

APPENDIX H – ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

PROPOSED CONSTRUCTION AND OPERATION OF ADAMS BATTERY ENERGY STORAGE
SYSTEM (BESS) AND ASSOCIATED INFRASTRUCTURE

Joe Morolong Local Municipality, Northern Cape Province

DFFE Ref No.: TBC

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PREPARED FOR:



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ENVIRONMENTAL MANAGEMENT PROGRAMME

Completed in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014 (as amended).

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ABBREVIATIONS

BA	Basic Assessment
BAR	Basic Assessment Report
BESS	Battery Energy Storage System
CAR	Corrective Action Report
CBA	Critical Biodiversity Area
DAFF	Department of Agriculture, Fisheries and Forestry
DEA	Department of Environmental Affairs
DFFE	Department of Forestry, Fisheries and the Environment
DWS	Department of Water Affairs and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
EO	Environmental Officer
IDP	Integrated Development Plan
MSDS	Material Safety Data Sheet
NCR	Non-Conformance Report
NEMA	National Environmental Management Act
PM	Project Manager
PV	Photovoltaic
ROSE	Recycling Oil Saves the Environment
SAHRA	South Africa Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SDC	Safe Disposal Certificate
SDF	Spatial Development Framework
SHE	Safety, Health and Environmental
S&EIR	Scoping and Environmental Impact Report
TBC	To Be Confirmed

GLOSSARY OF SELECTED TERMS AND DEFINITIONS

CONTAMINATION	The release/spillage of a substance into an environment where it is not normally found, which is detrimental to that environment, its ecosystems and to humans.
CORRECTIVE (OR REMEDIAL) ACTION	Reactive response required to address an action that is in conflict with the requirements of the Site Documentation. The need for corrective action may be determined through monitoring, audits or management review.
DEVELOPER	Adams Energy (RF) (Proprietary) Limited is the applicant for the proposed development project.
DOMESTIC WASTE	Means waste, excluding hazardous waste that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes; (<i>NEM: WA, Act No. 59, 2008</i>).
ENVIRONMENT	Means the surrounding within which humans exist and that are made up of: <ul style="list-style-type: none"> (i) The land, water and atmosphere of the earth (ii) Micro-organism, plant and animal life. (iii) Any part or combination of (i) and (ii) and the interrelationships among and between them; and the physical, chemical aesthetical and cultural properties and conditions of the foregoing that influence human health and wellbeing (<i>NEMA, Act 107 of 1998</i>).
ENVIRONMENTAL IMPACT ASSESSMENT (EIA)	Means the systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes the basic assessment report and/or scoping and environmental impact assessment report (NEMA EIA Regulations GN. R982 of 2014, as amended).
IMPACT	A description of the potential effect or consequence of an aspect of a development on a specified component of the biophysical, social or economic environment within a defined time and space.
INCIDENT	An undesired event which may result in a significant environmental impact but can be managed through internal response.
MITIGATION	Measures designed to avoid, reduce or remedy the proposed adverse impacts (<i>DEAT, 1998</i>).
MONITORING	The repetitive and continued observation, measurement and evaluation of environmental criteria to follow changes over a period of time and to assess the efficiency of control measures (<i>DEAT, 1998</i>).
POLLUTION	Means any contamination or change in the environment caused by: <ul style="list-style-type: none"> • Substances • Radioactive or other waves; or • Noise, odours, dust or heat Emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or organ of state, where that change has an adverse effect on human health or wellbeing or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future (<i>NEMA, Act No. 107 of 1998</i>).
PROJECT	The proposed construction of a battery energy storage system in the proximity of Adams Solar Park
WASTE	Any substance, whether or not that substance can be reduced, re-used, recycled and recovered – <ul style="list-style-type: none"> (a) that is surplus, unwanted, rejected, discarded, abandoned or disposed of (b) which the generator has no further use of for (he purposes of production (c) that must be treated or disposed of; or (d) that is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but— <ul style="list-style-type: none"> (i) a by-product is not considered waste; and (ii) any portion of waste, once re-used, recycled and recovered, ceases to be waste (<i>NEM: WA, Act 59 of 2008</i>).

1 INTRODUCTION

1.1 Background

The developer, Enel Green Power South Africa (Pty) Ltd (**EGP**), is proposing to submit an application for an Environmental Authorisation for the construction of a Battery Energy Storage System (**BESS**) in the proximity of the existing Adams Solar photovoltaic facility located in Joe Morolong Local Municipality in the Northern Cape province. Part of the submission requirements is for the positive Environmental Authorisation (**EA**).

The general purpose and utilisation of a BESS is to save and store excess electrical output as it is generated, allowing for a timed release of electricity to the grid when the capacity is required and to provide ancillary services to the network. BESS systems therefore provide flexibility in the efficient operation of the electricity grid through decoupling of the energy supply and demand.

NCC Environmental Services (Pty) Ltd (**NCC**) was appointed by **EGP** to assist with proactive environmental management services for the 'proposed development' (hereafter referred to as the 'project'). This Environmental Management Programme report (**EMPr**) was compiled as part of the Basic Assessment Report (**BAR**) application process for **EA** required by the National Environmental Management Act, 1998 (Act No. 107 of 1998) (**NEMA**). Section 19-20 [BA] of the NEMA EIA Regulations (as amended), require that as part of the EA application process, an EMPr be prepared and submitted for a decision by the competent authority, the Department of Forestry, Fisheries and the Environment (**DFFE**).

The EIA Regulations should also be read in conjunction with Section 24N of NEMA.

1.2 Scope of EMPr

This EMPr provides environmental guidance to the developer, engineers, agents and contractor(s) for the planning, construction, and operational phases of the proposed development activities with regard to their responsibilities in terms of accountable environmental management. This EMPr is to be implemented by the aforementioned parties in the execution of the project in order to ensure environmental compliance on site. The effectiveness of the EMPr is limited by the level of adherence to the conditions set forth in the EMPr. It is further assumed that conformance to the EMPr will be monitored and audited as set out in this EMPr.

1.2.1 EMPr overview

An EMPr indicates the potential environmental impacts that a development activity could have on the biophysical and socio-economic environment and which mitigation and monitoring procedures should be implemented to minimise negative impacts and optimise positive impact. This EMPr provides generic and site-specific environmental management measures related to the project in terms of keeping the overall environmental footprint as small as possible. The EMPr has been compiled to form the basis of a management system to implement on this particular project to regulate and control activities pre-construction [planning and design phase], during construction as well as during the operational phase.

The EMPr is primarily based on the principles of NEMA which bestows a ‘*Duty of Care*’ on those who cause, have caused or may in future cause pollution or degradation of the environment, as per of Section 28(1) of NEMA.

This EMPr is a dynamic document which can be updated as required on a continuous basis to ensure environmental best practice prevails. Any substantive EMPr amendments considered necessary must first be submitted to the Project Manager and Environmental Control Officer (**ECO**)_ for consideration. Final amendments to the EMPr must be submitted to the relevant authority for consideration and approval.

1.2.2 Purpose of EMPr

This EMPr has been compiled to provide recommendations and guidelines for the implementation of control measures to mitigate against negative environmental impacts, and the associated monitoring thereof, throughout the duration of the proposed development project. The purpose of the EMPr is to ensure that all relevant impacts are considered for the undertaking of environmentally responsible activities and provides both generic and direct specifications for "*good environmental practice*" for application across the lifecycle of the project [planning, design, construction, and operational phases].

The EMPr informs the relevant project role-players (developer, engineer, contractor, compliance officer, e.g., ECO and all other staff employed at the site) as to their respective roles and duties in the fulfilment of the

environmental legal requirements during all phases, with particular reference to the prevention and mitigation of anticipated negative environmental impacts. Furthermore, it aims to organise and coordinate the environmental management and mitigation measures with construction and operational activities and pragmatically describe these measures in order to prevent, reduce or otherwise manage the potential negative environmental impacts associated with the project. Where opportunities exist to enhance/optimize any favourable/positive impacts related to the project, these have also been described.

1.2.3 Objectives of EMPr

The objectives are:

- a) To ensure compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international
- b) To assign roles and responsibilities to parties involved regarding the implementation of this EMPr
- c) To verify environmental performance through information on impacts as they occur
- d) To outline mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimise the extent of negative environmental impacts, and to otherwise manage environmental impacts associated with the proposed project
- e) To detail specific actions deemed necessary to assist in minimising the environmental impact of the project
- f) To identify measures that could optimise beneficial/favourable/positive impacts
- g) To create management structures that address the concerns and complaints of I&APs with regards to the Project
- h) To propose mechanisms for monitoring compliance with the EMPr and reporting thereon
- i) To specify time periods within which the measures contemplated in the final EMPr must be implemented, where appropriate.

1.2.4 Structure of EMPr

The EMPr is divided into five (5) phases. Each phase has specific issues and activities related to that period.

