary resources to monitor and manage environmental requirements; ▪ Implement aspect-specific method statements to deal with emergency situations; ▪ Provision of adequate emergency response equipment to mitigate and manage an incident or emergency; and ▪ Provision of specific training related to implementation of environmental management requirements. ▪ The Contractor must maintain detailed records of parameters monitored. These detailed records must demonstrate the effectiveness of the management actions implemented to mitigate potential impacts. The Contractor must submit a monthly database / report of management works implemented to the Holder of the EA, as part of the Contractors monthly report.		Method Statements on behalf of the Contractor.	
Site documentation: Monitoring	11. Contractor must submit Environmental Monitoring Method Statement which details scope, nature, process, schedule, and templates for environmental monitoring. 12. Monitoring results must be used to determine effectiveness of management programme.	Holder of the EA	Effective implementation of the EMPr and monitoring of the environment by the Contractor. EO to provide Main Contractor with brief weekly environmental monitoring report covering onsite	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	13. All complaints, compliments or other comments relating to environmental management parameters must be recorded in site issues register of Contractor for inclusion in project issues register held by Holder of EA. 14. Contractor must monitor and maintain the following on an on-going basis: ▪ Re-growth of alien invasive vegetation; ▪ Validity of the pest control officer certificate; ▪ Fire break requirements associated to construction related activities; ▪ Stormwater systems; ▪ Topsoil and backfill volumes; ▪ Access road condition; ▪ Dust generated from stockpiles; ▪ Noise; ▪ Water quality; ▪ Erosion prevention; and ▪ Landscaping requirements for rehabilitation. 15. The Contractor must maintain detailed records of parameters monitored. These detailed records must demonstrate the effectiveness of the management actions implemented to mitigate potential impacts. 16. Contractor must submit monthly database / report of management works implemented to Holder of the EA, as part of Contractors monthly report 17. Daily and weekly reports must detail observations and information relating to		events which occurred during past week. Will highlight key performance areas and provide feedback on corrective and preventive actions taken. Weekly reports submitted by the Contractor's Manager prior to submission to Holder of EA for monthly reporting.	

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	requested management actions and their effectiveness. 18. Monitoring results and associated required management and mitigation actions for coming monitoring period must be presented in the monitoring section of the Contractors monthly report. 19. Contractor must submit a monthly database of *inter alia* the following works to the Holder of the EA. This database must include as a minimum: ▪ Extent of alien invasive clearing operations; ▪ Volumes of herbicide used on the project; ▪ Stockpile volumes of chipped material, topsoil, fertile soil and subsoil; ▪ Volume of recyclable waste removed from site; ▪ Water volumes recycled and used for dust suppression; and ▪ Maintenance of chemical toilets. 20. All complaints, compliments or other comments relating to construction related works must be recorded by Contractor in communications register of receiving party for inclusion in project issues register. 21. Site clearance monitoring results and associated required management and mitigation actions for the coming monitoring period must be presented in the monitoring section of Contractors monthly report. 22. Weekly reports must detail observations and information relating to requested management actions and their effectiveness.			

6.2.4 Environmental Education and Training

This section deals with the environmental training of construction employees.

Table 13: Environmental Education and Training

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Environmental education and training: Environmental training	1. The Holder of the EA must appoint an ECO prior to construction 2. Ensure that all site personnel have a basic level of environmental awareness training. The ECO will be responsible for the training and topics covered must include: • What is meant by "Environment"; • Why the environment needs to be protected and conserved; • How construction activities can impact on the environment; • What can be done to mitigate against such impacts; • Awareness of emergency and spills response provisions; • Social responsibility during construction e.g. being considerate to local residents; and • Specific mitigation measures stipulated in the EMPr and EA. 3. Environmental awareness training for all construction staff must be undertaken by the ECO prior to construction starting. Translators are to be used where necessary. The topics covered must include, but not be limited to the following:	Holder of the EA	All staff members are aware of the EMPr requirements relevant to them.	ECO Induction: Once off Toolbox talks: Weekly

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	• Use of the appropriate fire-fighting equipment; • The need for a "clean site" policy; • The prevention of accidental spillage of hazardous chemicals and oil; • Pollution of water resources (both surface and groundwater); • Air pollution and litter control; • The need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources; and • General safety. 4. Training of new staff that did not receive the initial training is the responsibility of the ECO. 5. Staff operating equipment (such as cranes, etc.) must be adequately trained and sensitized to any potential hazards associated with their tasks. 6. No operator must be permitted to operate critical mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager.			
Environmental education and training: Monitoring of environmental training	7. The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed. If necessary, the ECO and / or a translator must be called to the site to further explain aspects of environmental or social behaviour that are unclear. Toolbox talks are required	Holder of the EA	Thorough induction to site.	ECO Induction: Once off Toolbox talks: Weekly

6.2.5 Erosion Control

This section deals with erosion issues and actions that need to be implemented during construction

Table 14: Erosion Control

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Erosion Control	1. Wind screening and storm water control must be undertaken to prevent soil loss from the site, where applicable. 2. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion, if any. 3. All erosion control mechanisms need to be regularly maintained. 4. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. 5. Retention of vegetation where possible to avoid soil erosion 6. Vegetation clearance must be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. 7. Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed. 8. No impediment to the natural water flow other than approved erosion control works is permitted. 9. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion.	Holder of the EA	Erosion plan implemented and hydrological measures in place. Erosion minimised and due care illustrated throughout project life cycle Appropriate stormwater structures incorporated in final design.	Weekly inspections

6.2.6 Water Use and Quality and Aquatic Ecology

This section deals with water use and quality issues and actions that need to be implemented during construction

Table 15: Water Use and Quality and aquatic ecology

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Water Use and Quality: Water Use	1. Develop a sustainable water supply management plan to minimize the impact to natural systems by managing water use, avoiding depletion of aquifers and minimizing impacts to water users. 2. Water must be reused, recycled or treated where possible. 3. Consultation with key stakeholders to understand any conflicting water use demands and the community's dependency on water resources and conservation requirements within the area.	Holder of the EA	Compliance to all legislative requirements. Water Management Plan	Weekly
Water Use and Quality: Water Quality	4. The quality and quantity of effluent streams discharged into the environment including storm water must be managed and treated to meet applicable effluent discharge guidelines. 5. Efficient oil and grease traps or sumps must be installed and maintained at refuelling facilities, workshops, fuel storage depots, and containment areas and spill kits must be available with emergency response plans. 6. Refuelling, handling of hydrocarbon products or maintenance and servicing of heavy earthmoving vehicles must not take place over within 100m of any on-site watercourses. All vehicle maintenance or refuelling must be done off-site, or alternatively, in a designated (hard or impermeable surface) area on-site.	Holder of the EA	Storm Water Management Plan implemented. Waste Management Plan Implemented	Weekly

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Water Use and Quality: Storm Water	7. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants. 8. Temporary cut off drains and berms must be required to capture storm water and promote infiltration. 9. Promote a water saving mind set with construction workers in order to reduce water wastage. 10. New storm water systems must be developed strictly in accordance with engineers' specifications in order to ensure efficiency. 11. Hazardous substances (fuel) must be stored at least 100m from any water bodies on site to avoid pollution. 12. The installation of the storm water system must take place as soon as possible to attenuate storm water from the construction phase as well as the operation phase. 13. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water pathways over the site. i.e. these materials must not be placed in storm water channels, drainage lines or rivers. 14. There must be periodic checking of the site's drainage system to ensure that the water flow is unobstructed. 15. If a batching plant is necessary, run-off must be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas.	Holder of the EA	Storm Water Management Plan implemented.	Once off installation / weekly inspections
Water Use and Quality: Concrete Mixing	16. Concrete contaminated water must not enter soil or any natural drainage system as this disturbs the natural acidity of the soil and affects plant growth.	Holder of the EA	Batching plant managed according to approved Method Statement	Monthly inspections

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Water Use and Quality: Public areas	17. Food preparation areas must be provided with adequate washing facilities and food refuse must be stored in sealed refuse bins which must be removed from site on a regular basis. 18. The contractor must take steps to ensure that littering by construction workers does not occur and persons must be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines. 19. No washing or servicing of vehicles on site unless in abounded area and agreed to by the ECO.	Holder of the EA	All staff members are aware of the EMPr requirements relevant to them. Storm Water Management Plan implemented. Compliance to all legislative requirements. All waste managed according to approved Method Statement Vehicles repaired as per the approved Method Statement for vehicles management	Ongoing

6.2.7 Waste Management

This section deals with waste management issues and actions that need to be implemented during construction

Table 16: Waste Management

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Waste Management: Litter Management	1. Refuse bins must be placed at strategic locations to ensure that litter does not accumulate within the construction site. 2. The Contractor must supply waste collection bins where such are not available and all solid waste collected must be disposed of at registered/licensed landfill.	Holder of the EA	All waste managed according to approved Method Statement	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	3. A housekeeping team must be appointed to regularly maintain the litter and rubble situation on the construction site. 4. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling. 5. Littering by the employees of the Contractor must not be permitted under any circumstances. The ECO must monitor the neatness of the work sites as well as the Contractor campsite. 6. Skip waste containers must be maintained on site. These must be kept covered and arrangements made for them to be collected regularly. 7. Waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours. 8. Where a registered waste site is not available close to the construction site, the Contractor must provide a method statement with regard to waste management. 9. Certificates of disposal must be obtained by the Contractor and kept on file, if relevant. 10. All waybills and disposal slips (e.g. safe disposal certificates, waste manifests) must be retained for a minimum period of five (5) years for the disposal activities associated with the construction and decommissioning of the proposed facility, per regulation 8(1) of the NEM:WA, 2008 Waste Classification and Management Regulations published in GN No. R. 634 of 23 August 2013. 11. Under no circumstances will solid waste be burnt on site. 12. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.			

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	13. An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical. The contractor must ensure that its personnel are made aware of the health risks associated with any hazardous substances used, have been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training.			
Waste Management: Hazardous Waste	14. All hazardous waste materials, if present, must be carefully stored as advised by the ECO, and then disposed of off-site at a licensed landfill site, where practical. 15. Contaminants to be stored safely to avoid spillage. 16. Machinery must be properly maintained to keep oil leaks in check 17. All necessary precaution measures must be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills must immediately be cleaned up and all affected areas rehabilitated	Holder of the EA	All waste managed according to approved Method Statement	Ongoing
Waste Management: Remedial Actions	18. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site. 19. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site. 20. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil. 21. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material. 22. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure.	Holder of the EA	All waste managed according to approved Method Statement	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	23. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use. 24. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment and stored in adequate containers until appropriate disposal.			

6.2.8 Flora

This section deals with floral issues and actions that need to be implemented during construction

Table 17: Flora

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Flora: Existing Vegetation	1. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step. 2. Removal or disturbance of any TOPs, Red Data listed or Provincially protected species may only be done after obtaining permits from relevant authorities. 3. A DENC permit is required for animal and plant search-and-rescue. 4. Materials must not be delivered to the site prematurely if possible, which could result in additional areas being cleared or affected.	Holder of the EA	Ensure the EMPr is adhered to. Ensure the conditions of the EA are adhered to. All staff members are aware of the EMPr requirements relevant to them	Once-off issuing of permit Ongoing concern for species of conservation concern

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Flora: Rehabilitation	5. Natural areas outside of the project footprint impacted during construction must be rehabilitated with locally indigenous species typical of the representative botanical unit. Seeds from surrounding seed banks can be used for re-seeding. 6. Rehabilitation must take place in a phased approach as soon as possible. 7. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.	Holder of the EA	Plant Rehabilitation Implemented Impacts avoided or managed as per specialist recommendations.	Rehabilitate once phase is complete
Flora: Demarcation of construction and laydown areas	8. All plants outside of the construction footprint must be left undisturbed. Species of special concern must be clearly marked and recorded electronically. 9. The construction area must be well demarcated where this is viable and no construction activities must be allowed outside of this demarcated footprint 10. Vegetation removal must be phased in order to reduce impact of construction. 11. Strict and regular auditing of the construction process to ensure containment of the construction and laydown areas. 12. Soils must be kept free of petrochemical solutions that must be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.	Holder of the EA	Plant Rescue Plan Implemented Ecological Management Plan Impacts avoided or managed as per specialist recommendations.	Once off
Flora: Utilisation of resources	13. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.	Holder of the EA	Impacts avoided or managed as per specialist recommendations.	Once off
Flora:	14. Alien vegetation on the site will need to be controlled.	Holder of the EA	Alien Plant Management Plan Implemented	Monthly inspection

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Exotic Vegetation	15. The contractor must be responsible for implementing a programme of weed and exotic species control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.			
	SPECIFIC MITIGATION MEASURES			
	16. Compile a Rehabilitation Plan for all areas affected by construction, that fall outside the permanent infrastructure footprint. 17. Compile an Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas and provides a programme for long-term control. Undertake monitoring to evaluate whether further measures would be required to manage impacts. 18. Relevant permits must be obtained for specimens that will be lost. 19. A Plant Rescue Plan must be compiled to be approved by the appropriate authorities. Keep footprint as small as possible by selecting options that affect a smaller overall area of habitat. 20. As far as possible, locate infrastructure within areas that have been previously disturbed or in areas with lower sensitivity scores, taking the ecological sensitivity map into account. 21. Wherever technically possible, avoid sensitive features and habitats when locating infrastructure. 22. Cross streams and other linear features at right angles, where possible, and also near their end-points or where there are natural breaks in the feature of concern.		Impacts avoided or managed as per specialist recommendations. Plant Rescue Plan Implemented Ensure the conditions of the EA are adhered to. Compliance to all legislative requirements.	Continual monitoring

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	23. Apply mitigation measures according to assessment by Surface Water Specialist (assessment that informed the BA). 24. Where possible, access roads should be located along existing farm, access and district roads, even if these require upgrading. 25. No speeding on access roads – install speed control measures, such as speed humps, if necessary, and penalties for non-compliance. Excessive dust can be controlled by using appropriate dust-control measures. 26. Restrict impact to development footprint only and limit disturbance spreading into surrounding areas. 27. Ensure all possible steps are taken to limit erosion of surfaces, including proper management of storm-water runoff. 28. No additional clearing of vegetation should take place without a proper assessment of the environmental impacts and authorization from relevant authorities, unless for maintenance purposes, in which case all reasonable steps should be taken to limit damage to natural areas. 29. No driving of vehicles off-road outside of construction areas. 30. For any plants that are transplanted, annual monitoring should take place to assess survival. This should be undertaken for a period of three years after translocation and be undertaken by a qualified botanist. The monitoring programme must be designed prior to translocation of plants and			

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	should include control sites to evaluate mortality relative to wild populations.			