The impacts are identified and given a brief description in line with the project phases outlined in Appendix 4, Section 1(d) of the EIA Regulation (as amended) and are highlighted below:

a) Planning and Design Phase

This section provides management principles for the planning and design phase of the development prior to the undertaking of any construction activities. The primary environmental objective during this phase is to ensure the best suited environmental option for the proposed development is selected based on the final design (*i.e.*, plans, drawings, layouts, surveys, environmental assessments, and specialist studies) undertaken for the proposed site footprint.

b) Pre-Construction Phase (includes assessments, approvals, permits, authorisations)

This section will provide guidance on pre-construction activities including authorisation/permit requirements, site establishment; environmental induction and training and awareness; site access and health and safety. Environmental actions, procedures and responsibilities are described. Management principles are outlined, and the developer will be required to follow these guidelines including those conditions derived from the EA, should one be issued by the decision-making authority.

c) Construction Phase (includes contractor appointment and site establishment)

Based on the premise that the proposed development is authorised to proceed; this section provides management principles for the construction phase. Environmental actions, procedures and responsibilities are specified. These specifications should form part of any contractual documentation and the contractor will be required to comply with these specifications to the satisfaction of the developer, Project/Site Manager and ECO.

d) Post-Construction Phase (includes site de-establishment and rehabilitation)

Upon completion of construction and prior to operation of the controlled environmental farm facility, this section provides measures, environmental actions, procedures, and responsibilities for site de-establishment by the construction contractor and any rehabilitation requirements. These requirements should also form part of the contractual documentation and the contractor will be required to comply with these measures to the satisfaction of the developer, Project/Site Manager and ECO.

e) Operational Phase

This section of the EMPr includes management principles, best practice, procedures, and responsibilities as required for controlling the impact on the environment during operational activities. The aim is to ensure that the infrastructure is operated and maintained according to ‘best practice’, in other words, to ensure that the development is maintained and operated in an environmentally sensitive and sustainable manner where operational activities do not result in reasonably avoidable environmental impacts from occurring.

1.3 Author of the EMPr

Appendix 4(1) of the EIA Regulations, 2014 (as amended), indicates that the EMPr must contain details of the EAP who prepared the document and the relevant expertise of the EAP. The EMPr has been prepared by Nick Gates and Craig Burne of NCC Environmental Services (Pty Ltd (NCC). NCC is a Cape Town based environmental consulting firm with regional offices in Durban and Johannesburg. The company has extensive consulting experience in a variety of private and public sector development and construction projects throughout South Africa. The CV of the author is attached as **Annexure A**.

1.4 Legal requirements

The Constitution of the Republic of South Africa (Act No. 108 of 1996) Section 24 states:

Everyone has the right to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

As such, certain activities associated with development projects may trigger particular environmental legislative requirements, either under the various Duty of Care provisions found in Section 28 of NEMA, some of the Specific Environmental Management Acts, the NEMA Listing Notices or other approvals which are required prior to commencing with the development. Other relevant legislation is provided in **Annexure B**.

1.5 Environmental authorisation

According to section 2, subsections 1, 2 & 3 of **NEMA** [the Act], all Organs of State have to apply certain principles set out in the Act when taking decisions that may significantly affect the environment. The key principles of this Act include that all “actions” approved must be economically, socially, and environmentally sustainable and justifiable. It further states that “*environmental management must place people and their needs at the forefront of its concern*” and that their collective interests must be served equitably.

In accordance with NEMA and the relevant EIA Regulations, NCC engaged with DFFE on behalf of the project in order to assess the legal requirements to be met related to the proposed development. It was confirmed that an application for environmental authorisation (EA) was required. The works carried out on the project will be undertaken in accordance with the NEMA EIA Regulations, 2014 (As amended).

Project associated activities should be implemented and managed according to the best and current industry practice, as identified in the contractual, project-specific documentation. This EMP, which forms an integral part of any contractual documents, informs the project role-players as to their duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by the project. Where applicable, the content of this EMP is aligned with the requirements as set out in Section 19(4) of the EIA Regulations, 2014 (As amended).

The contractor should note that obligations imposed by the approved EMP are binding in terms of any agreements between the developer EGP and themselves and will therefore be part of the terms of additional conditions and the general conditions of contract that pertain to this development. The contractor shall identify and comply with all South African national and provincial environmental legislation, including associated regulations and all local by-laws relevant to the project. Key legislation currently applicable to the design, construction and implementation phases of the development must be complied with. The list of primary applicable legislation provided below (**Annexure B**) is intended to serve as a guideline only and is not exhaustive.

2 PRIMARY LEGISLATION

Refer to **Box 1**.

Box 1: Primary environmental legislation, municipal by-laws and strategies, policies, and plans.

National Legislation and Regulations

- **Agricultural Pests** Act of 1983 (Act No. 36 of 1983)
- **Alien and Invasive** Species Regulations, 2014
- **Animals Protection** Act of 1962 (Act No. 71 of 1962)
- Conservation of **Agricultural** Resources Act (Act No. 43 of 1983)
- Environment **Conservation** Act (Act No. 73 of 1989)
- Fertilizers, Farm Feeds, **Agricultural** Remedies and Stock Remedies Act (Act No. 36 of 1947)
- **Hazardous Substances** Act (Act No. 15 of 1973)
- **Health** Act (Act No. 63 of 1977)
- **Mineral and Petroleum** Resources Development Act (Act No. 28 of 2002)
- **Mountain** Catchment Areas Act (Act No. 63 of 1970)
- National **Dust** Control Regulations, 2013
- **National Environmental Management** Act (Act No. 107 of 1998) (as amended)
- National Environmental Management: **Air Quality** Act (Act No. 39 of 2004)
- National Environmental Management: **Biodiversity Act** (Act No. 10 of 2004)
- National Environmental Management: **Protected Areas** Act (Act No. 57 of 2003)
- National Environmental Management: **Waste** Act (Act No. 59 of 2008)
- National **Forest** Act (Act No. 84 of 1998)
- National **Health** Act (Act No. 61 of 2003)
- National **Heritage** Resources Act (Act No. 25 of 1999)
- National **Road Traffic** Act (Act No. 93 of 1996)
- National **Road Traffic** Regulations 2000 (as amended)
- National **Veld and Forest Fire** Act of 1998 (Act No. 101 of 1998)
- National **Water** Act (Act No. 36 of 1998)
- NEMA **EIA Regulations**, 2014 (as amended)
- **Noise** Control Regulations GN R 154 in GG No. 13717 of 10 January 1992 (published in terms of Section 25 of the Environment Conservation Act 73 of 1989)
- Occupational **Health and Safety** Act (Act No. 85 of 1993)
- **The Constitution** of the Republic of South Africa (Act No. 108 of 1996)
- **Water Services** Act (Act No. 108 1997)
- World **Heritage** Convention Act (Act No. 49 of 1999)

Other Documentation

- Integrated Resources Plan 2010-2030 (IRP 2010)
- Joe Morolong Local Municipality Integrated Development Plan 2021/2022
- John Taolo Gaetsewe District Municipality Integrated Development Plan 2021/2022
- National Biodiversity Assessment (NBA) & National Vegetation Map
- National Freshwater Ecosystem Priority Area (NEFPA) Assessment
- The White Paper on Renewable Energy (November 2003)
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998)

3 PROJECT DESCRIPTION

The project will include the development of the BESS of up to 4ha in extent to be located adjacent to (within 100m of) the existing Photovoltaic Facility (PV) and associated substation.

Associated infrastructure includes:

- i. A Substation with a maximum height of - HV busbar up to 10m max and an HV Building up to 4m max.
- ii. Access road to the BESS (the existing access road will be utilized) branching off the existing roads, and internal roads (up to 8m wide) within the footprint of the BESS, as needed.
- iii. MV Cabling (underground or overhead) between the BESS and the HV/MV BESS substation.
- iv. HV Cabling (underground or overhead) between the HV/MV BESS substation and the existing HV substation or for loop in and loop out to the existing HV connection line
- v. Fencing around the BESS and the substation for increased security measures.
- vi. Temporary laydown area within the 4ha footprint of the BESS.
- vii. Possible firebreak around the BESS facility which is to be located within the 4ha BESS footprint.

3.1 Site Location

The proposed site is located on Farm Adams No. 328 Remainder within the Joe Morolong Local Municipality, John Taolo Gaetsewe District Municipality, Northern Cape Province.

This area has been selected as it is located adjacent to the existing Adams Solar Park Photovoltaic Facility and connecting transmission line (**Figure 1: Site Locality Map (Topographical Map)**).

Table 1: Property Details.

Property Details		
GPS co-ordinates	27° 22' 29.8"S	23° 00' 34.9"E
District Municipality	John Taolo Gaetsewe District Municipality	
Local Municipality	Joe Morolong Local Municipality	
Nearest Town	Hotazel	
Ward	4(34501004)	
SG	C04100000000032800000	

Table 2: GPS positions BESS Facility.

Activity – BESS Facility		
Point	Latitude (S)	Longitude (E)
A	27°22'27.57"S	23° 0'29.25"E
B	27°22'27.07"S	23° 0'42.05"E
C	27°22'30.01"S	23° 0'42.05"E
D	27°22'31.96"S	23° 0'29.10"E

Table 3: GPS positions BESS Facility substation.

Activity – BESS Facility		
Point	Latitude (S)	Longitude (E)
A	27°22'27.57"S	23° 0'29.25"E
B	27°22'27.40"S	23° 0'31.76"E
C	27°22'29.40"S	23° 0'31.65"E
D	27°22'29.40"S	23° 0'29.19"E

Table 4: GPS positions linear structures – Overhead Lines (Option A: Substation to Substation).

Activity – BESS Facility		
Point	Latitude (S)	Longitude (E)
A (BESS)	27°22'27.86"S	23° 0'29.11"E
B (Turn)	27°22'24.47"S	23° 0'28.98"E
C (Existing Substation)	27°22'25.16"S	23° 0'28.07"E

Table 5: GPS positions linear structures – Overhead Lines (Option B: Loop In & Loop Out).

Activity – BESS Facility		
Point	Latitude (S)	Longitude (E)
A (BESS)	27°22'28.60"S	23° 0'29.16"E
B (Existing Line)	27°22'28.64"S	23° 0'27.57"E

Two grid connection options have been explored, option A (connection from the BESS Substation to the existing HV substation) and option B (connection from the BESS Substation to the loop in and loop out to the existing HV connection line).

The R380 road between Kathu and Hotazel is located approximately 1km to the west of the property.

The Mamatwane Manganese mine and sinter plant is located across the R380 to the west of the proposed site.

An existing 132kV transmission line servicing the current solar facility runs adjacent to the existing Adams PV facility and the proposed site.

The remaining surrounding properties are utilised for agricultural purposes.

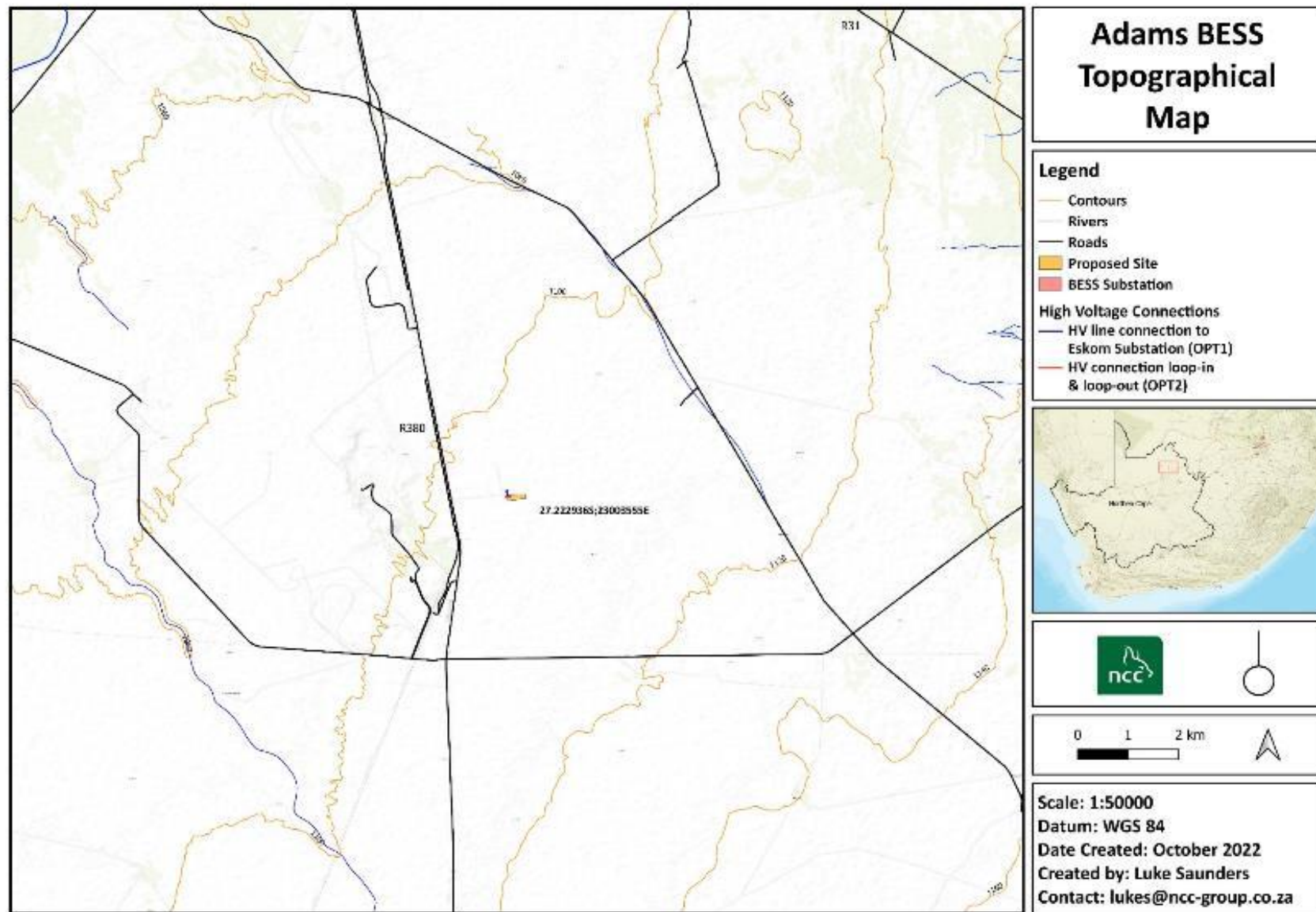


Figure 1: Site Locality Map (Topographical Map).

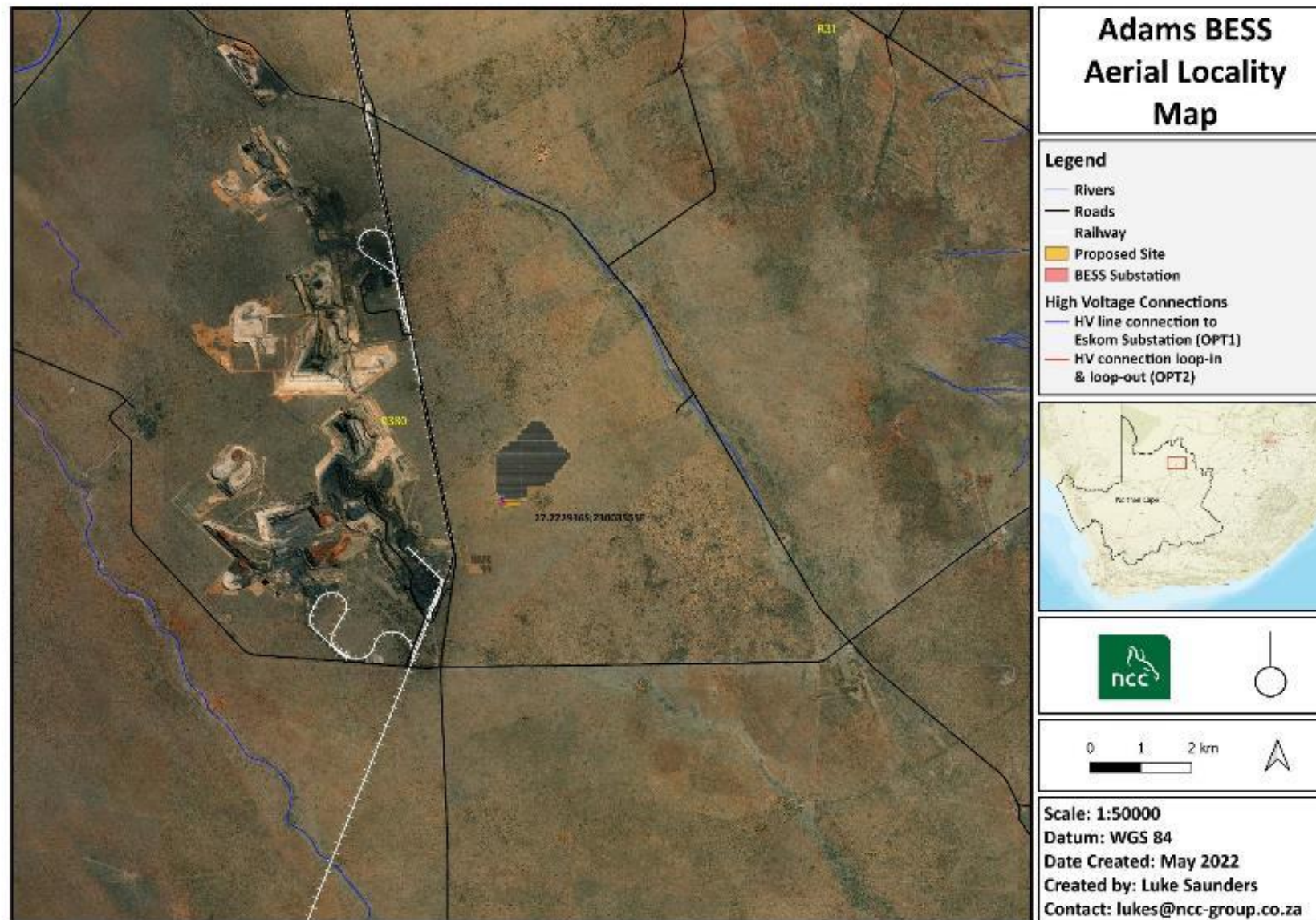


Figure 2: Site Locality Map (Aerial Photograph).

3.2 Site sensitivities

The proposed development footprint in relation to environmental sensitivities is illustrated in Figure 3: Biodiversity Map.

Within the site, there was little apparent variation in the vegetation composition. In some areas, such as near the watering points, the density of trees was somewhat higher, and the grass layer grazed out. However, there were no significant differences visible that warranted recognition as different plant communities within the site. It is possible that the dry conditions at the time of sampling as well as the burnt condition of a large proportion of the site may have hindered the recognition of the different communities within the site. However, this seems unlikely as the substrate was very homogenous and there was little significant variation in the woody layer.

In addition, no drainage lines or other edaphic features occur within the site that might lead to differentiation of the vegetation.

The development will not impact on any freshwater biodiversity and no specific impact management interventions for freshwater biodiversity features are considered necessary or provided in this respect.