6.2.9 Fauna

This section deals with faunal issues and actions that need to be implemented during construction

Table 18: Fauna

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Fauna	1. No trapping or snaring of fauna on the construction site. 2. No faunal species are to be harmed by maintenance staff during any routine maintenance at the development. 3. No animals are to be kept as pets except those owned by the landowners. 4. Any trenches that are required for cabling etc., must not be left open for extended periods as fauna such as tortoises will fall in and become trapped. Any open trenches must be checked regularly for trapped fauna.	Holder of the EA	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to. Compliance to all legislative requirements	Ongoing

6.2.10 Soils and Geology

General guidelines for management of soils are provided in **Annexure D**.

This section deals with soils and geology issues and actions that need to be implemented during construction.

Table 19: Soils and Geology

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Soils and Geology: Topsoil	1. The contractor must, prior to the commencement of earthworks determine the average depth of topsoil (if any), and agree on this with the ECO. The full depth of topsoil must be stripped from areas affected by construction and related activities prior to the commencement of foundations. This must include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed surface areas. 2. Care must be taken not to mix topsoil and subsoil during stripping. 3. Should any topsoil become polluted the contractor must remove the polluted soil to the full depth of pollution and replace it at his own expense with clean topsoil. 4. Refuelling, handling of hydrocarbon products or maintenance and servicing of heavy earthmoving vehicles must not take place over bare soil. All vehicle maintenance or refuelling must be done off-site, or alternatively, in a designated (hard or impermeable surface) area on-site. 5. Removed polluted topsoil must be transported to a licensed landfill site. 6. The topsoil must be conserved on site in and around the pit area	Holder of the EA	Erosion plan implemented and hydrological measures in place All waste managed according to approved Method Statement Ensure the EMPr is adhered to.	Ongoing
Soils and Geology: Soil Stripping	7. No soil stripping must take place on areas within the site that the contractor does not require for construction works or areas of retained vegetation. 8. Construction vehicles must only be allowed to utilize existing tracks or pre-planned access routes.	Holder of the EA	Ensure the EMPr is adhered to.	Ongoing
Soils and Geology:	9. Stockpiles must not be situated such that they obstruct natural water pathways.	Holder of the EA	Erosion plan implemented and hydrological measures in place	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Soil Stockpiles	10. Stockpiles must not exceed 2m in height unless otherwise permitted by the Engineer. 11. If stockpiles are exposed to windy conditions or heavy rain, they must be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles must further be protected by the construction of berms or low brick walls around their bases. 12. Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding. 13. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage / leakage occurs must be recorded.			

6.2.11 Noise and Vibrations

This section deals with noise issues and actions that need to be implemented during construction.

Table 20: Noise and vibrations

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Noise and Vibrations	1. The construction phase must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development. 2. The construction crew must abide by the local by-laws (if applicable) regarding noise.	Holder of the EA	Noise and lighting managed according to approved Method Statement Ensure the EMPr is adhered to.	Monthly inspections

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	3. Ensure that noise as a component is included in the induction of employees and contractors, and how their activities and actions can impact on residents in the area (reverse alarms and reversing close to dwellings, driving fast past residential dwellings at night, maintenance of equipment). All contractors and employees must receive this induction. 4. Construction site yards, workshops, concrete batching plants, and other noisy fixed facilities must be located well away from noise sensitive areas. Once the proposed final layouts are made available by the contractor(s), the sites must be evaluated in detail and specific measures designed into the system. 5. Truck traffic must be routed away from noise sensitive areas, where possible. 6. Noisy operations must be combined so that they occur where possible at the same time. 7. Construction workers to wear necessary ear protection gear. 8. Noise from labourers must be controlled. 9. The contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour must be transported to and from the site by the contractor or his Sub-Contractors by the contractors own transport. 10. Implementation of enclosure and cladding of processing plants. 11. When working in very close proximity to potentially sensitive receptors, coordinate the working time with periods when the receptors are not at home where possible. An example			

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	would be to work within the 08:00 to 17:00 time-slot to minimize the significance of the impact because: 12. Where possible construction work must be undertaken during normal working hours (07H00 – 17H00), from Monday to Saturday; If agreements can be reached (in writing) with all the surrounding (within a 500m distance) potentially sensitive receptors, these working hours can be extended. 13. The Holder of the EA must investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000m from location where construction activities are taking place. 14. When any noise complaints are received, noise monitoring must be conducted at the complainant, followed by feedback regarding noise levels measured. 15. Reduce the noise impact during the construction phase by: ▪ Using the smallest/quietest equipment for the particular purpose. Ensuring that equipment is well-maintained and fitted with the correct and appropriate noise abatement measures.			

6.2.12 Heritage, Archaeological, Palaeontological and Cultural Landscape

This section deals with the impact that the new development has on potential archaeological artefacts on the site

Table 21: Heritage and Paleontology

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timimg
Heritage	1. The contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken. 2. Any discovered artefacts must not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits must be obtained from Northern Cape Heritage Resources Authority) should the proposed site affect any world heritage sites or if any heritage sites are to be destroyed or altered. 3. Should any archaeological sites / graves be uncovered during construction, their existence must be reported to the Holder of the EA and Contractor immediately.	Holder of the EA	Impacts to heritage resources managed and avoided as far as possible Chance Find Procedure Implemented	Once off at inductions
Paleontology	4. Monitor major excavations for fossil material by the ECO on an on-going basis during construction phase. 5. Significant fossil finds must be reported to Northern Cape Heritage Resources Authority for recording and sampling by a professional palaeontologist. 6. Significant chance find procedure must be followed: • When a chance find is made the person must instantly stop all work near the find. • The site must be secured to protect it from any additional damage • The finder of the fossil heritage must immediately report the find to his/her direct supervisor, according to the reporting protocols instituted by the Holder of the EA. The supervisor must in turn report the find to his/her manager and the ECO. The ECO must report the find to the relevant authorities and a relevant palaeontologist.	Holder of the EA	Chance Find Procedure Implemented	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timimg
	• The ECO must appoint a relevant palaeontologist to investigate and access the chance find and site. • Both ECO and palaeontologist must ensure that accurate records and documentation are kept. The documentation must start with the initial chance find report, including records of all actions taken, persons involved and contacted, comments received and findings. • These documents will be necessary to request authorizations and permits from the relevant Authorities to continue with the work on site • The reports and all other documents will be submitted to Northern Cape Heritage Resources Authority by the palaeontologist. • The report will include recommendations for additional specialist work if necessary, or request approval to continue with the development. • Once the required approvals have been issued, the development may carry on with the development. • The ECO will close off the chance find procedure and would be required to implement any requirements issued by the Authority and to add it to the operational management plan. • Demarcate heritage sites / find spots / colonial structures / grave sites identified during this study as no-go areas; • Demarcate and fence during construction, if construction activities area to happen within 100 meters from heritage sites / find spots / colonial structures / grave sites;			

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timimg
	• Monitor heritage sites / find spots / colonial structures / grave sites areas if construction is going to take place through them. • A management plan for the heritage resources must be compiled and approved for implementation during construction.			

6.2.13 Social Environment

This section deals with social environment and actions that need to be implemented during construction

Table 22: Social Environment

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Social Environment	1. All contact with the affected parties must be courteous at all times. The rights of the affected parties must be respected at all times. 2. A complaints register must be kept on site. Details of complaints must be incorporated into the audits as part of the monitoring process. This must be in carbon copy format, with numbered pages. Any missing pages must be accounted for by the Contractor. 3. Damage to infrastructure must not be tolerated and any damage must be rectified immediately by the Contractor. A record of all damage and remedial actions must be kept on site. 4. Care must be taken not to damage irrigation equipment, lines, channels and crops.	Holder of the EA	Clear communication channels maintained Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Ongoing

6.2.14 Construction Traffic and Access

This section deals with construction traffic and access and actions that need to be implemented during construction

Table 23: Construction Traffic and Access

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Construction Traffic and Access: Construction traffic	1. Construction routes and required access roads must be clearly defined. 2. A route study is to be undertaken as part of the final traffic transportation plan to confirm the most appropriate route to site. 3. Recommendations of the Stormwater Management Plan must be implemented. 4. All equipment moved onto site or off site during a project is subject to the legal requirements. 5. The Contractor must ensure that all the necessary precautions against damage to the environment and injury to persons are taken in the event of an accident. 6. Stagger component delivery to site. 7. Reduce the construction period. 8. Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase. 9. Access of all construction and material delivery vehicles must be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure. 10. Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance. 11. In cases where severe water restrictions are imposed, other measures like the use of wetting agents such as chemical stabilisation or "hydromulch", can be considered. 12. In situations where the use of water is necessitated, non-potable water sources are to be utilised.	Holder of the EA	A traffic management strategy developed and implemented throughout the construction and operation phases. Storm Water Management Plan implemented Ensure the EMPr is adhered to.	Ongoing
Construction Traffic and	13. The main routes on the site must be clearly signposted and printed delivery maps must be issued to all suppliers and Sub-Contractors.	Holder of the EA	A traffic management Strategy developed and Implemented	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Access: Access			throughout the construction and operation phases.	
Construction Traffic and Access: Road Maintenance	14. Where necessary suitable measures must be taken to rehabilitate damaged areas. 15. Contractors must ensure that access roads are maintained in good condition by attending to potholes, corrugations and storm water damages as soon as these develop. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have spilt.	Holder of the EA	A traffic management Strategy developed and Implemented throughout the construction and operation phases.	Ongoing
Construction Traffic and Access: General	16. The contractor must meet safety requirements under all circumstances. All equipment transported must be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used must be in place. 17. Care for the safety and security of community members crossing access roads must receive priority at all times. 18. 19. Management strategies for dust suppression to be implemented and dust generating activities to be suspended during periods of strong winds. 20. . 21. Limit the number of vehicles and trucks travelling to and from the construction site, where possible. 22. Unless there are water shortages, ensure that dust suppression techniques are implemented • on all access roads; • in all areas where vegetation clearing has taken place; • on all soil stockpiles.	Holder of the EA	A traffic management Strategy developed and Implemented throughout the construction and operation phases. Adhere to Health and Safety Regulations	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	23.			

6.2.15 Energy Use

This section deals with energy use and actions that need to be implemented during construction

Table 24: Energy Use

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Energy Use:	1. Energy saving lighting must be implemented across the board. 2. Minimal lighting, while maintaining health and safety regulations, must be kept on during the night operations. 3. Equipment not in use must be switched off and unplugged to save on unnecessary energy costs and carbon footprint.	Holder of the EA	Adhere to Health and Safety Regulations Noise and lighting managed according to approved Method Statement	Ongoing

6.2.16 Employment

This section deals with employment issues and actions that need to be implemented during construction

Table 25: Employment

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Employment: Labour	1. The use of labour intensive construction measures must be used where appropriate. 2. Training of labour to benefit individuals.	Holder of the EA	Fair employment practises in place	Ongoing
Employment: Recruitment Plan	3. The majority of unskilled labourers must be drawn from the local market and where possible use must be made of local semiskilled and skilled personnel. 4. Local suppliers to be used where possible. 5. The Project Manager must ensure that all staff working on the proposed project are in possession of a South African Identity Document or a relevant work permit. 6. Ensure adequate advertising in the project community areas, local papers for labour. Adverts are to be placed in each area where the public meetings were conducted namely, Sutherland. 7. Local community key stakeholders must be utilised to source labour where possible. 8. The recruitment process must be equitable and transparent. A concerted effort will be made to guard against nepotism and/or any form of favouritism during the process 9. A record of official complaints by employees is to be maintained 10. Where possible, subcontract to local construction companies 11. Consultation with local authorities is essential so as to manage job creation expectations and ensure that all eligible workers in the primary study area are informed of the opportunities. 12. To ensure that skills are adequately acquired, additional training programmes may need to be held	Holder of the EA	Maintain a "locals first" recruitment policy as far as possible, reduced social impact from development HIV/AIDS awareness educational program implemented	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	during the construction phase to prepare the identified community members to be employed at the next phase, i.e. operational. 13. Initiating the education campaign among the local community (in partnership with the community members already active in the area) focusing on alcohol abuse, drug abuse, HIV/AIDS, STDs, etc. prior to the start of construction and maintaining this campaign throughout the project's duration.			

6.2.17 Occupational Health and Safety

This section deals with health and safety and actions that need to be implemented during construction

Table 26: Occupational Health and Safety

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Occupational Health Safety: Worker Safety	1. Implementation of safety measures, work procedures and first aid must be implemented on site. This must include the provision of first aid facilities, and the training of a number of employees to carry out first aid procedures. 2. Workers must be thoroughly trained in using potentially dangerous equipment. 3. Contractors must ensure that all equipment is maintained in a safe operating condition. 4. A safety officer must be appointed.	Holder of the EA	Adhere to Health and safety Regulations Ensure the EMPr is adhered to.	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	5. A record of health and safety incidents must be kept on site. 6. Any health and safety incidents must be reported to the Project Manager immediately. 7. Workers have the right to refuse work in unsafe conditions. 8. Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers / local residents.			
Occupational Health Safety: Electrical Safety and Isolation	9. All sources of hazardous energy or hazardous substances must have written procedures for isolation, identifying how the system, plant or equipment can be made and kept safe.	Holder of the EA	Adhere to Health and Safety Regulations	Ongoing
Occupational Health Safety: Physical Hazards	10. Geotechnical safety - All structures must be planned, designed and operated such that the geotechnical risks are appropriately managed.	Holder of the EA	Adhere to Health and Safety Regulations	Ongoing
Occupational Health Safety: Machine and Equipment	11. Use must be made of reflective markings on structures, traffic junctions, and other areas with a potential for accidents. 12. Safety barriers must be installed in high risk locations.	Holder of the EA	Adhere to Health and Safety Regulations	Ongoing
Occupational Health Safety: Fitness for work	13. Shift management systems must minimize risk of fatigue. Establish alcohol and other drug policy for the operation.	Holder of the EA	Adhere to Health and Safety Regulations	Regular unscheduled inspections

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Occupational Health Safety: Protective Gear	14. Personal Protective Equipment (PPE) must be made available to all construction staff and must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn where necessary i.e. dust masks, ear plugs etc. 15. No person is to enter the site without the necessary PPE.	Holder of the EA	Adhere to Health and Safety Regulations	Ongoing
Occupational Health Safety: Construction equipment safety	16. All equipment used for construction must be in good working order with up to date maintenance records	Holder of the EA	Adhere to Health and Safety Regulations	Ongoing
Occupational Health Safety: Procedure in the event of a petrochemical spill	17. A spill kit needs to be kept on site to address any unforeseen spillages. 18. The individual responsible for or who discovers the petrochemical spill must report the incident to the Project Manager, Contractor or ECO. 19. The problem must be assessed and the necessary actions required will be undertaken. 20. The immediate response must be to contain the spill. 21. The source of the spill must be identified, controlled, treated or removed wherever possible.	Holder of the EA	All waste managed according to approved Method Statement	Ongoing
Occupational Health Safety: Safety of surrounding residents	22. Landowners within 1km must be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples of these are: • Blasting • Earthworks / earthmoving machinery on steep slopes above houses / infrastructure	Holder of the EA	Clear communication channels	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	• Risk to residence along haulage roads / access routes.			
Occupational Health Safety: Emergency evacuation plan	23. Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.	Holder of the EA	Adhere to Emergency Evacuation Plan	Once off
Occupational Health Safety: Maintenance	24. The PV facility and surrounding areas are to be regularly maintained. A maintenance schedule must be drawn up and records of all maintenance kept.	Holder of the EA		Ongoing

6.2.18 Security

This section deals with security and actions that need to be implemented during construction.

Table 27: Security

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Security	1. Site access must be controlled, with security staff stationed at access points during construction. 2. Labour must be transported to and from the site to discourage loitering in adjacent areas and a possible increase in crime or disturbance. 3. Unsocial activities such as consumption or illegal selling of alcohol, drug utilisation or selling and prostitution on site must be prohibited.	Holder of the EA	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	Disciplinary or criminal action must be taken against any persons found to be engaged in such activities. 4. Only pre-approved staff must be permitted to stay in the staff accommodation where staff accommodation is provided. 5. The construction camp site must be fenced, where necessary to prevent any loss or injury to persons during the construction phase. 6. No alcohol / drugs to be present on site. 7. No firearms allowed on site or in vehicles transporting staff to / from site (unless used by security personnel or landowners). 8. Construction staff is to make use of the facilities provided for them, as opposed to ad-hoc alternatives (e.g. fires for cooking, the use of surrounding bush as a toilet facility are forbidden). 9. Trespassing on private / commercial properties adjoining the site is forbidden.			

6.3 Operation Phase

- Makes sure that operation activities are properly managed in respect of environmental aspects and impacts.
- Activities must be undertaken with minimal disruption to other land uses in the area, in particular with regard to farming practices, traffic and road use, and effects on local residents.
- Minimises impacts on fauna.
- Conduct annual basis reviews of the EMPr to evaluate its effectiveness.
- Take appropriate action as a result of findings and recommendations in management reviews and audits.
- Develop and implement an Environmental Management System (EMS) for the BESS Facility and associated infrastructure, if possible to be combined with the overall site facility.
- Manage and report on the BESS Facility's environmental performance.
- Maintain a register of all known environmental impacts and manage the monitoring thereof.
- Conduct internal environmental audits and co-ordinate external environmental audits.
- Liaise with statutory bodies such as the National and Provincial departments of Environment, Forestry and Fisheries (DEFF and DENC) on environmental performance and other issues.
- Conduct environmental training and awareness for the employees who operate and maintain the BESS Facility.

- Compile environmental policies and procedures.
- Liaise with interested and affected parties on environmental issues of common concern.
- Track and control the lodging of any complaints regarding environmental matters.
- The EMPr specifies mitigation measures for the following environmental aspects:
    - Construction Site Decommissioning
    - Rehabilitation and Maintenance
    - Operation and Maintenance
    - Biodiversity
    - Aquatic Ecology
    - Agriculture
    - Visual Impact
    - Heritage
    - Social Environment
    - Health and Safety

6.3.1 Rehabilitation and Maintenance and Biodiversity

This section deals with the issues relating to rehabilitation after construction as well and therefore must be applied during rehabilitation.

Table 28: Rehabilitation and maintenance and Biodiversity

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Rehabilitation: Rehabilitation	1. A mixture of vegetation seed can be used provided the mixture is carefully selected to ensure the following: • Annual and perennial species are chosen. • Pioneer species are included. • All the species must not be edible. • Species chosen will grow in the area under natural conditions. • Root systems must have a binding effect on the soil. • The final product must not cause an ecological imbalance in the area. 2. All natural areas impacted during construction must be rehabilitated with locally indigenous species that were present on the site prior to construction. 3. Rehabilitation must take place in a phased approach as soon as possible. 4. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.	Holder of the EA	Ensure the EMPr is adhered to. Ensure the conditions of the EA are adhered to. All staff members are aware of the EMPr requirements relevant to them Plant Rescue Plan Implemented Ecological Management Plan Impacts avoided or managed as per specialist recommendations.	Monthly inspections for the first year after construction thereafter annually
Rehabilitation: Maintenance	5. The site need to be monitored every three (3) months for the first year to identify the emergence of alien species and any erosion concerns.	Holder of the EA	Alien Plant Management Plan Implemented	Three months
Biodiversity: Flora	6. Indigenous vegetation must be maintained and all exotics removed as they appear and disposed of appropriately. 7. Vegetative re-establishment must, as far as possible, make use of indigenous or locally occurring plant varieties within the servitude. 8. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas during and following rehabilitation.	Holder of the EA	Alien Plant Management Plan Implemented Plant Rehabilitation Implemented	Monthly inspections for the first year after construction thereafter annually

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	9. Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the new development as there are also likely to be prone to invasion problems. 10. Regular alien clearing must be conducted using the best-practice methods for the species concerned. The use of herbicides must be avoided as far as possible.			
Biodiversity: Fauna	11. No faunal species must be harmed by maintenance staff during any routine maintenance. 12. The collection, hunting or harvesting of any plants or animals at the site must be strictly forbidden by anyone except landowners or other individuals with the appropriate permits and permissions where required. 13. If any parts of the site need to be lit at night for security purposes, this must be done with downward-directed low-UV type lights (such as most LEDs) as far as possible, which do not attract insects. 14. All hazardous materials must be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site must be cleaned up in the appropriate manner as related to the nature of the spill. 15. All vehicles accessing the substation sites and servitude must adhere to a low speed limit (30-40km/h max) to avoid collisions with susceptible species such as snakes and tortoises. 16. If parts of the facility are to be fenced, no electrified strands must be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution as they do not move away when electrocuted but rather adopt defensive behaviour and	Holder of the EA	Ensure the EMPr is adhered to. Ensure the conditions of the EA are adhered to. All staff members are aware of the EMPr requirements relevant to them Noise and lighting managed according to approved Method Statement A traffic management Strategy developed and Implemented throughout	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	are killed by repeated shocks. Alternatively, the electrified strands must be placed on the inside of the fence and not the outside. 17. Erosion management at the site must take place according to the Erosion Management Plan and Rehabilitation Plan. 18. All roads and other hardened surfaces must have runoff control features which redirect water flow and dissipate any energy in the water which will pose an erosion risk. 19. All erosion problems observed must be rectified as soon as possible, using the appropriate erosion control structures and re-vegetation techniques. Any roads that will not be rehabilitated must have runoff control features which redirect water flow and dissipate any energy in the water which will pose an erosion risk. 20. All cleared areas must be re-vegetated with indigenous perennial shrubs and grasses from the local area. These can be cut when dry and placed on the cleared areas if natural recovery is slow. 21. There must be an integrated management plan for the development area during operation, which is beneficial to fauna and flora.		the construction and operation phases. Erosion plan implemented and hydrological measures in place Storm Water Management Plan implemented. Ecological Management Plan Implemented	

6.3.2 Operation and Maintenance

This section deals with the potential impacts that could result from the operation and maintenance of the BESS Facility.

Table 29: Operation and maintenance

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Operation and Maintenance: Maintenance	1. All applicable standards, legislation, policies and procedures must be adhered to during operation. 2. Regular ground inspection of the energy facilities must take place to monitor their status	Holder of the EA	Ensure the conditions of the EA are adhered to. Compliance to all legislative requirements	Monthly inspections
Rehabilitation: Public awareness	3. The emergency preparedness plan must be ready for implementation at all times should an emergency situation arise.	Holder of the EA	Adhere to Emergency Evacuation Plan	Ongoing

6.3.3 Aquatic Ecology

This section deals with the issues relating to surface water during operation

Table 30: Aquatic Ecology

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Aquatic Ecology	1. All stipulated mitigation measures are to be adhered to in order to minimise potential impacts to surface water resources.	Holder of the EA	Key sensitive areas avoided Impacts avoided or managed as per specialist recommendations.	Ongoing

6.3.4 Agriculture

This section deals with issues relating to agricultural potential and resources and actions that need to be implemented during operation

Table 31: Agriculture

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timimg
Agriculture: Erosion	1. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize the soil against erosion.	Holder of the EA	Plant Rehabilitation Implemented Erosion plan implemented	Ongoing
SPECIFIC MITIGATION MEASURES				
Agriculture: Erosion	2. Maintain the storm water run-off control system. Monitor erosion and remedy the storm water control system in the event of any erosion occurring. 3. Facilitate re-vegetation of denuded areas throughout the site	Holder of the EA	That existence of hard surfaces causes no erosion on or downstream of the site.	Bi-annual

6.3.5 Heritage, Archaeological, Palaeontological and Cultural Landscape

This section deals with the impact that the new development has on potential archaeological artefacts on the site

Table 32: Heritage

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Heritage, archaeology and cultural: Unidentified heritage structures, beyond the	1. The nature of heritage resources are such that they are non-renewable. The proper mitigation and documentation of these resources can however preserve the data for research. 2. Any heritage features of significance identified during the operational phase will require formal mitigation or where possible accommodate such resources.	Holder of the EA	Heritage Management Plan Implemented Cultural Management Plan	Once off

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
already surveyed portions of the property.	3. A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations. 4. A chance finds protocol must be developed that includes the process of work stoppage, site protection, evaluation and informing Northern Cape Heritage Resources Authority of such finds and a final process of mitigation implementation.			

6.3.6 Social Environment

This section deals with social environment and actions that need to be implemented during operation

Table 33: Social Environment

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Social Environment	1. All contact with the affected parties must be courteous at all times. The rights of the affected parties must be respected at all times. 2. Ensure that the expectations (rules) of the farmers regarding access to farms are understood and effectively adhered to. 3. Installation of an electronic number plate reader at the entrance to the PV Facility. 4. Establish a local skills desk to identify the skills set of the local residents available for the operation phase of the PV. 5. Up-skill construction workers with aptitude to maintain the PV facility.	Holder of the EA	Clear communication channels maintained	Ongoing

6.3.7 Health and Safety

This section deals with the issues relating to health and safety during operation

Table 34: Health and Safety

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Health and Safety: Emergency evacuation plan	1. Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency. 2. Develop and implement an occupational health and safety plan. 3. Train all onsite personnel handling chemical or hazardous substances in the use of such substances and the environmental, health and safety consequences of incidents.	Holder of the EA	Emergency Evacuation Plan implemented Occupational Health And Safety Plan implemented	Annual
Health and Safety: Maintenance	4. A maintenance schedule must be drawn up and records of all maintenance kept.	Holder of the EA	Maintenance Schedule Implemented	Ongoing
Health and Safety: Fire safety	5. Firefighting equipment in the form of fire hydrants or fire extinguishers must be available on the site. These must be regularly maintained by an appropriate company.	Holder of the EA	Adhere to Health and safety Regulations Ensure the EMPr is adhered to.	Annually
Health and Safety: Storage and handling of hazardous waste	6. A spill kit needs to be kept on site to address any unforeseen spillages. 7. Transport of all hazardous substances must be in accordance with the relevant legislation.	Holder of the EA	All waste managed according to approved Method Statement Compliance to all legislative requirements.	Ongoing

6.4 Decommissioning Phase

The Facility is expected to have a lifespan of 20 years (with maintenance). Equipment associated with this would only be decommissioned once it has reached the end of its economic life or at the end of the power purchase agreement. It is most likely that decommissioning activities of the infrastructure would comprise the dismantling and replacement of the equipment with more appropriate technology / infrastructure available at that time. It must be noted that decommissioning activities will need to be undertaken in accordance with the legislation applicable at that time, which will require this section of the EMPr to be revisited and amended.

Please note that there are relevant mitigation measures contained under the construction section that should be applied during decommissioning and therefore are not repeated.

The general specifications of Construction and Rehabilitation are also relevant to the decommissioning of the Droogfontein BESS Facility and must be adhered to.

- All structures not required for the post-decommissioning use of the site are dismantled and/or demolished, removed and waste material disposed of at an appropriately licensed waste disposal site or as required by the relevant legislation.
- Rehabilitate access / service roads and servitudes not required for the post-decommissioning use of the site. If necessary, an ecologist should be consulted to give input into rehabilitation specifications.
- All disturbed areas are compacted, sloped and contoured to ensure drainage and runoff and to minimise the risk of erosion.
- Monitor rehabilitated areas quarterly for at least a year following decommissioning and implement remedial action as and when required.
- Any fauna encountered during decommissioning activities should be removed to safety by a suitably qualified person.
- All vehicles to adhere to low speed limits (i.e.40km/h max) on the site, to reduce risk of faunal collisions as well as reduce dust.
- Retrenchments should comply with South African Labour legislation of the day.
- The EMPr specifies mitigation measures for the following environmental aspects:
    - On-going Stakeholder involvement
    - Community health and safety
    - Waste Management
    - Biodiversity
    - Aquatic Ecology
    - Agriculture
    - Visual Impact
    - Air Quality

Mitigation measures implemented during construction with regards to the construction camp and equipment will remain the same for the decommissioning phase when a construction camp will need to be established again.