Figure 3: Biodiversity Map.

3.3 Overview of BESS System

The proposed BESS will be housed inside containers or similar structures with a total footprint of up to 4ha in extent. It will be located adjacent to the existing Adams Solar Facility.

Both Lithium-ion and Redox-flow technology are being considered for the project, depending on which is most feasible at the time of implementation.

Lithium Ion

Li-ion batteries get their name from the transfer of lithium ions between the electrodes, both when energy is injected for storage purposes and when it is extracted. Within the lithium family there are a variety of different chemistries and designs from numerous suppliers.

Instead of metallic lithium, Li-ion batteries use lithiated metal oxides as the cathode, and carbon typically serves as the anode. Unlike other batteries with electrodes that change by charging and discharging, Li-ion batteries offer better efficiency because the ion movements leave electrode structures intact.

Lithium-ion-based energy storage systems may have cycle durations up to 8 hours. The expected lifetime is related to the cycling Depth of Discharge (DoD). Li-ion batteries' lives are generally limited to less than 80% DoD to ensure an adequate life.

The modularity of the Li-ion cells allows them to be constructed as modules and scaled. Battery packs can then be combined with inverters and controls systems and packaged into BESS at manufacturing facilities. When packaged into standard shipping container sizes, shipping the BESS around the world via truck, rail, or ship is greatly facilitated. Containerized BESS can be sited on pads or simple foundations and electrically connected to switchgear. Containerization significantly reduced the costs for local labour and on-site construction.

Modularized and packaged systems offer ease of system removal from site for disposal at end of life. Site contamination is unlikely, and site restoration would include infrastructure removal and revegetation. The materials used in Li-ion batteries are typically considered non-hazardous waste. The metals in the system can be recycled, but they do not represent a high salvage value.

Vanadium Redox Flow (VRF)

The VRF is based on redox reactions of different ionic forms of vanadium. During battery charge, V^{3+} ions are converted to V^{2+} ions at the negative electrode through the acceptance of electrons. Meanwhile, at the positive electrode, V^{4+} ions are converted to V^{5+} ions through the release of electrons. Both of these reactions absorb

the electrical energy put into the system and store it chemically. During discharge, the reactions run in the opposite direction, resulting in the release of the chemical energy as electrical energy.

Both electrolytes in the VRF are composed of vanadium ions in an aqueous sulphuric acid solution at very low pH. The acidity of the sulphuric acid is comparable to that of the electrolyte found in lead-acid batteries, with a pH of between 0.1 and 0.5.

The electrodes used in VRF are composed of high-surface area carbon materials. The membrane physically separates the two vanadium-based electrolyte solutions, preventing self-discharge while allowing for the flow of ions to complete the circuit. The vanadium electrolytes are stored in separate large electrolyte tanks outside the cell stack.

The electrolyte tanks and associated pipes, valves etc. must be composed of materials that are resistant to corrosion in the very low pH environment. The cell stack is generally environmentally benign. The only material in the stack that might be considered toxic is the ion exchange membrane, which is composed of highly acidic (or alkaline) material.

The VRF is the most technically mature of the flow-type battery chemistries. The first operational VRF was successfully demonstrated in the late 1980s.

The VRF offers a relatively high cell voltage, which is favourable for higher power and energy density. Cross-transport of vanadium ions across the membrane is also reported as a challenge. These membranes can be vulnerable to fouling, wherein vanadium ions become irreversibly trapped in the membrane and increase resistive losses in the cell.

3.4 Construction Activities

The development project will, during the construction phase, include the following activities:

- a) Establishing and operating a contractor's site camp incorporating offices, car ports, storage areas, workshops, laboratories, ablution facilities, services, and access.
- b) Procurement and transferring materials, plant, and equipment from commercial sources to and within the site's construction footprint
- c) Receiving and storing construction and building materials
- d) Storing construction waste and rubble for collection and disposal
- e) Site preparation, including vegetation clearance and removal of existing structures
- f) Earthworks, stockpiling and spoiling of materials, including any gravel, soil, rocks, and boulders
- g) Excavation of trenches for the installation/connection of water, wastewater, and electrical services
- h) Construction of new structures, installation of services and internal infrastructure
- i) Site rehabilitation activities.

3.5 Operation Activities

The functioning and operation of the BESS facility farm is expected to be long-term and fully functional once construction is complete.

Operational infrastructure and activities will include:

- a) BESS and connection infrastructure
- b) Operational Offices
- c) Eating area, locker rooms and ablution facility
- d) Storage Area
- e) Access road and parking

3.6 Decommissioning and rehabilitation

EGP plans to maintain the BESSs in the long-term. Replacement of battery components may be required however no decommissioning of the system as a whole is planned in the foreseeable future. Maintenance management measures (e.g., the return to supplier clause) that cover the disposal of certain components have been included in the EMPr under the operational phase.

The typical life expectancy for the BESS system is between 15 to 20 years, all depending on the technology used, operations and application of the system and maintenance regimes applied etc. The system is modular, which

allows premature equipment failures to be counteracted by replacing the specific sections, without major impact on the holistic system.

As with the other equipment, the decommissioning process for BESS involves dismantling and removing the equipment and waste from the site in compliance with applicable federal and local rules governing its safe transport and disposition.

The actual scope of decommissioning shall allow for the energy storage system to be safely de-energized, disassembled, readied for shipment or storage, and removed from the premises.

Once a used battery is removed from service and diverted toward end-of-life management, it will be disposed as per the most relevant measures as identified at the time.

These can include the following.

- Recordkeeping.
- Labelling.
- Specified storage methods.
- Outline approved recycling or disposal pathways and structures.

The balance of plant represents a significant quantity of materials, including:

- Concrete pads or foundations.
- steel enclosures or containers.
- Cabling.
- Array of electronics that are part of the entire energy storage system package (conversion units).

Concrete and steel are readily recyclable, and many enclosures can be reused. Inverters, control systems, and other electronic equipment share many of the challenges of e-waste more broadly, but useful materials often can be recovered. There is a possible salvage cost of the batteries since they can be sold as second-hand systems, or the batteries carry some recycle value to be reused

The table below provides a broad overview of potential activities associated with the dismantling of a typical BESS Facility. Certain activities may not be relevant to the Adams BESS facility decommissioning process.

Table 6: Overview of potential dismantling activities.

Key Equipment	Description
Power Conversion Units	Removal and demolishing of Inverter Modules, Inverter Step-Up transformers, Switchgear, Canopies and Enclosures, Rebar of Concrete Foundations
Cable Reticulation System	Removal and Demolish of Cable Trays, Racks, Ladders, Supports, Conduit etc.
Low Voltage Cabling	Removal of DC, LV and Communication Cabling
Medium Voltage Cabling	Partial removal of MV Cabling - above ground and up to a level
Cable Trench Rehabilitation	Opening and Closing of Cable Trenches - Rehabilitating the Route
Batteries and Container	Removal of Batteries and Containers, Rebar of Concrete Foundations
Transport to Recycling Facility	Current batteries to be transported back to manufacturer
Recycling of Lithium-Ion Batteries	Depending on recycling plant (cost of recycling and salvaging could be included)
Storm Water Management System	Removal and Demolish of Storm water Pipes, Culverts, Headwalls etc
Fencing	Removal and Demolish of Plant Perimeter Fence
Topsoil Strip	Strip and Store of Topsoil from Formed areas now impacted by Decommissioning
Import and Replace Topsoil	Import Topsoil from Commercial Sources

4 POTENTIAL ENVIRONMENTAL IMPACTS

The construction activities associated with the Project and the broad manner in which these may impact on the biophysical and human environment have been summarised in the BAR.

In summary a range of potential impacts that may be expected to occur or result from the proposed development either positive [+ve], negative [-ve] or neutral [0], include:

Table 7: Potential Impacts.

Potential Impacts	Status
Soil compaction / erosion / pollution	[-ve]
Pollution of surface and/or groundwater	[-ve]
Loss of terrestrial biodiversity	[-ve]
Emergence and establishment of invasive alien vegetation and noxious weeds	[-ve]
Landscape change and visual/aesthetic impacts	[-ve] [+ve], or [0];
Socio-economic impacts	[+ve]
Cultural, historical, archaeological and/or palaeontological impacts	[0];

It is expected that the significance of any negative impacts on the surrounding biophysical and human environment associated with the proposed development will be largely reduced provided this EMPr is strictly adhered to.

Implementation of the Environmental Specifications (**ES**) described in Section 6 of this EMPr aim to avoid, reduce and minimise negative/adverse impacts accordingly. This will require open communication and a collaborative effort between the developer/EA holder, all contractors and any potential end-user developers/clients if they are ultimately different from the primary developer/EA holder. This will have particular relevance with regard to sensitive areas on the site footprint and water and waste management activities during both construction and operations. Good environmental compliance can be enhanced through effective management and maintenance planning, as supported by monitoring and auditing programmes.

The Adams BESS facility, once operational, would have opportunities which include:

- Reduction in carbon emissions in the country's power generation infrastructure
- Unlocking constrained networks (Reduction in loading/ congestion of upstream High Voltage networks)
- Reducing voltage drops and improve quality of supply
- Deferment or replacement of future capital expansion projects
- Supports mini grids in areas with limited access to bulk power; and
- Peak load reduction - battery storage can be dispatched during peak load time (thereby extending baseload and offset carbon emissions).