6.4.1 On-going Stakeholder involvement

This is the process that is recommended if the substations sites are decommissioned.

This section relates to the stakeholder involvement that needs occur during decommissioning.

Table 35: On-going stakeholder involvement

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Ongoing stakeholder involvement	1. Community to be notified, as culturally appropriate, timeously of the planned decommissioning, e.g.: Proposed decommissioning start date; and Process to be followed. 2. Recommend that a meeting with community leader(s) be held before decommissioning commence to inform them: • What activities will take place during the decommissioning phase. • How these activities will impact upon the communities and/or their properties. • Regarding the timeframes of scheduled activities 3. Regular interaction between Holder of the EA and community leader(s) during the decommissioning phase 4. A reporting office / channel to be established must community members experience problems with contractors / sub-contractors during the decommissioning phase. 5. A register to be kept of problems reported by community members and the steps taken to address / resolve it.	Holder of the EA	Clear communication channels maintained	Ongoing

6.4.2 Construction Site Decommissioning

This section deals with the demolishing of the construction camp and the actions that need to be implemented

Table 36: Construction Site Decommissioning

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Construction Site Decommissioning: Removal of equipment	1. All structures comprising the construction camp are to be removed from site apart from what may be required for the operation of the facility. 2. The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint etc., and these must be cleaned up. 3. All hardened surfaces within the construction camp area must be ripped, all imported materials removed, and the area must be top soiled and regressed using the guidelines set out in the re-vegetation plan that forms part of this document.	Holder of the EA	Compliance to all legislative requirements. Ensure the EMPr is adhered to. Alien Plant Management Plan Implemented Plant Rehabilitation Implemented	Once off
Construction Site Decommissioning: Temporary services	4. The Contractor must arrange the cancellation of all temporary services. 5. Temporary roads must be closed and access across these, blocked. 6. All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO.	Holder of the EA	Clear communication channels maintained A traffic management Strategy Implemented Alien Plant Management Plan Implemented Plant Rehabilitation Implemented	Once off
Construction Site Decommissioning: Associated Infrastructure	7. Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the Engineer. 8. All surfaces hardened due to construction activities are to be ripped and imported material thereon removed.	Holder of the EA	All waste managed according to approved Method Statement	Once off

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	9. All rubble is to be removed from the site to an approved disposal site as approved by the ECO. Burying of rubble on site is prohibited. 10. Refueling, handling of hydrocarbon products or maintenance and servicing of heavy earthmoving vehicles must not take place over bare soil or within 32m of any on-site watercourses. All vehicle maintenance or refueling must be done off-site, or alternatively, in a designated (hard or impermeable surface) area on-site. 11. The site is to be cleared of all litter. 12. The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials. 13. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer. 14. All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer. 15. The Contractor must repair any damage that the construction works has caused to neighbouring properties, specifically, but not limited to, damage caused by poor storm water management.			
Construction Site Decommissioning: Rehabilitation plan	16. Rehabilitate and re-vegetate cleared areas with indigenous plant species that were present on the site prior to construction. 17. All roads utilized during the construction phase must be rehabilitated to an acceptable standard after construction is complete.	Holder of the EA	Alien Plant Management Plan Implemented Plant Rehabilitation Implemented	Three monthly inspections

6.4.3 Community Health and Safety

This section deals with the issues relating to health and safety during decommissioning

Table 37: Community Health and Safety

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Ongoing stakeholder involvement	1. Demarcated routes to be established for construction vehicles to ensure the safety of communities, especially in terms of road safety and communities to be informed of these demarcated routes. 2. Excavated areas to be fenced off and regularly inspected to ensure that humans and animals do not have access to the site. 3. Where dust is generated by trucks passing on gravel roads, dust mitigation measures to be enforced. 4. Any infrastructure that would not be decommissioned must be appropriately locked and/or fenced off to ensure that it does not pose any danger to the community	Holder of the EA	A traffic management Strategy Implemented Ensure the EMPr is adhered to.	Ongoing

6.4.4 Waste Management

This section deals with the issues relating to waste management during decommissioning

Table 38: Waste Management

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Waste Management	1. All decommissioned equipment must be removed from site and disposed of at a registered land fill. Records of disposal must be kept. 2. All waybills and disposal slips (e.g. safe disposal certificates, waste manifests) must be retained for a minimum period of five (5) years for the disposal activities associated with the construction and decommissioning of the proposed facility, per regulation 8(1) of the NEM:WA, 2008 Waste Classification and Management Regulations published in GN No. R. 634 of 23 August 2013. 3. PVs must be recycled if possible.	Holder of the EA	All waste managed according to approved Method Statement	Ongoing

6.4.5 Biodiversity

This section deals with the issues relating to biodiversity during decommissioning

Table 39: Biodiversity

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Biodiversity: Fauna	1. All hazardous materials must be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site must be cleaned up in the appropriate manner as related to the nature of the spill. 2. All vehicles accessing the site must adhere to a low speed limit (30-40km/h max) to avoid collisions with susceptible species such as snakes and tortoises.	Holder of the EA	All waste managed according to approved Method Statement A traffic management Strategy Implemented Ensure the EMPr is adhered to.	Ongoing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	3. No excavated holes or trenches must be left open for extended periods as fauna may fall in and become trapped. 4. All above-ground infrastructure must be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables must generate additional disturbance and impact, however, this must be in accordance with the decommissioning and recycling plan, and as per the agreements with the land owners concerned.			
Biodiversity: Erosion control	5. There must be regular monitoring for erosion for at least 2 years after decommissioning by the Holder of the EA to ensure that no erosion problems develop as a result of the disturbance, and if they do, to immediately implement erosion control measures. 6. All erosion problems observed must be rectified as soon as possible, using the appropriate erosion control structures and re-vegetation techniques. 7. All disturbed and cleared areas must be re-vegetated with indigenous perennial shrubs and grasses from the local area.	Holder of the EA	Erosion plan implemented and hydrological measures in place Alien Plant Management Plan Implemented Plant Rehabilitation Implemented	Ongoung
Biodiversity: Alien invasive plant control	8. Wherever excavation is necessary for decommissioning, topsoil must be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. 9. Due to the disturbance at the site alien plant species are likely to be a long-term problem at the site following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned. 10. Regular monitoring for alien plants within the disturbed areas for at least two years after decommissioning or until alien invasives are no longer a problem at the site.	Holder of the EA	Alien Plant Management Plan Implemented Plant Rehabilitation Implemented	Monthly for a duration of two years

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	11. Regular alien clearing must be conducted using the best-practice methods for the species concerned. The use of herbicides must be avoided as far as possible			

6.4.6 Aquatic Ecology

This section deals with the issues relating to Aquatic Ecology during decommissioning

Table 40: Aquatic ecology

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Habitat and biota (inclusive of the vegetation component) and ecological structure of the watercourses identified in the study area.	1. No indiscriminate movement of construction equipment in the watercourses and buffer zones surrounding the watercourses may be permitted. Use must be made of the existing roads during the decommissioning phase; 2. All surface infrastructure within the watercourses and that within its 100m ZoR must be decommissioned. All materials must be removed from the watercourses (where applicable) and may temporarily be stockpiled outside the 32 m NEMA ZoR, where after is must be removed from site and disposed of at a registered disposal facility; 3. Should road crossings be decommissioned, road footprint areas within the watercourse must be levelled to the same level and shape as that of the upstream and	Holder of the EA	All waste managed according to approved Method Statement Ensure the EMPr is adhered to Alien Plant Management Plan Implemented Plant Rehabilitation Implemented	Ongoing monitoring for 3 years

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
	downstream reaches. This will ensure a continuous bed level and prevent any concentration of surface flow from occurring; 4. Watercourse embankments must be suitably rehabilitated (shaped and revegetated) to prevent any erosion from occurring; 5. All bare areas in the study area, specifically where vegetation was initially cleared for surface infrastructure components) must be ripped and be revegetated within suitable indigenous vegetation species; 6. All areas revegetated must be monitored until suitable basal cover has been re-established. Follow up revegetation should take place in areas where initial revegetation is not successful; 7. It is recommended that a Watercourse Rehabilitation and Management Plan be compiled and implemented once the layout plan has been finalised. Implementation must be overseen by a suitably qualified Environmental Site Officer (ESO) and the EO must sign off the rehabilitation before the relevant contractors leave site; 8. Refuelling, handling of hydrocarbon products or maintenance and servicing of heavy earthmoving vehicles must not take place within 32m of any on-site watercourses. All vehicle maintenance or refuelling must be done off-site, or alternatively, in a designated (hard or impermeable surface) area on-site; and 9. Post-closure monitoring of the watercourses (for a period of 3 years), with specific mention of the invasion of alien vegetation species) is recommended to be undertaken.		Water course Rehabilitation Plan	
Geomorphology, hydrological	10. No indiscriminate movement of construction equipment through the watercourses outside of the existing crossing			

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
functioning and surface water quality (if present) within the watercourses identified in the study area.	point or driving in unmarked areas through the buffer zones of the watercourses may be permitted. This will avoid any disturbance to the hydrological regime of the watercourses as disturbances has already occurred and the existing road crossings are considered to promote hydrological connectivity and avoid any concentrated flow in the watercourses; 11. High flood peaks from the decommissioning footprint areas can be mitigated by ensuring that no concentrated runoff from the surface infrastructure area and subsequent cleared area enters the watercourses. The velocity of surface water flow from these areas must be reduced by ensuring that the vegetation in the buffer area surrounding the watercourses are intact or by the strategic placement of silt traps of haybales as a means to obstruct flow but still allow flow to percolate at a reduced velocity and encourages a diffuse flow pattern; 12. Areas where surface infrastructure have been decommissioned and removed must be suitably compacted and revegetated to ensure that no erosion occurs which may contribute to the sediment load of the watercourses; and 13. Should erosion gullies be noted, these areas must be rehabilitated by infilling them with suitable soil and ensuring the area is vegetated. The increased surface roughness will discourage concentrated flow paths to develop and ensure diffuse flow patterns.			

6.4.7 Agriculture

This section deals with issues relating to agricultural potential and resources and actions that need to be implemented during decommissioning

Table 41: Agriculture

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Agriculture: Soil erosion	1. Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there. 2. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize the soil against erosion.	Holder of the EA	Erosion Plan implemented Alien Plant Management Plan Implemented Plant Rehabilitation Implemented	Every 2 months during the decommissioning phase, and then every 6 months after completion of decommissioning, until final sign-off is achieved.
Agriculture: Topsoil Loss	3. If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.	Holder of the EA	That topsoil loss is minimised	After disturbance

6.4.8 Geotechnical

This section deals with issues relating to soil management actions that need to be implemented during decommissioning

Table 42: Geotechnical

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Removal of subsoils (soil, rock)	1. Use of temporary berms and drainage channels to divert surface water where feasible. 2. Minimize earthworks and demolish footprints. 3. Use of existing roads and tracks were feasible. 4. Rehabilitation of affected areas (such as re-grassing). 5. Develop a chemical spill response plan. 6. Develop dust and demolition fly suppression plan. 7. Vehicle repairs to be undertaken in designated areas. 8. Reinstate channelized drainage features.	Holder of the EA	Erosion Plan implemented	Once off

6.4.9 Heritage, Archaeological, Palaeontological and Cultural Landscape

This section deals with the impact that the decommissioning has on potential archaeological artefacts on the site

Table 43: Heritage

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Heritage, archaeology and cultural	1. Same as construction phase	Holder of the EA	Heritage Management Plan Implemented Cultural Management Plan	Once off

6.4.10 Transportation

This section deals with the issues relating to traffic and transportation during decommissioning

Table 44: Traffic and Transportation impacts

Impact	Impact Management Actions	Responsibility	Impact Management Outcome	Frequency / Timing
Traffic Congestion	1. Stagger component removal from site 2. Reduce the decommissioning period 3. Staff and general trips should occur outside of peak traffic periods. 4. Regular maintenance of gravel roads.	Holder of the EA	Ensure the EMPr is adhered to. Ensure Traffic Management Plan is adhered to.	Once off
Air Quality	5. Dust Suppression of gravel roads, as required. 6. Regular maintenance of gravel roads 7. Staff and general trips should occur outside of peak traffic periods	Holder of the EA	Ensure the EMPr is adhered to. Ensure Traffic Management Plan is adhered to.	Ongoing
Noise pollution	8. Stagger component removal from site 9. Reduce the decommissioning period as far as possible 10. Staff and general trips should occur outside of peak traffic periods	Holder of the EA	Ensure the EMPr is adhered to. Ensure Traffic Management Plan is adhered to.	Once off

7 SPECIALIST SPECIFIC MITIGATION MEASURES

Impact	Description	Mitigation
Agricultural	• Loss of agricultural land use, agricultural land directly occupied by the development infrastructure will become unavailable for agricultural use. • Soil degradation through erosion; topsoil loss; and hydrocarbon contamination.	• Soil erosion prevention measures must be implemented such as gabions, sand bags etc. whilst energy dissipaters should be constructed at any surface water outflow points. • The site must be monitored weekly for any signs of off-site siltation; • All areas impacted by earth-moving activities must be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding;

Impact	Description	Mitigation
		• All exposed earth must be rehabilitated promptly with suitable vegetation to stabilise the soil; • Any exposed earth must be rehabilitated promptly with suitable vegetation to protect the soil. • Any contaminated soil associated with construction activities must be contained in separate areas or receptacles such as water-proof drums; • Design an effective system of storm water run-off control, where it is required -that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion. • Topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re spreading during rehabilitation. • During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.
Hydrology	• Change in impervious surface preventing infiltration and harvesting of rainwater/groundwater abstraction • Increase in Storm Water • General spills/Leaks • Battery Spills/Leaks during Operation	• The development must recycle water on site and reuse it for plant maintenance but stay within catchment limits. • The development must follow suitable contamination measures to ensure no contamination occurs. • Storm water structures should promote infiltration to ensure the recharge of the groundwater aquifer. • Existing boreholes should be used in order to not over utilize groundwater resources. • The mitigation measures required relates to the development and implementation of an adequate storm water management plan to be designed by an appropriate engineer. • The engineer should account for both natural run-off (that which can be released into the natural landscape with no detrimental effect) and excess artificial run-off generated by the proposed BESS development structures. • Attenuation dams and evaporation ponds are examples that can contain storm water run-off. Other structures that may be considered are semi-permeable surfaces that can absorb artificial run-off but releases a certain amount into the landscape. Energy dissipating structures can also be used.

Impact	Description	Mitigation
		• Such structures can reduce the amount and rate of excess run-off generated by the proposed development entering wetlands and thereby prevent the onset of erosion. • The development must stay outside of the 1:100 year flood extent. • All vehicles will need to be checked for leakage before and after entering the construction area. • Areas where fuels are either kept or transferred will need to be bunded so as to contain spillage. • Cement mixing sites will also need to be strategically positioned and bunded to prevent spillage. • Ablution facilities must be provided to prevent workers urinating near or in the wetlands. • Ablution facilities must be positioned at least 100 metres away from the wetland areas and buffer zones. • Soakaways must be located away from any active boreholes. • BESS component oils/chemicals mitigation measures - Standard measures are typically accommodated in the design of the BESS to ensure that should an accidental spillage occur, it would not pollute the surrounding soils or any runoff from the BESS. • Solid State Batteries are unlikely to leak, as they are housed in containers that accommodate spills. • Should contaminated water leak from the batteries, this would typically be removed from the site, and would be recycled off-site as part of the remediation process. • It is important that such design-related mitigation measures be incorporated into the BESS design to minimise the risk of any oil/chemical spillage being transported off the site. • Implement the storm-water management plan and ensure appropriate water diversion systems are put in place. • Compile (and adhere to) a procedure for the safe handling of battery cells. • Compile an emergency response plan and implement should an emergency occur. • Ensure that spill kits (if appropriate) are available on site for clean-up of spills and leaks.

Impact	Description	Mitigation
		• Drip-trays or containment measures must be placed under equipment that poses a risk when not in use. • Immediately clean up spills and dispose of contaminated soil at a licensed waste disposal facility. • Dispose of waste appropriately to prevent pollution of soil and groundwater. • Install monitoring systems to detect leaks or emissions. • On-site battery maintenance should be done over appropriate drip trays/containment measures and any hazardous substances must be disposed of appropriately. • Record and report all fuel, oil, hydraulic fluid or electrolyte spills to the PM / Engineer / ERP so that appropriate clean-up measures can be implemented.
Geotechnical	• Disturbance/ displacement/ removal of soil and rock • Soil Erosion	• Design facility layout to minimise earthworks and levelling; • Soil erosion prevention measures must be implemented such as gabions, sand bags etc. whilst energy dissipaters should be constructed at any surface water outflow points. • The sites must be monitored weekly for any signs of off-site siltation; • All areas impacted by earth-moving activities must be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding; • All exposed earth must be rehabilitated promptly with suitable vegetation to stabilise the soil; • Any exposed earth must be rehabilitated promptly with suitable vegetation to protect the soil. • Design an effective system of storm water run-off control, where it is required -that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion. • Topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re spreading during rehabilitation. • During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.
Terrestrial Ecology:	• Disturbance of the site may lead to encroachment of alien plant species on-site and to the surrounding areas;	• Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step.

Impact	Description	Mitigation
Vegetation and fauna	• Increase in alien invasive species, therefore a possible loss in biodiversity; • Utilisation of natural resources • Reduction in biodiversity	• Removal or disturbance of any TOPs, Red Data listed or Provincially protected species may only be done after obtaining permits from relevant authorities. • A DENC permit is required for any animal and plant search-and-rescue. • Materials must not be delivered to the site prematurely if possible, which could result in additional areas being cleared or affected. • Identify sensitive fauna and flora prior to construction works and demarcate these areas; • Site personnel must undergo Environmental Training and be educated on keeping any vegetation and faunal disturbance to a minimum; • Poaching or harvesting of indigenous flora / fauna is strictly forbidden; • Alien plant encroachment must be monitored and prevented as outlined in the EMPr; • All exposed earth must be rehabilitated promptly with suitable vegetation to protect the soil. • Repair of any erosion scars which have developed must be undertaken as soon as they are identified; • All natural areas outside of the project footprint impacted during construction must be rehabilitated with locally indigenous species typical of the representative botanical unit. Seeds from surrounding seed banks can be used for re-seeding. • Rehabilitation must take place in a phased approach as soon as possible. • Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. • All plants outside of the construction footprint must be left undisturbed. Species of special concern must be clearly marked and recorded electronically with GPS coordinates. • The construction area must be well demarcated where this is viable and no construction activities must be allowed outside of this demarcated footprint • Vegetation removal must be phased in order to reduce impact of construction.

Impact	Description	Mitigation
		• Strict and regular auditing of the construction process to ensure containment of the construction and laydown areas. • Soils must be kept free of petrochemical solutions that must be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora. • Alien vegetation on the site will need to be controlled. • The contractor must be responsible for implementing a programme of weed and exotic species control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion. • No trapping or snaring of fauna on the construction site. • No faunal species are to be harmed by maintenance staff during any routine maintenance at the development. • No animals are to be kept as pets except those owned by the landowners. • Any trenches that are required for cabling etc., must not be left open for extended periods as fauna such as tortoises will fall in and become trapped. Any open trenches must be checked regularly for trapped fauna • No dogs or other pets must be allowed on site, except those confined to landowners' dwellings. • Night driving must be strictly limited and, where absolutely required, lower speed limits should apply for night driving. • Personnel on site must undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas. • The illegal collection, hunting or harvesting of any animals at the site must be strictly forbidden
Heritage	• Impact on archaeological and historical heritage resources • Unidentified heritage structures, beyond the already surveyed portions of the property	• Include heritage chance finds procedure in EMPr for project development • The Heritage Act requires that all operations exposing archaeological and historical residues must cease immediately pending an evaluation by the heritage authorities.

Impact	Description	Mitigation
		• Should any features of heritage significance be identified then all construction activities at the location must stop pending approval from the SAHRA. • Any heritage features of significance identified during the operational phase will require formal mitigation or where possible accommodate such resources. • A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations. • A chance finds protocol must be developed that includes the process of work stoppage, site protection, evaluation and informing Northern Cape Heritage Resources Authority and SAHRA of such finds and a final process of mitigation implementation.
Palaeontology	• Impact on palaeontological resources • Unidentified palaeontological resources	• Significant fossil finds must be reported to Northern Cape Heritage Resources Authority for recording and sampling by a professional palaeontologist. • Significant chance find procedure must be followed: o When a chance find is made the person must instantly stop all work near the find. o The site must be secured to protect it from any additional damage o The finder of the fossil heritage must immediately report the find to his/her direct supervisor, according to the reporting protocols instituted by the Holder of the EA. The supervisor must in turn report the find to his/her manager and the ECO. The ECO must report the find to the relevant authorities and a relevant palaeontologist. o The applicant must appoint a relevant palaeontologist to investigate and access the chance find and site. o Both ECO and palaeontologist must ensure that accurate records and documentation are kept. The documentation must start with the initial chance find report, including records of all actions taken, persons involved and contacted, comments received and findings. o These documents will be necessary to request authorisations and permits from the relevant Authorities to continue with the work on site. o The reports and all other documents must be submitted to Northern Cape Heritage Resources Authority by the palaeontologist.

Impact	Description	Mitigation
		○ The report must include recommendations for additional specialist work if necessary, or request approval to continue with the development. ○ Once the required approvals have been issued, the development may proceed The ECO must close out the chance find procedure and ensure that any requirements issued by the Competent Authority are added to the operational management plan (Where required). • Demarcate heritage sites / find spots / colonial structures / grave sites identified during this study as no-go areas; • Demarcate and fence during construction any heritage resources within 100 meters of construction activities; • Monitor heritage sites / find spots / colonial structures / grave sites areas if construction is going to take place through or in close proximity to them. • A management plan for the heritage resources must be compiled and approved for implementation during construction.
Socio-Economic	• Creation of job opportunities for skilled personnel (e.g. engineers, specialists etc.) and non-skilled personnel (e.g. labourers); • Skills development of the local community through employment opportunities; • Possible economic benefits to local suppliers of building materials as goods and services may be purchased from these entities during the construction phase.	• All contact with the affected parties must be courteous at all times. The rights of the affected parties must be respected at all times. • Ensure that the expectations (rules) of the farmers regarding access to farms are understood and effectively adhered to. • Installation of an electronic number plate reader at the entrance to the BESS Facility. • Establish a local skills desk to identify the skills set of the local residents available for the operation phase of the BESS. • Up-skill construction workers with aptitude to maintain the BESS facility. • Wherever feasible, local residents should be recruited to fill semi and unskilled jobs; • Women should be given equal employment opportunities and encouraged to apply for positions; • A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills which they can use to secure jobs elsewhere post-construction. • A procurement policy promoting the use of local business should, where possible, be put in place to be applied throughout the construction phase.

Impact	Description	Mitigation
		• Communicate the benefits associated with renewable energy to the broader community; • Ensure that all affected land owners and tourist associations are regularly consulted; • A Grievance Mechanism should be put in place and all grievances must be dealt with in a transparent manner; • The mitigation measures recommended in the Heritage and Palaeontology Impact Assessment must be followed. • Work closely with the appropriate municipal structures in regard to establishing a social responsibility programme. • Establish a social responsibility programme either in line with the BID guidelines or equivalent; • Work closely with the appropriate municipal structures in regard to establishing a social responsibility programme; • Damage to infrastructure supporting surrounding communities must not be tolerated and any damage must be rectified immediately by the Contractor. A record of all damage and remedial actions must be kept on site. • Ensure that an onsite HIV infections policy is in place and that construction workers have easy access to condoms; • Expose workers to a health and HIV/AIDS awareness educational program; • Extend the HIV/AIDS program into the community with specific focus on schools and youth clubs. • Communicate the limitation of opportunities created by the project through Community leaders and Ward Councillors; • Draw up a recruitment policy in conjunction with the Community Leaders and Ward Councillors of the area and ensure compliance with this policy. • Ensure that, at all times, people have access to their properties as well as to social facilities • Ensure that construction workers are clearly identifiable. All workers should carry identification cards and wear identifiable clothing; • Fence off construction site (if feasible) and control access to these sites; • Appoint an independent, and preferably local, security company to monitor the site;

Impact	Description	Mitigation
		• Encourage local people to report any suspicious activity associated with the construction sites through the establishment of a community liaison forum; • Prevent loitering within the vicinity of the construction camp as well as the construction site.
Surface water	• Clearing of natural vegetation forming part of surface water catchment areas; • Increase in stormwater leading to an increase of peak flows entering riparian / wetland systems; • Potential oil spills/leaks during construction; • Potential for leaks from batteries leading to contamination of watercourses / wetlands; and • Contamination of ground and surface water and soil.	• Soil erosion prevention measures must be implemented such as gabions, sand bags etc. whilst energy dissipaters should be constructed at any surface water outflow points. • All areas impacted by earth-moving activities must be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding. • All exposed earth must be rehabilitated promptly with suitable vegetation to stabilise the soil. • Any exposed earth must be rehabilitated promptly with suitable vegetation to protect the soil. • Any contaminated soil associated with construction activities must be contained in separate areas or receptacles such as water-proof drums. • Repair of any erosion scars which have developed must be undertaken as soon as they are identified; • Design an effective system of storm water run-off control, where it is required -that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion. • The sites must be monitored weekly for any signs of off-site siltation; • All construction machinery and equipment must be regularly serviced and maintained to keep noise, dust and possible leaks to a minimum, as per the requirements of the EMPr; • An appropriate number of toilets (1 toilet for every 20 workers) must be provided for labourers during the Construction Phase. These must be maintained in a satisfactory condition and a minimum of 100m away from any water resources and outside of the 1:100 year floodline,
Traffic	• Increase in construction vehicles in the area; • Excessively slow or fast moving construction vehicles on the surrounding roads may cause accidents; and • If not properly maintained, increased road use on existing surrounding road infrastructure, for access purposes by	• The contractor must meet safety requirements under all circumstances. All equipment transported must be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used must be in place.

Impact	Description	Mitigation
	construction personnel, maycause damage to the existing infrastructure.	• Care for the safety and security of community members crossing access roads must receive priority at all times. • Ensure that roadworthy and safety standards are implemented at all times for all construction vehicles. • Trips must be planned to avoid peak hours as far as possible (i.e. 06:00 - 08:00 and 16:00 – 17:00) • Management strategies for dust suppression to be implemented and dust generating activities to be suspended during periods of strong winds. • Road kill monitoring programme must be established and fences erected where necessary to direct animals to safe road crossings on access roads. • Limit the number of vehicles and trucks travelling to and from the construction site, where possible. • Unless there are water shortages, ensure that dust suppression techniques are implemented on all access roads; in all areas where vegetation clearing has taken place; on all soil stockpiles. • Where necessary suitable measures must be taken to rehabilitate damaged areas. • Contractors must ensure that access roads are maintained in good condition by attending to potholes, corrugations and storm water damages as soon as these develop. • If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have spilt. • The main routes on the site must be clearly signposted and printed delivery maps must be issued to all suppliers and Sub-Contractors. • Construction routes and required access roads must be clearly defined at the commencement of construction • A route study is to be undertaken as part of the final traffic transportation plan to confirm the most appropriate route to site. • Recommendations of the Stormwater Management Plan must be implemented on all access roads • All equipment moved onto site or off site during a project is subject to the legal requirements.

Impact	Description	Mitigation
		• The Contractor must ensure that all the necessary precautions against damage to the environment and injury to persons are taken in the event of an accident. • Stagger component delivery to site. • Regular maintenance of gravel roads must be undertaken by the Contractor during the construction phase, and by Client/Facility Manager during the operational phase. • Access of all construction and material delivery vehicles must be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure. • Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance. • In cases where severe water restrictions are imposed, other measures like the use of wetting agents such as chemical stabilisation or "hydromulch", must be considered.
Noise	• Disruption to receptors through increased activity and noise in the area.	• The construction phase must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development. • The construction crew must abide by the local by-laws (if applicable) regarding noise. • Ensure that noise as a component is included in the induction of employees and contractors, and how their activities and actions can impact on residents in the area (reverse alarms and reversing close to dwellings, driving fast past residential dwellings at night, maintenance of equipment). All contractors and employees must receive this induction. • Construction site yards, workshops, concrete batching plants, and other noisy fixed facilities must be located well away from noise sensitive areas. Once the proposed final layouts are made available by the contractor(s), the sites must be evaluated in detail and specific measures designed into the system. • Truck traffic must be routed away from noise sensitive areas, where possible. • Noisy operations must be combined so that they occur where possible at the same time. • Construction workers to wear necessary ear protection gear.