5 IMPLEMENTATION, MONITORING AND REVIEW

5.1 Roles and Responsibilities

5.1.1 Proponent

EGP will be the project proponent for all components of the work related to the project. EGP is therefore accountable for ensuring compliance with the EMPr and all legal requirements related to the project. The proponent is also responsible for the appointment and management of the rest of the project team.

5.1.2 Competent Authority

The authorities or regulatory bodies (including various local authorities and provincial government) will be responsible for the timely processing and issuing of necessary permits or approvals if required for the proposed activities. The authorities may conduct inspections to audit compliance to any permits and conditions thereof. In such cases, the developer and contractors will need to communicate and collaborate with the authorities to ensure compliance.

5.1.3 Project Manager / Project Engineer

The Project Manager (PM) will firstly regulate, control and manage activities associated with the project, and secondly monitor and minimise project associated impacts on the environment by overseeing the implementation of the EMPr. The PM will ultimately be responsible for implementing or conforming to the environmental management measures by any person acting on their behalf, including but not limited to contractors, sub-contractors or service providers associated with the project. The PM will arrange for a post-construction meeting to discuss any issues that need immediate corrective or remedial actions, or to ensure preventative actions are implemented to improve the management of the project.

Additionally, they act as the agent of the Proponent on matters relating to the environment and compliance of the EMPr. They will receive reports from the EO and or ECO to the Proponent, approving the contractor's method statements, ensuring that the contractor is knowledgeable of the EMPr and its requirements and responsibilities.

5.1.4 Contractor Representative

The Contractor shall appoint an Environmental Officer (EO) or Safety, Health and Environmental (SHE) representative that is answerable to the proponent for effective implementation and monitoring of the EMPr specifications. The contractor(s) shall compile method statements for proposed activities and submit these to the EO (as well as the Project Engineer and ECO) for approval, develop and maintain a daily on-site monitoring system to comply with the EMPr, implement environmental training and awareness, report and maintain a record of incidents and public complaints, implement appropriate corrective and preventative measures,

maintain all on-site environmental records including waste disposal records and ensure internal auditing of the EMPr.

Communicating with the PM, ECO and DFFE where relevant, providing environmental awareness and training/induction etc to all staff, ensuring sub-contractors and suppliers are aware of the site conditions and applicable sections of the EMPr, addressing the findings of the ECO inspections, and providing an Environmental Incident Report File and a Complaints Register.

5.1.5 Environmental Control Officer

A suitably qualified independent ECO shall be appointed by the developer. The ECO shall have adequate environmental knowledge to understand the detailed environmental issues associated with the project and is to be well-versed in the contents of the EMPr and associated reports, and relevant authorisations/permits/licenses. The ECO will ensure that environmental mitigation measures are implemented through collaboration with the PM and compile regular environmental compliance reports and/or Audits as specified in the EA. The aim of ECO compliance monitoring will be to record the project's conformance with the EA and EMPr. Compliance reports will be made available to all project-role-players, including the authorities, and any other stakeholders that may request such. A post-construction audit must be undertaken by the ECO once all construction activities and any required rehabilitation are complete, and the related report made available to all project-role-players, relevant authorities, and stakeholders. It must be noted that the responsibility of the ECO on the project is to monitor EMPr compliance during construction and provide advice on the implementation of the EMPr as and when needed, and not to implement compliance. External environmental compliance monitoring during the operational phase, whether by an independent ECO, statutory body or other independent [third party] organisation, should continue on a frequency as agreed to between the authorities and developer.

5.1.6 Independent Environmental Auditor

In accordance with the NEMA: EIA Regulations the holder of an EA must:

For the period during which the environmental authorisation and EMPr, and where applicable the closure plan, remain valid—

- (a) Ensure that the compliance with the conditions of the environmental authorisation and the EMPr, and where applicable the closure plan, is audited; and*
- (b) Submit an environmental audit report to the relevant competent authority.*
- (c) Be prepared by an independent person with the relevant environmental auditing expertise; and*
- (d) Conform to requires in under Regulation 34 of NEMA: EIA Regs*

The role of the independent ECO and independent External Auditor are separate and must be kept as such.

5.2 Monitoring

A monitoring programme will be implemented for the duration of the Project. This programme will include:

- a) A once-off monitoring inspection by the independent ECO prior to site establishment by the contractor. The establishment of a baseline by taking selective, point-based photographs of identified environmental aspects and potential impact sites, should be done prior to Project commencement. The ECO shall retain the *pre-construction* photographic record, including any pre-existing damaged areas inside and outside the site footprint (construction area).
- b) Daily and weekly monitoring by the construction contractor during the construction phase as per the contract when the site is active.
- c) A register of all complaints received must be maintained on site by the contractor. All complaints / claims shall be handled immediately to ensure timeous rectification / compensation by the responsible party and should be directed to the PM and independent ECO for review and appraisal.
- d) Monthly compliance monitoring, auditing and or reporting by the ECO during the construction phase, focusing on EA and EMPr compliance, or at more frequent intervals as may be provided in the conditions of the EA.
- e) The ECO shall obtain additional photographic records *during construction* of any damaged areas requiring interim protection and/or rehabilitation. An incident register with an indication of the date, time, type of damage and reason for the damage shall be recorded to ensure the responsible party is held liable. The contractor shall be held liable for all unnecessary damage to the environment as a result of any negligent behaviour.
- f) Post-rehabilitation inspection(s) after rehabilitation activities are complete must be conducted by the ECO and/or vegetation ecologist to ensure conformance to the rehabilitation requirements, and where necessary, provide recommendations for any further rehabilitation actions required. This proposed timeframe for rehabilitation monitoring allows one full annual seasonal growing cycle to pass and for more accuracy and confidence in assigning success rates to rehabilitation.
- g) Compilation of a close out audit report by the ECO, focusing on final EA and EMPr compliance and the success of rehabilitation completion.

5.3 Reporting Procedures

5.3.1 Documentation

The following documentation must be kept on site by the contractor in order to record conformance to the conditions of the EA and EMPr. A site-based environmental file should include *inter alia*:

- a) Copy of the EA and EMPr.
- b) Method Statements compiled by the contractor and approved by the PM / ECO.
- c) Copy of the Rehabilitation Plan/Method Statement.
- d) A set of environmental registers which include:
 - i. Environmental legal, awareness and similar training materials and records.
 - ii. Complaints register, including details of complaints and actions required/taken (with dates).
 - iii. Incident register, including copies of notification of Emergencies and Incidents (this must be accompanied by dated photographic records).
 - iv. Waste registers and waste manifests.
- e) Copies of waste documentation such as disposal slips and/or Safe Disposal Certificates (SDCs).
- f) Material Safety Data Sheets (MSDSs) for all hazardous substances.
- g) Minutes and attendance registers of all progress meetings held.
- h) Monitoring results including environmental audit and inspection reports, checklists, register of audits, etc.
- i) Copies of any environmental Non-Conformance Reports (NCRs) issued.
- j) Copies of any Corrective Action Reports (CARs) in response to NCRs issued.
- k) Notifications of Emergencies and Incidents.

5.3.2 Method Statements

It is a statutory requirement to ensure the wellbeing of employees and the environment. To allow the mitigation measures in this document to be implemented, task-specific method statements should be developed for each set of tasks. A method statement details how and when an activity will be carried out, detailing possible dangers/risks, and the methods of control required. The contractor will be accountable for all actions taken in non-conformance of the approved Method Statements. The Contractor shall keep all the method statements and subsequent revisions on file, copies of which must be distributed to all relevant personnel for implementation. Determining which activities require a method statement involving environmental impacts may be decided upon by the Contractor, the ECO, the Project Manager, or the Contractor themselves prior to the said activity commencing. Guidelines for method statements are included in **Annexure G**.

5.3.3 Environmental Registers

Before commencement of construction, the contractor, with assistance by the ECO, will establish various environmental registers (as templates) for the Project. The contractor will ensure that the information is recorded for all complaints/incidents as per the guideline register templates, attached as **Annexure E** at the end of this document. The environmental registers will form an integral part of construction records to be transferred to the developer upon completion of construction. These records will be kept with the EMPr and will be made available on requested by the authorities and ECO. Maintenance and updating of environmental registers during the operational phase will need to continue as an internal function of the developer who must delegate this task to an appropriately competent site-based permanent employee.

5.3.4 Stakeholder Engagement

During construction, the contractor must ensure that relevant stakeholders are informed and updated throughout the activities. Sufficient signage should be erected around the site (including at the entrance), informing the public of the activities taking place. It is suggested that signboards be erected and include the following information:

- The name of the contractor; and
- The name and contact details of the site representative to be contacted in the event of emergencies or raising a public complaint.

The contractor will ensure a complaints/grievance procedure is in place prior to construction which addresses measures in dealing with both internal and external grievances.

The complaints/grievance procedure must be accompanied by complaints register which will record all communications received and actions undertaken to address the concerns. The register must be kept on file.

5.3.5 Non-Conformance Report

A Non-Conformance Report (NCR) will be issued to the contractor as a final step towards rectifying a failure in complying with a requirement of the EA or EMPr. This will be issued by the ECO or Project/Site Manager to the contractor in writing. Preceding the issuing of an NCR, the contractor must be given an opportunity to rectify the issue. Should the ECO assess a non-EMPr related incident or issue and find it to be significant (e.g. non-repairable damage to the environment), it will be reported to the relevant authorities and immediately escalated to the level of a NCR.

5.3.6 Environmental Emergency Response Plan

If the Health and Safety Plan/Specification specifically compiled and approved for the proposed development does not already cater for environmental emergencies, the contractor must compile an Environmental Emergency Response Plan/Method Statement. Emphasis should be placed on environmental aspects such as fire, flood and pollution incidents and prevention and any other Section 30 NEMA incidents and the associated reporting protocol. As far as any mitigation measures to prevent or avoid environmental incident and emergencies from occurring, which are within reasonable parameters for the contractor to control, such should be specified in a project specific Plan/ Method Statement.

6 DETAILED ENVIRONMENTAL MANAGEMENT PROGRAMME

The EMPr provides the framework for environmental monitoring and specifies the minimum requirements to be implemented by the contractor [during construction as per the contractual scope of works] and the end-user/developer [during operations of the facility] in order to minimise and manage negative environmental impacts and promote good environmental management practise. It is important that the EMPr requirements be systematically reviewed, understood, implemented and adhered to at all times.

This section comprises the environmental specifications for the Project.

6.1 ENVIRONMENTAL SPECIFICATIONS

The approach for Environmental Specifications implementation and the associated monitoring requirements relating to specific measures/aspects of ES implementation (for the duration of the Project) are divided into 5 phases:

- a) Planning and Design.
- b) Pre-Construction (includes assessments, approvals, permits, authorisations).
- c) Construction (includes contractor appointment and site establishment).
- d) Post-Construction (includes site de-establishment and rehabilitation); and
- e) Operation.

Specialist recommendations as prescribed in the specialist studies have been incorporated into the various applicable sections.

6.1.1 Scope of Application for the Environmental Specifications

The entire footprint including the site camp, site offices, designated working areas, internal access routes and the immediate surrounding areas fall within the scope of the EMPr during construction. The scope also applies to the final footprint *i.e.*, the new facility upon completion of construction and during operation. Any new personnel, sub-contractors, maintenance staff, plant, vehicles, machinery, and materials delivered to/stored on the site/facility will need to comply with the EMPr.

6.1.2 Environmental Principles for the Construction and Operational Phases

The following core environmental principles apply during *Construction* and *Operations*:

- Construction is typically a disruptive activity and maximum consideration must be given to minimising disturbances on the surrounding community and natural environment.
- Only the authorised 'construction footprint' approved for development should be utilised and occupied. No site 'creep' or increasing of the footprint to an area beyond that which is authorised is permitted.
- All relevant legislation should be adhered to, and all relevant permits and permissions should be obtained and complied with.

- The developer and contractor should foster collaborative and cooperative relationships with all relevant stakeholders including the authorities (i.e. DFFE, DWS, DAFF, conservation authorities, etc.) any other neighbouring landowners/land users and members of the adjacent local communities. Professional and timely communication with these parties as and when required will assist in the successful implementation of the proposed development and its future success.
- The contractor and other project role-players should acknowledge and sign the Letter of Acceptance (**Annexure F**) confirming their environmental commitments in terms of the EMPr.
- Wherever possible, both the developer and contractor should seek to employ local labour and maximise the involvement of small, local business enterprises into the project.

6.2 PLANNING AND DESIGN PHASE

This section sets out the requirements that must be undertaken prior to commencement of any construction activity and includes the legal permitting / authorisation requirements, other ancillary plans and activities; and design considerations. Mitigation measures and recommendations that should be considered during the planning and design phase are provided. The project team is responsible for ensuring that the design of the facility either responds to or is in alignment with the environmental constraints and opportunities in the overarching and relevant Strategic Development Framework (SDF) and Integrated Development Plan (IDP) for the Local Municipality and conforms to any jurisdictional and municipal planning requirements.

Planning and design activities should be undertaken within the context of all relevant legislative requirements and guidelines with due consideration regarding any authority requirements and any landowner and local community concerns. Where appropriate, these should be addressed through adequate design and planning in terms of the suite of documentation [*e.g.*, assessment reports, specialist reports, management plans, monitoring programmes, records of communication, final building, and layout plans, etc.] to be submitted to the respective jurisdictional authorities [*i.e.*, DFFE, LDM, DWS, etc.] for review, input, comment and an ultimate decision [by DFFE] on the proposed development application.

6.2.1 Management Objective

The primary environmental objective, during this phase, is to ensure the best suited environmental option for the proposed development is selected based on the final design (*e.g.*, plans, drawings, layouts, surveys, environmental assessments, and specialist studies) undertaken during the planning phase. The project-specific **BAR** and all respective **Appendices** and **Annexures** which supplement the **BAR** will represent the overall environmental management framework which should be adhered to during commencement of the activity [*i.e.*, construction] and the subsequent operational phase. To ensure that the development's activities are undertaken without significant disruption to other land uses and activities in the surrounding area, the following objective, impact management outcomes and monitoring requirements have been identified:

Objective	Ensure the best suited environmental option for the proposed development is selected based on the final design
Impact Management Outcomes	<ul style="list-style-type: none"> - The design meets the objectives and does not degrade the natural environment. The final design should be based on project plans, drawings, layouts, surveys, environmental assessments and specialist studies undertaken and should be in aligned with municipal plans (SDF & IDP). - Design and layouts should respond to the mitigation measures and recommendations in the BAR. - Construction and operational phase activities should not conflict with or disrupt surrounding land-use activities with a minimal negative impact on socio-economic, cultural and visual/aesthetic conditions.
Monitoring	<ul style="list-style-type: none"> - Review of the final design by the Project Manager, Engineer, Local Municipality and Environmental Authorities prior to the commencement of the activity i.e. Construction.

6.3 PRE-CONSTRUCTION PHASE

6.3.1 Authorisations, Permits and Licences

- All necessary authorisations, permits and licences must be obtained by the developer/contractor prior to the commencement of the activity *i.e.*, construction.

6.3.2 Appointment of Contractor

- The construction contractor must ensure that this EMPr forms part of any contractual agreements with any other contractors and sub-contractors for the execution of the project. All contractors must make adequate provision in their budgets for implementation of the EMPr.
- The Principal Contractor, including any sub-contractors and suppliers as may be the case, must comply with the relevant provisions of the EMPr, applicable environmental legislation, associated regulations, and any applicable local by-laws.

6.3.3 Appointment of Contractor Representative

- An EO must be appointed by the contractor for effective implementation and monitoring of the EA and EMPr specifications.
- The EO shall compile method statements for proposed activities and submit these to the Project Engineer and ECO for review and/or approval.
- The EO must develop and maintain a daily on-site monitoring system to comply with the EMPr, implement environmental training and awareness, report and maintain a record of incidents and public complaints, implement appropriate corrective and preventative measures, maintain all on-site environmental records including waste disposal records and ensure internal auditing of the EMPr.

6.3.4 Appointment of an ECO

- An independent ECO must be appointed by the holder of the EA (the developer) at their cost to monitor the implementation of the EMPr.
- The ECO must be appointed at least 30 days prior to the commencement of any site activities including, where necessary, a Search & Rescue of the site footprint. During this period, the ECO will review all relevant documentation pertaining to the Project.
- Once an ECO has been appointed, he/she must undertake monthly site inspections and provide monthly environmental audit reports for the duration of the construction and rehabilitation phases. Each audit report must contain the full results of the audit and should determine, by way of audit findings, whether the various aspects of the development (*i.e.*, audit criteria) are deemed to be *compliant*, *non-compliant* or *not-applicable*. Any conditions or findings found to be *not applicable* must be substantiated/explicated in terms of aspects (audit criteria) of the development which have either not

yet commenced, are no longer relevant or have been deemed to be applicable, as may be the case. If any recommended actions to address audit findings are, for example, required from any other organ of state, stakeholder, etc, these must be clearly stated with reasons.

6.3.5 Preparation of Method Statements

- Method Statements must be submitted by the contractor to the ECO and must be adhered to by the contractor, sub-contractors and the PM for the duration of the project. These can relate to water and storm water management, traffic, solid waste management, fuel storage and filling and dispensing of fuel (diesel and petrol), hydrocarbon spills, contaminated water and wastewater management, the storage and or transport of hazardous materials and chemicals, standard emergency procedures, biohazard control, etc and for any additional activities which the ECO and/or PM may deem necessary.
- The ECO will monitor compliance of the method statements, all copies of which must be submitted to the ECO for review prior to commencing with the activity. Revisions to approved method statements may become necessary.
- To this end, an agreement must be reached between the PM, ECO and contractor as to how a site-based instruction system of document revision, submission, review, approval, issuing, re-issuing and record-keeping is carried out.

6.3.6 Environmental Training and Awareness

It is important to ensure that the Contractor has the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental harm. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard. The contractor shall ensure that all employees and sub-contractors who carry out all or part of the contractor's obligations are adequately trained regarding the implementation of the EMPr, as well as environmental legal requirements and obligations, and general best practices. Training shall be conducted by the contractor EO/SHE Officer as and when required, as determined by the ECO by means of and initial (once-off) induction, continuous toolbox talks, awareness posters, meetings etc. General EA and EMPr requirements should form part of the formal site induction for all contractors, sub-contractors and casual labourers, preferably in their native language.

Awareness training should be provided in a verbal and/or visual format. Induction training may be a once-off event however the contractor should make provision for internal weekly training, holding of toolbox talks and displaying of environmental awareness posters. In addition to training, general environmental awareness must be fostered among the project's workforce to encourage the implementation of environmentally sound practices for the full duration of construction. The aim is to ensure environmental accidents are minimised and good environmental compliance is continuously attained.