Impact	Description	Mitigation
		• Noise from labourers must be controlled. • The contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour must be transported to and from the site by the contractor or his Sub-Contractors by the contractors own transport. • Implementation of enclosure and cladding of processing plants. • When working in very close proximity to potentially sensitive receptors, coordinate the working time with periods when the receptors are not at home where possible. An example would be to work within the 08:00 to 17:00 time-slot to minimize the significance of the impact because: • Where possible construction work must be undertaken during normal working hours (07H00 – 17H00), from Monday to Saturday; If agreements can be reached (in writing) with all the surrounding (within a 500m distance) potentially sensitive receptors, these working hours can be extended. • The Holder of the EA must investigate any reasonable and valid noise complaint if registered by a receptor staying within 2000m from location where construction activities are taking place. • When any noise complaints are received, noise monitoring must be conducted at the complainant, followed by feedback regarding noise levels measured, an if necessary appropriate mitgation. • Reduce the noise impact during the construction phase by: • Using the smallest/quietest equipment for the particular purpose. Ensuring that equipment is well-maintained and fitted with the correct and appropriate noise abatement measures.
Human Health Impacts	• Potential dust generation from soil stripping, vehicle traffic on the access roads and motor vehicle fumes will have an impact on air quality; • Dust will be created during the Construction Phase, which may impact on surrounding local community members • Human fatalities / injuries caused by battery fires / explosions.	• Road dampening must be undertaken as and when required to prevent excess dust during construction; • Road surface stabilisers can also be implemented to supress dust during construction; • Management strategies for dust suppression to be implemented and dust generating activities to be suspended during periods of strong winds. • Rehabilitation must take place in a phased approach as soon as possible. • Compile an Emergency Response Plan and ensure that this is located on site at all times and that all personal are familiar with the procedures.

Impact	Description	Mitigation
		• Ensure that emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, etc.) are established prior to commencing operation. • Make all emergency procedures available, including responsible personnel, contact details of emergency services, etc. to all the relevant personnel. Clearly demarcate emergency procedures at the relevant locations around the site. • Provide suitable emergency and safety signage on site, and demarcate any areas which may pose a safety risk (including hazardous substances.). • Ensure that no fires are permitted on or adjacent to site except in areas designated for this purpose. Any such designated areas should be situated as far as possible from vegetated areas, e.g. flammable material stores any other high fire risk, or environmentally sensitive areas. • Ensure that no smoking is permitted. • Ensure that sufficient fire-fighting equipment is available on site. • Ensure that all personnel on site are aware of the location of firefighting equipment on the site and how the equipment is operated. • Liaise with the local fire-firefighting department with regards to emergency procedures.
Air quality	• Potential dust generation from soil stripping, vehicle traffic on the access roads and motor vehicle fumes will have an impact on air quality; • Dust will be created during the Construction Phase, which may impact on surrounding local community members.	• All construction machinery and equipment must be regularly serviced and maintained to keep noise, dust and possible leaks to a minimum, as per the requirements of the EMPr; • Road dampening must be undertaken as and when required to prevent excess dust during construction; • Road surface stabilisers can also be implemented to supress dust during construction.
Waste	• There is potential for the site and surrounding areas to become polluted if construction activities are not properly managed (e.g. oil / hazardous substance spills, litter from personnel on-site, sewage from ablutions etc.); and • Waste generation could be created from the following:	• All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials is supported; • All solid wastes must be disposed of at an appropriately registered landfill site and records maintained to confirm safe disposal; • Adequate scavenger-proof refuse disposal containers must be supplied to control solid waste on-site;

Impact	Description	Mitigation
	- Solid waste - plastics, metal, wood, concrete, stone, asphalt; - Chemical waste- petrochemicals, resins and paints; and - Sewage as may be generated by employees.	• It must be ensured that existing waste disposal facilities in the area are able to accommodate the increased waste generated from the proposed construction; • Chemical waste must be stored in appropriate containers and disposed of at an appropriately licensed disposal facility; • Portable sanitation facilities must be erected for construction personnel. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation). These facilities must also be monitored and serviced regularly and located more than 100m away from any natural water resources so as to prevent contamination of the water resource. • The construction site must be inspected for litter on a daily basis. Extra care must be taken on windy days. • Soil that is contaminated with, e.g. cement, petrochemicals or paint, must be disposed of at a registered waste disposal site. • It must be ensured that all hazardous contaminants are stored in designated areas that are sign-posted, lined with an appropriate barrier and bunded to 110% of the volumes of liquid being stored to prevent the bio-physical contamination of the environment (ground and surface water and soil contamination). Hazardous substance storage must not take place within 100m of a wetland/watercourse or within the 1:100 year floodline; and • Any significant spills on-site must be reported to the relevant Authority (e.g. Department of Water and Sanitation / Municipality etc.) and must be remediated as per the EMPr. • All waybills and disposal slips (e.g. safe disposal certificates, waste manifests) must be retained for a minimum period of five (5) years for the disposal activities associated with the construction and decommissioning of the proposed facility, per regulation 8(1) of the NEM:WA, 2008 Waste Classification and Management Regulations published in GN No. R. 634 of 23 August 2013. • All hazardous waste materials, if present, must be carefully stored as advised by the ECO, and then disposed of off-site at a licensed landfill site, where practical. • Contaminants to be stored safely to avoid spillage.

Impact	Description	Mitigation
		• Machinery must be properly maintained to keep oil leaks in check • All necessary precaution measures must be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills must immediately be cleaned up and all affected areas rehabilitated • Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site. • Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site. • The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil. • If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material. • If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure. • Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use. • Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.
Occupational Health Safety	• Electrical Safety • Chemical Safety • Safety of workers • Machinery maintenance • Fire safety	• Implementation of safety measures, work procedures and first aid must be implemented on site. This must include the provision of first aid facilities, and the training of a number of employees to carry out first aid procedures. • Workers must be thoroughly trained in using potentially dangerous equipment. • Contractors must ensure that all equipment is maintained in a safe operating condition.

Impact	Description	Mitigation
		• A safety officer must be appointed. • A record of health and safety incidents must be kept on site. • Any health and safety incidents must be reported to the Project Manager immediately. • Workers have the right to refuse work in unsafe conditions. • A record must be kept of drugs administered or precautions taken and the time and dates when this was done. This can then be used as evidence in court should any claims be instituted against the Holder of the EA or the Contractor. • Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers / local residents. • All sources of hazardous energy or hazardous substances must have written procedures for isolation, identifying how the system, plant or equipment can be made and kept safe. • Use must be made of reflective markings on structures, traffic junctions, and other areas with a potential for accidents. • Safety barriers must be installed in high risk locations. • Personal Protective Equipment (PPE) must be made available to all construction staff and must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn where necessary i.e. dust masks, ear plugs etc. • No person is to enter the site without the necessary PPE. • All equipment used for construction must be in good working order with up to date maintenance records. • MSDS and other standards exist to ensure proper storage of hazardous substances. • Lithium ion batteries require battery management systems to monitor and protect cells from overcharging

Impact	Description	Mitigation
		• Large ESS systems should be designed with appropriate fire detection and suppression systems. • Fire detection and suppressant systems • Gas level monitoring for several different gases (related to degradation of the batteries that increases risk of fire) • Heat sensors • Battery condition monitoring systems • Dousing mechanism for emergency cooling and fire suppression • Density limits in the containers • Spacing limits between containers • Insulated containers • High powered HVAC (Heating, Ventilation and Air-Conditioning) System, monitored centrally • Multiple temperature sensors for both the cells and air temperature • Automated shut down mechanism if temperatures get too high • Containers sealed and douse in case of fire to prevent the spread • Battery management system to prevent overuse and maintain good battery condition
Security	• Crime • Alcohol and drug abuse • Loitering • Access control • Fire arms	• A security company must be employed to guard the construction site and monitor access. • Site access must be controlled via a boom and gatehouse, with security staff stationed at access booms during construction. • Labour must be transported to and from the site to discourage loitering in adjacent areas and a possible increase in crime or disturbance. • Unsocial activities such as consumption or illegal selling of alcohol, drug utilisation or selling and prostitution on site must be prohibited.

Impact	Description	Mitigation
		Disciplinary or criminal action must be taken against any persons found to be engaged in such activities. • Only pre-approved staff must be permitted to stay in the staff accommodation where staff accommodation is provided. • The construction camp site must be fenced, where necessary to prevent any loss or injury to persons during the construction phase. • No alcohol / drugs to be present on site. • A security company must be employed to guard the construction site and monitor access. • Site access must be controlled via a boom and gatehouse, with security staff stationed at access booms during construction. • Labour must be transported to and from the site to discourage loitering in adjacent areas and a possible increase in crime or disturbance. • Unsocial activities such as consumption or illegal selling of alcohol, drug utilisation or selling and prostitution on site must be prohibited. Disciplinary or criminal action must be taken against any persons found to be engaged in such activities. • Only pre-approved staff must be permitted to stay in the staff accommodation where staff accommodation is provided. • The construction camp site must be fenced, where necessary to prevent any loss or injury to persons during the construction phase.

8 ADDITIONAL MANAGEMENT PLANS

8.1 High-level Alien Invasive Management Plan

Table 45: Alien Invasive Management Plan for construction phase

ALIEN INVASIVE MANAGEMENT PROGRAMME	
MITIGATION MEASURES	1. Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding. 2. Alien vegetation and the spread of exotic species on the site will need to be controlled. 3. The contractor must be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion. 4. Herbicide use must only be allowed according to contract specifications. The application must be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment must be properly investigated and only environmentally friendly herbicides must be used. 5. The use of pesticides and herbicides must be discouraged as these can impact on important pollinator species of indigenous vegetation. 6. Six monthly checks of the area must take place for the emergence of invader species. 7. Mitigation measures mentioned for the construction phase above must be implemented for any maintenance of the development that must be undertaken during the operation phase. 8. Correct rehabilitation with locally indigenous species. 9. Monitoring programme to ensure that rehabilitation efforts are successful to ensure that risks such as erosion, spread of exotic species and the edge effect are avoided. 10. Constant maintenance of the area to ensure re-colonisation of floral species. 11. Regular removal of alien species which will jeopardise the proliferation of indigenous species.

The above High Level Alien invasive management plan will be updated by a vegetation specialist once the detailed design stages of the proposed development are complete and the floral walk-though study has been undertaken.

8.2 Plant Rescue and Protection Plan

Table 46: Plant Rescue and Protection Plan

PLANT RESCUE PROTECTION PLAN	
MITIGATION MEASURES	1. The removal of protected plant species from the proposed development areas must take place prior to construction commencing. These plant species should be grown ex-situ and then relocated after construction has been completed.

PLANT RESCUE PROTECTION PLAN	
	2. Where possible, preference be given to conservation organisations to remove seeds, cuttings and plants prior to construction commencing for conservation purposes. 3. A large proportion of the impact of the development stems from the access roads and the number of roads must be reduced to the minimum possible and routes must also be adjusted to avoid areas of high sensitivity as far as possible, as informed by a preconstruction walk-though survey. 4. Pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc. 5. A pre-construction walk-through survey by the biodiversity specialist will be required during a favourable season to locate any protected plants / trees and/or sensitive species and/or ecological feature. This survey must cover the footprint of all proposed infrastructure, including internal access roads. If necessary, shift infrastructure to avoid impacts on species or specific features. 6. Vegetation clearing must only commence after the walk-through has been conducted and necessary permits obtained. 7. Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. 8. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step. 9. Materials must not be delivered to the site prematurely which could result in additional areas being cleared or affected. 10. No vegetation to be used for firewood. 11. Gathering of firewood, fruit, “muti” plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO. 12. Only vegetation within the footprint must be removed. 13. Vegetation removal must be phased in order to reduce impact of construction. 14. Construction site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas. 15. All natural areas impacted during construction must be rehabilitated with locally indigenous plant species. 16. A buffer zone must be established in areas where construction will not take place to ensure that construction activities do not extend into these areas. 17. Construction areas must be well demarcated and these areas strictly adhered to. 18. The use of pesticides and herbicides in the study area must be discouraged as these impacts on important pollinator species of indigenous vegetation. 19. Soils must be kept free of petrochemical solutions that must be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora. 20. Soil stockpiles must not become contaminated with oil, diesel, petrol, garbage or any other material, which must inhibit the later growth of vegetation in the soil.

The above Plant Recue and Protection Plan will be updated by a vegetation specialist once the detailed design stages of the proposed development are complete and the floral walk-though study has been undertaken.

8.3 Re-Vegetation and Habitat Rehabilitation Plan

Table 47: Re-Vegetation and Habitat Rehabilitation Plan

RE-VEGETATION AND HABITAT REHABILITATION PLAN	
MITIGATION MEASURES	1. Re-vegetation must aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment. 2. Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed. This must be done through seeding with indigenous grasses. 3. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction. 4. All natural areas impacted during construction must be rehabilitated with locally indigenous species typical of the representative botanical unit. 5. Rehabilitation must take place in a phased approach as soon as possible. 6. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding. 7. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. 8. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged. 9. Habitat destruction must be limited to what is absolutely necessary for the construction of the infrastructure, including the construction of new roads. In this respect, the recommendations from the Ecological Specialist Study must be applied strictly. Personnel must be adequately briefed on the need to restrict habitat destruction, and must be restricted to the actual construction area. 10. Monitoring programme to ensure that rehabilitation efforts are successful to ensure that risks such as erosion, spread of exotic species and the edge effect are avoided.

The above Re-Vegetation and Habitat Rehabilitation Plan will be updated by a vegetation specialist once the detailed design stages of the proposed development are complete and the floral walk-though study has been undertaken.