Environmental training is aimed at:

- Promoting environmental awareness.
- Informing the contractor of all applicable environmental procedures, policies and programmes.
- Providing generic and simplified training on the implementation of environmental management specifications; and
- Providing job-specific environmental training in order to understand the key environmental features of the construction site and the surrounding environment.

The contractor shall ensure that attendance records of all training interventions are kept in accordance with the record keeping and document control requirements and records must be sent to the ECO at intervals determined by the ECO. The training records shall verify each of the targeted personnel's training experience. If necessary, the ECO and/or a translator should be called to the site to further explain any aspects of environmental or social behaviour which are unclear. Basic environmental awareness material is attached as **Annexure D**.

6.3.7 Search & Rescue

A search-and-rescue plan needs to be developed for the site. Protected trees are required to be tagged and a permit be obtained from the relevant authority to either relocate or destroy identified species.

A botanical search and rescue be undertaken for protected species including *Boophone disticha*, *Harpagophytum procumbens* as well as any other protected and realistically relocatable floral species (succulent or geophytic types) known from the quarter degree square in which the site is located

6.4 CONSTRUCTION PHASE

To simplify the EMP requirements, each aspect related to the EMP has been addressed during the construction phase in the Tables 6.4.1 to 6.4.17 below, under relevant sub-headings. Each action number within the tables is supported by mitigation measures and actions which will need to be adhered to / implemented by the responsible party. The terms used in the tables throughout this section are briefly described below for ease of reference:

- **Mitigation Measures and Actions**

This section indicates the environmental measures, actions and controls required to either prevent and/or minimise the potential impacts on the environment that is associated with the project.

- **Responsibility**

This section indicates the party responsible for implementing the mitigation measures and actions laid out in the EMP.

6.4.1 Site Establishment and Access

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	The contractor must establish their construction camp, offices, workshops and any other temporary infrastructure on the BESS site footprint or in a previously disturbed / impacted area in a manner that does not adversely affect the natural environment, with the assistance of an EO.	Contractor	Once-off
2.	Prior to the establishment of the site camp/office, the contractor will produce a site layout and access plan showing the positions of all equipment storage, waste stockpiling, fuel storage areas, access routes and other infrastructure for approval by the ECO and PM.	Contractor	Once-off
3.	The construction area must be clearly demarcated on the layout and access plan, and all other areas (in particular any environmentally sensitive areas) must be considered ' no-go areas ' for all construction activity, personnel and equipment.	Contractor	Once-off; then continuous
4.	It is recommended the contractor first identifies/marks all routes which will ultimately become permanent access roads and use these as temporary access routes during construction. Markers should show the direction of travel to which the access route leads.	Contractor	Once-off; then continuous
5.	Adequate signage must be placed in the areas where construction will take place warning the public and neighbouring landowners of the activities taking place.	Contractor	Once-off; then continuous
6.	For security measures, it is recommended that the site be secured and manned by security on a 24-hour basis for the duration of construction.	Contractor	Continuous (daily)

7.	Housekeeping within the construction camp must be kept in an orderly state at all times (managing stacking, storage, waste areas, etc.)	Contractor	Continuous (daily)
8.	Vegetation removal for site establishment is to be kept to an absolute minimum. Where applicable, no trees are to be removed with the exception of weeds and alien invader plants.	Contractor	Once-off
9.	The physical footprint of the construction camp must be located a minimum horizontal distance of 100m or further from any freshwater resource/watercourse and any associated riparian areas.	Contractor	Once-off
10.	The contractor must ensure that a storm water drainage system on the temporary camp site/office area is adequately designed to prevent standing water and/or erosion from taking place. In this regard, an overarching Stormwater Management Plan which applies to the overall development infrastructure must be adhered to by the contractor during construction.	Contractor	Once-off; then continuous
11.	Adequate drainage and erosion protection in the form of cut-off berms or trenches must be provided around the site, where necessary. Any steep gradients on site must be avoided, if and where applicable.	Contractor	Once-off; then continuous
12.	Where applicable, the contractor must mark all internal access routes . Markers should show the direction of travel to which the access route leads. Measures to ensure these routes are adhered to and that access outside permitted routes or demarcated areas is prohibited must be implemented.	Contractor	Once-off; then continuous
13.	All speed limits must be strictly adhered to at all times.	Contractor	Continuous (daily)
14.	If there are high volumes of construction traffic along site access routes, dust prevention measures must be implemented to reduce dust creation.	Contractor	As and when required
15.	Any temporary access routes should remain strictly one-way and be a maximum width of 3m.	Contractor	Once-off; then continuous
16.	No vendors or other similar traders should be allowed to access the site.	Contractor	Continuous

6.4.2 Ablution/Sanitation

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	The contractor must provide a minimum of one mobile chemical toilet per 15 persons/employees.	Contractor	Continuous (daily)
2.	Chemical toilets must be strategically placed and positioned (to allow easy access to workers, preferably no more than a 100m from each work area) and must not be situated within 32m from any freshwater resource/watercourse .	Contractor	Once-off; reposition as and when required
3.	All ablution activities must take place in these facilities and all wastewater must be contained and disposed of at an established / registered wastewater treatment site/works. The contractor must ensure that toilets are serviced (cleaned or emptied) regularly (minimum of once per week, possibly twice) and that no spillage occurs during routine servicing and maintenance. A registered waste service provider must service the facilities on a regular basis and provide waste disposal certificates which must be maintained on the contractor's site environmental file.	Contractor	Continuous
4.	All temporary/portable toilets must be secured to the ground to prevent them from toppling due to wind or any other cause.	Contractor	Once-off; then continuous
5.	Provision of the necessary sanitary measures <i>i.e.</i> potable water for hand-washing and toilet paper must be available at all times.	Contractor	Continuous (daily)
6.	Unauthorised dumping / spilling of waste material from toilets into the environment and burying of waste is strictly prohibited.	Contractor	Continuous monitoring

6.4.3 Permanent infrastructure and associated internal access roads

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Only the authorised footprint for the planned infrastructure and associated access roads/routes etc., as per the final layout and design plan and as authorised in the EA, is permitted on the property. Should any significant alterations to the authorised footprint be necessary such as alternative / additional access roads and infrastructure and / or alternative designs, the developer in consultation with the ECO must engage with the authority to obtain confirmation, in writing, whether amendments to the EA and EMPr would be required.	Contractor/ Developer	If required, as and when required
2.	Strict access control should be implemented to reduce the risk of indiscriminate heavy plant and vehicle access all over the site causing unnecessary environmental damage.	Contractor	Continuous (daily)
3.	Any No-go areas on the site footprint must be indicated as such with adequate warning signs. Any ecologically sensitive areas identified on the site are considered No-go areas .	Contractor	Once-off, continuous monitoring

4.	It is recommended the contractor first identifies/marks all routes which will ultimately become permanent access roads and use these as temporary access routes during construction. Markers should show the direction of travel to which the access route leads.	Contractor	Once-off, continuous monitoring
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6.4.4 Ecologically Sensitive and No-go Areas

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Any sensitive areas or features (e.g. protected trees/vegetation and watering points, nests, burrows, etc) which do not fall within the authorised site footprint are considered No-go areas must be indicated as such with adequate barricading and warning signage.	Contractor	Continuous monitoring
2.	Any ecologically sensitive areas which do not form part of the approved development footprint should not be accessed by machinery or workers for any reason. Any contractors observed within these 'No-go' areas should be fined as per a fining schedule/system setup for the project.	Contractor/ Developer	Continuous monitoring

6.4.5 Plant & Equipment Maintenance

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Any heavy machinery and construction vehicles kept on site are to be stored in a dedicated vehicle maintenance yard which must be illustrated on the construction camp layout plan/map.	Contractor	Continuous (daily)
2.	No machinery or vehicles may be extensively repaired anywhere on site other than in a dedicated maintenance yard, or alternatively, off site at an existing/established commercial service/repair workshop. A dedicated maintenance area must be demarcated, on an impermeable surface and contained viz. leading to an oil-water separator or containment sump. Any servicing of vehicles done on-site must be within a dedicated service area which is impermeable, bunded and equipped with spill kit material, drip trays, etc.	Contractor	As and when required, continuous monitoring
3.	All vehicles and equipment must be serviced regularly to avoid the contamination of the area from fuel, oil and hydraulic fluid leaks, spills, etc. Machinery or equipment used on site must not constitute a pollution hazard in respect of hydrocarbon substances.	Contractor	As and when required / continuous
4.	Access of all maintenance and material delivery vehicles must be strictly controlled.	Contractor	Continuous
5.	The contractor must order any faulty equipment to be repaired or withdraw from use if the equipment or machinery is continually polluting and/or irreparable.	Contractor	As and when required

6.	Suitably covered receptacles must be made available and conveniently placed for the disposal of waste. All waste/used oils, grease or hydraulic fluids must be placed therein, and these receptacles will be removed from the site on a regular basis for disposal at a registered or licensed disposal facility.	Contractor	Once-off, then continuous
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6.4.6 General and Hazardous Substances Materials