8.4 Erosion Management Plan

Table 48: Erosion Management Plan

EROSION MANAGEMENT PLAN	
MITIGATION MEASURES	1. Contractor to provide method statement on erosion control, showing how storm water will be managed. 2. To prevent erosion, material stockpiled for long periods (2 weeks) must be retained in a bermed area. 3. Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks. 4. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 5. Wind screening and stormwater control must be undertaken to prevent soil loss from the site. 6. Other erosion control measures that can be implemented are as follows: • Brush packing with cleared vegetation • Mulch or chip packing • Planting of vegetation • Hydroseeding / hand sowing 7. Sensitive areas need to be identified prior to construction so that the necessary precautions can be implemented. 8. All erosion control mechanisms need to be regularly maintained. 9. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. 10. Retention of vegetation where possible to avoid soil erosion. 11. Vegetation clearance must be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. 12. Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed. This must be done through seeding with indigenous grasses that were present on site prior to construction. 13. No impediment to the natural water flow other than approved erosion control works is permitted. 14. To prevent storm water damage, the increase in storm water run-off resulting from construction activities must be estimated and the drainage system assessed accordingly. 15. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion.

8.5 Stormwater Management Plan

A Stormwater Management Plan cannot be compiled until the detailed design stages of the proposed development are complete, which will only take place if the proposed Droogfontein BESS Facility development is authorised by the DEFF. It is however stipulated in this EMPr that a Stormwater Management Plan must be compiled before any construction commences and be implemented during the construction phase. Refer to **Section 8.2.3.**

8.6 Open Space Management Plan

Table 49: Open Space Management Plan

OPEN SPACE MANAGEMENT PLAN	
MITIGATION MEASURES	1. A buffer zone must be established in areas where construction will not take place, to ensure that construction activities do not extend into these areas. 2. Vehicle movement must be restricted to authorised access roads. 3. Before construction begins, all areas to be developed must be clearly demarcated with pegs, fencing or orange construction barrier where applicable. 4. All Construction Camp are to be fenced off in such a manner that unlawful entry is prevented and access is controlled. Signage must be erected at all access points in compliance with all applicable occupational health and safety requirements. All access points to the Construction Camp must be controlled by a guard or otherwise monitored, to prevent unlawful access. 5. The contractor and ECO must ensure compliance with conditions described in the EA. 6. Records of compliance/ non-compliance with the conditions of the authorisation must be kept and be available on request. 7. Records of all environmental incidents must be maintained and a copy of these records be made available to the national and provincial departments on request throughout the project execution. 8. Site establishment must take place in an orderly manner and all required amenities must be installed at camp sites before the main workforce move onto site. 9. All construction equipment must be stored within this construction camp. 10. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment. 11. The Contractor must provide sufficient ablution facilities, in the form of portable / VIP toilets, at the Construction Camps, and must conform to all relevant health and safety standards and codes. No pit latrines, French drain systems or soak away systems must be allowed and toilets must not be situated within 100 meters of any surface water body or 1:100 year flood line. A sufficient number of toilets must be provided to accommodate the number of personnel working in the area. 12. The Contractor must inform all site staff to make use of supplied ablution facilities and under no circumstances must indiscriminate sanitary activities be allowed.

OPEN SPACE MANAGEMENT PLAN	
	13. No fires will be allowed and the Contractor must make alternative arrangements for heating. LP Gas may be used, provided that all required safety measures are in place. The Contractor must take specific measures to prevent the spread of veld fires, caused by activities at the campsites. These measures must include appropriate instruction of employees about fire. 14. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts. 15. Project manager must ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks. 16. Staff must be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training. 17. Staff must be trained in the hazards and required precautionary measures for dealing with these substances

8.7 Monitoring System

Table 50: Monitoring System

MONITORING SYSTEM	
MITIGATION MEASURES	1. Monitoring must be undertaken to evaluate the success of mitigation measures. Monitoring methods must be in accordance with features that need to be monitored. 2. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and provides for spillage prevention and containment. 3. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control. 4. Spillage packs must be available at construction areas. 5. Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage area(s). These pollution prevention measures for storage must include a bund wall high enough to contain at least 110% of any stored volume, and this must be sited away from drainage lines in a site with the approval of the Project Manager. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential storm water events. 6. These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.

MONITORING SYSTEM	
	7. An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical. The contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training. 8. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage / leakage occur must be attained and given to the project manager. 9. Topsoil and subsoil to be protected from contamination. This must be monitored on a monthly basis by a visual inspection of diesel/oil spillage and pollution prevention facilities. 10. Concrete and chemicals must be mixed on an impervious surface and provisions must be made to contain spillages or overflows into the soil. 11. Relevant departments and other emergency services must be contacted in order to deal with spillages and contamination of aquatic environments. 12. Soils must be kept free of petrochemical solutions that must be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.

8.8 Traffic Management Plan

Table 51: Traffic Management Plan

TRAFFIC MANAGEMENT PLAN	
MITIGATION MEASURES	1. A designated transport coordination manager must be appointed to oversee and manage the traffic safety officers. Additionally, the designated transport coordination manager must inform and keep up-to-date the interested and affected parties of all the activities taking place that will have a direct impact on them. 2. A traffic safety officer must be nominated to make all the necessary arrangements to maintain the required traffic measures for the duration of the project. The safety officer must liaise daily with the transportation coordination manager to keep them apprised of the state of all the traffic arrangements. 3. All construction traffic must comply with the legal load requirements as outlined in the National Road Traffic Act and National Road Traffic Regulations. 4. During periods of high construction traffic entering and exiting the site, it is recommended that flagmen help direct the traffic. This will enable the safe movement of construction and public traffic at the entrance and reduce the number of potential conflicts. 5. The South African Road Traffic Signs Manual (SARTSM), Volume 2, June 1999 is to be used for all traffic during the construction activities of the proposed project. 6. Any damage caused by the construction vehicles to the existing road infrastructure must be repaired in kind, prior to the completion of the project. 7. A dust suppression system for the gravel roads must be in place to prevent excessive dust from the traffic polluting the air. 8. All abnormal loads must be transported under a permit. 9. A route study be undertaken to confirm the most appropriate route to site. 10. The appropriate load permits be obtained from the Western Cape Department of Transport prior to construction.

8.9 Transportation Management Plan

Table 52: Transportation Management Plan

TRANSPORTATION MANAGEMENT PLAN	
MITIGATION MEASURES	1. For each convoy of abnormal vehicles/loads a designated safety officer must be nominated. 2. All vehicles used during the transport of materials and in the construction activities are required to be roadworthy per the National Road Traffic Act (NRTA) and display all pertinent certificates as required. 3. For any vehicles that operate under an exemption permit, a roadworthy certificate will not be required; however, the exemption permit will require that the vehicle is fit for operation on public roadways. 4. All vehicles travelling to and from the site must adhere to all laws imposed by the law enforcement agencies, and must comply with any requests made by the law enforcement officials. 5. All construction vehicles that are entering the site must also be available via radio or telephone communication to the transport coordination manager. So that in the event of an emergency, all vehicles can be accounted for. 6. During the delivery of the components and associated infrastructure, the person in charge must be in communication with transport coordination manager, so that he/she will keep track and document the progress of the vehicles to facilitate any issues that may arise during the transportation phase. 7. All vehicles must comply with the posted speed limits on public roads as well as the speed limits within the development. 8. All abnormal vehicles and loads to be transported are required to have a valid permit before any trip is begun. 9. SANRAL Western & Southern Region will need to be contacted in order to obtain consent for the abnormal load transport on their roadways. 10. An escort is required to accompany the abnormal vehicle to warn the normal travelling public and to promote the safe flow of traffic if the normal flow of traffic is disrupted by the abnormal vehicle. 11. Construction vehicles delivering raw materials to the site must be covered to prevent any debris along the roads. 12. Ensure a large portion of vehicles traveling to and from the proposed development site travel in the 'off peak' periods. 13. Implement pedestrian safety initiatives. 14. Trucks must stop at regular intervals to allow queuing vehicles to pass.

A consolidated Traffic and Transport Management Plan, taking into account the final route selection must be prepared once the Project advances to the preliminary phase. This plan must ensure that vehicles arrive in a dispersed manner throughout the day to reduce the impact to other road users. Methods to improve driver safety must also be outlined, e.g. the use of speed cameras or Average Speed Over Distance (ASOD). Furthermore, this plan must include measures to minimise the impact on local commuters so as not to disturb existing retail and commercial operations.

8.10 Heritage Management Plan

Table 53: Heritage Management Plan

HERITAGE MANAGEMENT PLAN	
MITIGATION MEASURES	1. In the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, Northern Cape Heritage Resources Authority needs to be contacted. An enquiry must be lodged with them into the necessity for a Heritage Impact Assessment. 2. In the event that a further heritage assessment is required it is advisable to utilise a qualified heritage practitioner, preferably registered with the Cultural Resources Management Section (CRM) of the Association of Southern African Professional Archaeologists (ASAPA). (a) This survey and evaluation must include: (b) The identification and mapping of all heritage resources in the area affected; (c) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7 of the National Heritage Resources Act; (d) An assessment of the impact of the development on such heritage resources; (e) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development; (f) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources; (g) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and (h) Plans for mitigation of any adverse effects during and after the completion of the proposed development. 3. It is advisable that an information section on cultural resources be included in the SHEQ training given to contractors involved in surface earthmoving activities. These sections must include basic information on: (a) Heritage; (b) Graves; (c) Archaeological finds; and (d) Historical Structures. 4. This module must be tailor made to include all possible finds that could be expected in that area of construction. Possible finds include: (a) Open air Stone Age scatters, disturbed during vegetation clearing. This will include stone tools. (b) Palaeontological deposits such as bone, and teeth in fluvial riverbank deposits. 5. In the event that a possible find is discovered during construction, all activities must be halted in the area of the discovery and a qualified archaeologist contacted.

HERITAGE MANAGEMENT PLAN	
	6. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures. 7. If mitigation is necessary, an application for a rescue permit must be lodged with Northern Cape Heritage Resources Authority. 8. After mitigation, an application must be lodged with Northern Cape Heritage Resources Authority for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued will such a site be destroyed. 9. If during the initial survey sites of cultural significance are discovered, it will be necessary to develop a management plan for the preservation, documentation or destruction of such a site. Such a program must include an archaeological/palaeontological monitoring programme, timeframe and agreed upon schedule of actions between the company and the archaeologist. 10. In the event that human remains are uncovered, or previously unknown graves are discovered, a qualified archaeologist needs to be contacted and an evaluation of the finds made. 11. If the remains are to be exhumed and relocated, the relocation procedures as accepted by Northern Cape Heritage Resources Authority need to be followed. This includes an extensive social consultation process.

The above Heritage Plan will be updated by a heritage specialist once the detailed design stages of the proposed development are complete and the walk-though study has been undertaken.

8.11 Chance Finds Protocol

A following procedure will only be followed if fossils are uncovered during excavation.

8.11.1 Legislation

Cultural Heritage in South Africa (includes all heritage resources) is protected by the **National Heritage Resources Act (Act 25 of 1999) (NHRA).** According to Section 3 of the Act, all Heritage resources include **"all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens**".

Palaeontological heritage is unique and non-renewable and is protected by the NHRA and are the property of the State. It is thus the responsibility of the State to manage and conserve fossils on behalf of the citizens of South Africa. Palaeontological resources may not be excavated, broken, moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

8.11.2 Background

A fossil is the naturally preserved remains (or traces) of plants or animals embedded in rock. These plants and animals lived in the geologic past millions of years ago. Fossils are extremely rare and irreplaceable. By studying fossils, it is possible to determine the environmental conditions that existed in a specific geographical area millions of years ago.

8.11.3 Introduction

This informational document is intended for workmen and foremen on construction sites. It describes the actions to be taken when mining or construction activities accidentally uncovers fossil material.

It is the responsibility of the Environmental Site Officer (ESO) or site manager of the project to train the workmen and foremen in the procedure to follow when a fossil is accidentally uncovered. In the absence of the ESO, a member of the staff must be appointed to be responsible for the proper implementation of the chance find protocol as not to compromise the conservation of fossil material.

8.11.4 Chance Find Procedure

- If a chance find is made the person responsible for the find must immediately **stop working** and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately **report** the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.

- A preliminary report must be submitted to the Heritage Agency within **24 hours** of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- The site must be secured to protect it from any further damage. **No attempt** should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

8.12 Fire Management Plan

The intent of a Fire Management Plan (FMP) is to provide fire safety requirements to ensure that the construction and operation of the proposed Droogfontein 3 Solar BESS Energy Facility, which are defensible from wildfire and, in turn, do not represent a significant threat of ignition source for the surrounding native habitat.

It must be noted that during extreme fire conditions, there are no guarantees that a given structure will not burn. Precautions and mitigating measures identified in this plan are designed to reduce the likelihood that fire would impinge upon the proposed structures as well as minimise the impact of fires if they do occur. This FMP does not guarantee that fire will not occur in the area or that fire will not damage property or cause harm to persons or their property.

Droogfontein 3 Solar BESS Energy Facility will rely heavily on the co-operation and proactive participation between managers, employees and contractors to maintain a high level of Fire safety awareness at all times.

This management plan is also a reflection of Droogfontein 3 Solar BESS Energy Facility commitment towards the constant safeguarding of employees against Fire hazards, whilst complying with the requirements of the Fire Safety Act, 6 of 2002 and Occupational Health and Safety Act, 85 of 1993.

8.12.1 Fire and Maintenance of Access Roads for Energy Facility

- A primary access and escape route will be visible and known to all who visit the facility and will be controlled by a security gate.
- There will be other dedicated secondary gravel roads leading to/from the project site to/from the primary access.
- There will be more than one vehicular access gate leading into the project.

- An escape route map with safe gathering points needs to be visible at all the entrance gates/construction camps for anyone to familiarise themselves with upon entry (and will be provided prior to construction once the final facility layout and building plans have been approved by the appropriate department / authority).

8.12.2 Fire Safety Act, 6 of 2002

A copy of the fire safety act is to be available at the facility for everyone's easy access purposes.

8.12.3 Principles of Fire Safety

The aims of implementing measures to limit the incidences and spread of fire are:

- To ensure the safety of people, minimising loss of life and injury.
- To minimise loss of and damage to property and possessions.
- To minimise the negative impact on the environment.
- To safely and effectively extinguish fire when needed.

8.12.4 Requirements in Terms of the South African Bureau of Standards (SABS)

From a fire safety point of view, all buildings erected within the boundaries of South Africa must comply with the SABS 0400:1990- The application of the National Building Regulations. The following requirements are appropriate and can be adapted for planning and design of buildings. Any building must be so designed, constructed and equipped that in case of fire:

- The protection of occupants or users therein is ensured and that provision is made for the safe evacuation of such occupants or users.
- The spread and intensity of such fire within such buildings and the spread of fire to any other building will be minimised.
- Adequate means of access and equipment for detecting, fighting, controlling and extinguishing such fire are adopted.

8.12.5 Management Commitment

It will be the responsibility of managers to:

- Enforce such measures as may be necessary in the interest of the preservation of employee's safety including safety against fire.
- Permit employees to perform work only once the precautionary measures are put in place.
- Provide the necessary supervision to staff to ensure that precautionary measures are maintained.
- Ensure that the staff are adequately trained in fire procedures.
- Ensure that all staff are informed regarding their scope of authority.
- Ensure that the FMP is reviewed and updated regularly to meet the projects needs at that particular point in time.
- Ensure that the firefighting equipment is regularly serviced.

- Make sure that the FMP forms part of the facility induction which will be made compulsory for each new member to the facility to attend.

8.12.6 Employees' Contribution to Fire Management

The successful implementation of the FMP will require the full co-operation of every employee.

In this regard it will be expected of every employee to:

- Take care of the fire detection and fire protection systems and equipment.
- Carry out any lawful order given to him/her and obey the fire procedures laid down, or authorised thereto, by Droogfontein BESS in the interest of health and fire safety.
- Report any situation which may cause fire to the supervisor and/or Health and Safety Representative.
- Be able to make recommendations to the relevant Health and Safety representative who will take the recommendation into consideration and if agreed upon then implemented.

Co-operation will be expected from any other Contractor or subcontractor to ensure that any duty or requirement imposed on Droogfontein BESS, as the employer, through legislation, is complied with.

8.12.7 Fire Prevention / Control

The following preliminary measures will be taken to try and prevent and/or control fires on site:

- Smoking and open flames will be prohibited in areas near flammable and/or combustible materials.
- Fire Fighting equipment will be sufficiently available on site and must comply with the relevant legislation.
- All equipment will be serviced annually and pressure tested every five (5) years.

8.12.8 Response

- The facility must at all times have emergency numbers readily available to all employees and staff. These include the fire department as well as emergency care numbers to make sure that fires are quickly extinguished when they occur and that the victims (if any) are medically treated and taken to a nearby hospital or clinic if needs be.
- The staff will be trained to use the firefighting equipment for small fires that can be contained but alternatively if the fire cannot be contained, the appropriate authorities must be contacted to assist in extinguishing the fire.
- If the fire cannot be contained, workers must evacuate the site in an orderly manner led by a trained Health and Safety representative.
- During construction phase, fire protection measures like placing fire extinguishers on site are compulsory before any hot work can commence or where any flammable substances are present.
- During operation phase, Fire protection equipment like Fire Extinguishers will be situated at carefully selected locations for easy access during an emergency.

8.12.9 Management Plan

The following will form the key elements of the FMP:

- Legal Compliance
  - A work place that is safe and without risk to the health and safety of employees in compliance with the requirements of the Occupational Health and Safety Act 85 of 1993 and its regulations as well as the Fire Safety Act, 6 of 2002.

- Fire hazard identification and risk assessment
  - Identify any fire hazards and risks and then determine the extent and impact.
  - Endeavour to eliminate fire hazards and develop control measures to contain the fires.

- Fire Safety, Health and Environmental Proficiency
  - Ensure that employees are conversant with the potential fire hazards and the precautionary measures required with respect to these hazards through regular awareness training.
  - Incorporate and discuss Fire Safety into the daily Toolbox talks.

- Written Safe Word Procedures
  - Develop written safe work procedures for all fire high risks and provide the necessary training to employees if needs be.

- Training and Education
  - Include the fire management plan in all Health and Safety training and assessments and provide the necessary training and awareness to all categories of employees.
  - Provide awareness and training to all new employees including temporary employees and contractors on site.

- Prevention
  - Suitable preventative measures against exposure to hazards are an integral part of daily activities.
  - Personnel protective equipment must be provided for the protection of employees when necessary.
  - Corrective and/or fire preventative measures must be put in place.

- Elimination of Fire Incidents
  - The elimination of fire incidents, including injuries on duty to which employees and the public can be exposed to will be achieved through the proper investigation of any fire incidents. Factors which cause any fire incidences will be determined and then corrective and preventative measures will be developed and implemented in liaison with all relevant stakeholders.

- First Aid Kit
  - A first aid kit will be available on site which will contain all the necessary medication (e.g. pain medication) and equipment to pre-treat any fire injury depending on the magnitude of the injury. If the injury is too severe, the victim must be taken to the nearest hospital or clinic to be treated by professionals and not treated on site.
  - There will be a sufficient number of employees trained in first aid medical assistance in case of small controllable fire incidents occurring on site.

- Machinery, Plant and Equipment
    - All mechanical equipment will be safeguarded in order to protect the health and safety of persons that must be exposed to such equipment.
    - Regular maintenance of all equipment (including firefighting equipment) and inspections will be recorded.
    - Only equipment that is safe and in working condition will be used by the employees. Equipment is to be inspected every day before use.

- Sub-Contractors
    - Sub-contractors will sign an agreement with the Developer to ensure their compliance with the FMP.
    - Sub-contractors will work according to the Health and Fire Safety standards.

8.13 Environmental Awareness Plan

Legislation requires that a company who prepares an environmental management program must develop an environmental awareness plan describing the manner in which the company intends to inform his or her employees of any environmental risks which must result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment. In recognition of the need to protect our environment, environmental management should not only be seen as a legal obligation but also as a moral obligation.

This Environmental Awareness Plan is intended to create the required awareness and culture with personnel and contractors / service providers on environmental safety and health issues associated with the development activities.

8.13.1 Policy on Environmental Awareness

This Environmental Awareness Plan must serve as the basis for the induction of all new employees (as well as contractors depending on the nature of their work on site) on matters as described herein and read in conjunction with the EMPr. The Plan will also be used to hone awareness of all employees on a continuous basis.

Specific environmental awareness performance criteria will also form part of the job descriptions of employees, to ensure diligence and full responsibility at all levels of the organisational work force.

8.13.2 Implementation of Environmental Awareness

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout the project's duration. This will ensure that environmental accidents are minimised and environmental compliance maximised.

Environmental awareness will be fostered in the following manner:

- Induction course for all workers on site, before commencing work on site.
- Refresher courses as and when required

- Daily toolbox talks with all workers on the site at the start of each day, where workers can be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working.
- Displaying of information posters and other environmental awareness material at the general assembly points.

8.13.3 Training and awareness

The Main Contractor is to take responsibility for the management of their staff and subcontractors on the project site during the construction phase and supervise them closely at all times. The onus is on the MC to make sure that all their staff and subcontractors fully comprehend the contents of the EMPr. The MC must organise environmental awareness training programmes, which should be targeted at the two levels of employee: management and labour.

8.13.4 Training of construction workers

All construction staff must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must be informed of how to recognise historical / archaeological artefacts that may be uncovered. They must also be apprised of the EMPr's requirements. Environmental awareness training programmes need to be formulated for these employee levels and must comprise:

- A record of all names, positions and duties of staff to be trained;
- A framework for the training programmes;
- A summarised version of the training course(s); and
- An agenda for the delivery of the training courses.

Such programmes will set out the training requirements, which need to be conducted prior to any construction works occurring and will include:

- Acceptable behaviour with regard to flora and fauna;
- Management and minimising of waste, including waste separation;
- Maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants, cement, mortar and other chemicals;
- Responsible handling of chemicals and spills;
- Environmental emergency procedures and incident reporting; and
- General code of conduct towards I&APs.

The ECO may be requested to provide additional on-site training (in a first language) in respect of environmental aspects that are unclear to the construction personnel. A translator may be required to assist with this additional training. The cost for the translator will be borne by the Main Contractor.

9 CONCLUSION

The environmental and social impacts of the project were identified through the four project phases (pre-construction, construction, operation and decommissioning) in compliance with National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended) and the EIA Regulations 2014 (as

amended). **No fatal flaws have been found for the proposed. No unacceptable negative impacts have been identified that cannot be reduced with the implementation of the proposed mitigation and management measures. Both positive and negative project impacts have been identified.**

Based on the above information and proposed mitigation measured, SiVEST is of the opinion that the Project will not have significant adverse social and environmental impacts. Most adverse impacts will be of a temporary nature during the construction phase and can be managed to acceptable levels with implementation of the recommended mitigation measures for the Project such that the overall benefits from the Project will greatly outweigh the few adverse impacts.

All the negative impacts could be easily mitigated. Generally, the proposed development will result in appreciable benefits to the people in the project area of influence and bring opportunities for development to the country.

The EAP is satisfied that the EMPr is in compliance with National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended) and the EIA Regulations 2014 (as amended)

ANNEXURE A

CURRICULUM VITAE

ANNEXURE B
ENVIRONMENTAL INCIDENTS

LOG Environmental Incident Log

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

ANNEXURE C

COMPLAINTS RECORD SHEET

Complaints Record Sheet

COMPLAINTS RECORD SHEET	**File Ref:** **Page …. of ….**	**DATE:** ……
COMPLAINT RAISED BY:		
CAPACITY OF COMPLAINANT:		
COMPLAINT RECORDED BY:		
COMPLAINT:		
PROPOSED REMEDIAL ACTION:		
ECO: _____ Date: _____		
NOTES BY ECO:		
ECO: _____ Date: _____ Site Manager: _____ Date: _____		

ANNEXURE D

MANAGEMENT OF SOILS: GUIDELINES

Topsoil

- Source of topsoil
- Topsoil must be stripped from all areas that are to be utilised during the construction period and where permanent structures and access is required. These areas will include temporary and permanent access roads, construction camps, and lay down areas. Topsoil must be stripped after clearing of woody vegetation and before excavation or construction commences.
- The topsoil is regarded as the top 300mm of the soil profile irrespective of the fertility appearance, structure, agricultural potential, fertility and composition of the soil.

Topsoil stripping

- Soil must be stripped to a minimum depth of 150mm and maximum depth of 300mm or to the depth of bedrock where soil is shallower than 300mm. Herbaceous vegetation, overlying grass and other fine organic matter must not be removed from the stripped soil.
- No topsoil which has been stripped must be buried or in any other way be rendered unsuitable for further use by mixing with spoil or by compaction using machinery.
- Topsoil must preferably be stripped when it is in a dry condition in order to prevent compaction.

Topsoil stockpiling

- The Consulting Engineer or Environmental Control Officer must stockpile stripped topsoil in areas, which have been approved. Soil stockpiles must take the form of windows.
- To prevent erosion, material stockpiled for long periods (2 weeks) must be retained in a bermed area.
- Topsoil, mulch and subsoil stockpiles must be placed in higher-lying areas of the sit, and must not be positioned within stormwater channels or areas of ponding.
- Topsoil stripped from different soil zones must be stockpiled separately and clearly identified as such. Under no circumstances must topsoil obtained from different soil zones be mixed.
- Soil stockpiles must not be higher than 2m or stored for a period longer than one year. The slopes of soil stockpiles must not be steeper than 1 vertical to 2.5 horizontal.
- No vehicles must be allowed access onto the stockpiles after they have been placed. Topsoil stockpiles must be clearly demarcated in order to prevent vehicle access and for later identification when required.
- Soil stockpiles must not become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation in the soil.
- After topsoil removal has been completed, the Contractor must apply soil conservation measures to the stockpiles where and as directed by the Consulting Engineer or Environmental Control Officer. This must include the use of erosion control fabric or grass seeding.

Topsoil replacement

- Topsoil must be replaced to a minimum depth of 75mm over all areas where it has been stripped and over disused borrow pits, after construction in those areas has ceased. Topsoil placement must follow as soon as construction in an area has ceased.

- All areas onto which topsoil is to be spread must be graded to the approximate original landform with maximum slopes of 1:25 and must be ripped prior to topsoil placement. The entire area must be ripped parallel to the contours to a minimum depth of 300mm.
- Topsoil must be placed in the same soil zone from which it had been stripped. However, if there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil must be brought from other soil zones at the approval of the Consulting Engineer or Environmental Control Officer.
- Where topsoil that has been stripped by the Contractor is insufficient to provide the minimum specified depth, the Contractor must obtain suitable substitute material from other sources at no cost to the employer. The suitability of the substitute material must be determined by means of soil analyses, which are acceptable to the Consulting Engineer or Environmental Control Officer.
- No vehicles must be allowed access onto or through topsoil after it has been reinstated.
- After topsoil reinstatement is complete, cleared and stockpiled vegetative matter must be spread randomly by hand over the top soiled area. The vegetative material must be replaced on the areas from where it has been removed.

ANNEXURE E
PLANT RESCUE PLAN

TO BE INCLUDED IN FINAL EMPr PRIOR TO CONSTRUCTION

ANNEXURE F

ECOLOGICAL MANAGEMENT PLAN

TO BE INCLUDED IN FINAL EMPr PRIOR TO CONSTRUCTION

ANNEXURE G

ALIEN PLANT MANAGEMENT PLAN

TO BE INCLUDED IN FINAL EMPr PRIOR TO CONSTRUCTION

ANNEXURE H
REHABILITATION PLANS

TO BE INCLUDED IN FINAL EMPr PRIOR TO CONSTRUCTION

ANNEXURE I

OPEN SPACE MANAGEMENT PLAN

TO BE INCLUDED IN FINAL EMPr PRIOR TO CONSTRUCTION

ANNEXURE J

TRAFFIC MANAGEMENT PLAN

TO BE INCLUDED IN FINAL EMPr PRIOR TO CONSTRUCTION

ANNEXURE K
TRANSPORTATION PLAN

TO BE INCLUDED IN FINAL EMPr PRIOR TO CONSTRUCTION

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