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Refuelling or storage of hazardous substances must not take place within 100m of any watercourse.	Contractor	Continuous
2.	A spill kit must be readily available on site if heavy machinery and/or hazardous substances are to be used during the project.	Contractor	Continuous
3.	Hazardous substance storage areas should be secured, under lock and key, so as to minimise the risk of theft and/or unauthorised handling.	Contractor	Continuous
4.	Suitable fire prevention facilities (extinguishers, fire beaters) must be available at all storage facilities.	Contractor	Continuous
5.	All fuel storage tanks and associated facilities must be designed and installed in accordance with the relevant oil industry standards, SANS codes and other relevant requirements.	Contractor	Once-off
6.	Symbolic safety signs illustrating 'No Smoking', 'No Naked Flames' and 'Danger' are to be prominently displayed in and around the fuel storage area.	Contractor	Once-off, continuous monitoring
7.	Appropriate storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent spillages onto the ground around the storage area(s). These pollution prevention measures for storage should include a bund wall high enough to contain at least 110% of any stored volume. Such a facility must be on an impervious surface. The storage area must be securely fenced and all hazardous substances such as fuel, oils, chemicals, etc, must be stored therein. Drip trays, a thin concrete slab or a facility with a durable PVC lining, must be installed in such storage areas with a view to prevent soil contamination and surface and ground water pollution.	Contractor	Once-off, continuous monitoring
8.	The capacity of any fuel storage tank on site must be clearly displayed and the product contained within the tank clearly identified.	Contractor	Once-off, continuous monitoring
9.	Only empty and externally clean tanks/drums may be stored on the bare ground. All empty and externally dirty tanks/drums must be sealed and stored in a designated, barricaded area where the ground surface has been bunded.	Contractor	Continuous monitoring
10.	If fuel is dispensed from 210 litre (44 gallon) drums, the proper dispensing equipment must be used accompanied by use of drip trays. The drum must not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank must be stored in a waterproof container when not in use.	Contractor	As and when required, continuous monitoring

11.	Any spilled/contaminated fuel, oil and chemical contaminated rags must be stored in leak-proof containers and disposed of at an approved hazardous waste site. Safe Disposal Certificates (SDCs) must be obtained for any hazardous wastes which are disposed of and such documentation must be maintained for record-keeping purposes on site.	Contractor	As and when required, continuous monitoring
12.	Storage facilities (including any tanks) must be protected from the ingress of stormwater from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.	Contractor	Once-off, continuous monitoring
13.	Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site. The MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or spillages.	Contractor	Continuous
14.	A registered waste disposal service provider (sub-contractor) must be employed to remove any waste oil and other hazardous waste. Such waste must only be disposed of at a licensed landfill site designed to handle hazardous waste. Appropriate SDCs must be provided for all hazardous waste being disposed of.	Contractor	As and when required, continuous monitoring
15.	The contractor must ensure that all staff are made aware of the health risks associated with any hazardous substances used and are provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training.	Contractor	Continuous (daily)
16.	Any cement / concrete must not be mixed directly on the ground. Mixing trays and/or impermeable sumps must be used at all mixing and supply points. Unused cement bags are to be stored so as not to be affected by rain or runoff events.	Contractor	As and when required, continuous monitoring
17.	If applicable, the washing of concrete trucks on site is prohibited unless disposed of into a designated wash area approved by the ECO.	Contractor	Continuous monitoring
18.	Used cement bags must be stored in weather-proof containers to prevent windblown cement dust and water contamination. Used cement bags must be disposed of on a regular basis via the solid waste management system and must not be used for any other purpose.	Contractor	As and when required, continuous monitoring
19.	All remains of excess/un-used cement or concrete must be physically removed on completion of the plaster or concrete pour section and disposed of. Washing the remains into the ground is not acceptable as soil contamination and groundwater pollution may occur.	Contractor	As and when required, continuous monitoring
20.	No paint products may be disposed of on site.	Contractor	Continuous monitoring
21.	Care should be taken of the storage thresholds contained in the 2014 NEMA EIA Regulation Listing Notices as well as the NEMWA waste management listed activities contained in Category A and B.	Contractor	Continuous monitoring
22.	The contractor must maintain a record of the sourcing of all materials used during construction.	Contractor	Continuous

6.4.7 Spills, Incidents and Pollution Control

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Any spillage must be investigated and immediate action must be taken according to the requirements of a spill contingency plan/method statement. Spillages must be reported to the EO, ECO and Project Manager.	Contractor	As and when required, continuous monitoring
2.	In the case of a spill of hydrocarbons, wastewater, sewerage, chemicals, bituminous, cement or asphalt materials in the contractor's laydown storage/areas or on the construction site, the spill should be contained and cleaned up and the material together with any contaminated soil collected and disposed of as hazardous waste to minimise pollution risks and reduce bunding capacity.	Contractor	As and when required, continuous monitoring
3.	Should a pollution incident occur on site, the contractor must: <ul style="list-style-type: none"> • Implement reasonable measures immediately to contain and minimise the impacts of the incident • Notify all persons whose health may be affected by the incident • Undertake clean up procedures immediately • Notify the EO, ECO, PM of the incident immediately and advise as to what corrective actions/measures have been or will be implemented • Record the incident in the Environmental Incident Register; and • Implement measures to prevent similar incidents from occurring in the future. 	Contractor	As and when required, continuous monitoring
4.	Where applicable, concrete mixing must be confined to as few areas as possible and <i>ad-hoc</i> mixing is to be avoided. Any areas where concrete mortar is mixed must be cleaned up after use. Concrete mixing is to be undertaken on impervious surfaces such as on mortar boards.	Contractor	As and when required, continuous monitoring
5.	Any works requiring large concrete quantities should preferably source concrete from mobile ready-mix concrete mixers [trucks] from established commercial suppliers off-site. This will limit the impacts associated with concrete batching on site.	Contractor	As and when required
6.	Stockpiles of soil and construction material are to be bermed to prevent any lateral spread of leachate or polluted runoff.	Contractor	Once-off, continuous monitoring

6.4.8 Waste Management

6.4.8.1 General Waste

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	<p>General waste produced on site will likely include:</p> <ul style="list-style-type: none"> Office waste (e.g. printer cartridges, paper, plastics, packaging, etc); Construction waste (scrap metal, wood, glass, rubble, packaging); and General domestic waste (food, cardboards, paper, bottles, tins). <p>An adequate number of general waste receptacles (including skips and bins) must be positioned around the construction camp laydown area and on site (working areas) to collect all waste types and domestic refuse and to minimise littering.</p>	Contractor	<p>Once-off, then continuous</p> <p>Disposal to landfill monthly</p>
2.	Bins must be clearly marked/labelled and appropriately lined for efficient control and safe containment and disposal of waste.	Contractor	Once-off, then continuous
3.	Different waste bins, for different waste streams must be provided to ensure correct waste separation.	Contractor	Once-off, then continuous
4.	Where applicable, a demarcated area must be allocated for waste sorting and disposal on the site.	Contractor	Once-off
5.	All waste receptacles must be appropriately covered to ensure waste does not affected by wind, rain or vermin.	Contractor	Continuous
6.	Larger quantities of general waste produced on site (e.g. spoil or rubble) are to be collected in skips for disposal at a registered landfill site. Hazardous waste in not to be mixed or combined with general waste earmarked for disposal at a general landfill site.	Contractor	Monthly disposal to landfill
7.	Under no circumstances is waste to be burnt or buried on site. The excavation and use of rubbish pits on site is forbidden.	Contractor	Continuous
8.	Waste bins must be cleaned out on a regular basis to prevent any windblown waste and/or visual disturbance.	Contractor	Daily or weekly depending on the need
9.	All general waste must be removed from any active construction areas on a daily basis and disposed of in suitable waste receptacles at the designated waste storage area in the construction camp.	Contractor	Daily
10.	The contractor must ensure that all general waste is disposed of at an appropriately licensed waste disposal facility/landfill. Through exploring practical means for reducing, reusing and recycling waste generated in undertaking the activity, the contractor should aim to produce and dispose of a minimum amount of waste as possible.	Contractor	Monthly, continuous
11.	If waste skips are to be used on site they must be covered and leak proof. Placement must be within the development footprint and preferably on hardened, impermeable surface.	Contractor	Once-off, continuous monitoring
12.	A waste register is to be maintained on site and updated. Waste disposal records and/or safe disposal certificates	Contractor	Continuous /As and when required

	(SDCs) must be obtained from the waste removal company as evidence of correct, lawful disposal.		
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6.4.8.2 Hazardous Waste

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Hazardous waste is to be disposed of at a licenced hazardous waste landfill site. Available/existing landfill sites must be identified at the inception of the Project. Hazardous wastes which may be produced on site, derived from hazardous substances, include: <ul style="list-style-type: none"> Oil and other lubricants, electrolyte, diesel, petrol, paints, solvents; Containers that contained chemicals, oils, paints, or greases; and Other material e.g., used rags, soils, batteries, gravel and water contaminated by hazardous substances (i.e. oil, fuel, grease, chemicals or bitumen). 	Contractor	Once-off, continuous monitoring Disposal to landfill on a monthly or quarterly basis
2.	Hazardous waste bins must be clearly labelled, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be securely covered with a lid).	Contractor	Once-off, continuous monitoring
3.	A hazardous waste disposal certificate, or safe disposal certificate (SDC) must be obtained from the waste removal company as evidence of correct, lawful disposal.	Contractor	After disposal (monthly or quarterly)
4.	If waste skips are to be used on site, suitable waste skips for handling hazardous waste are required which must be covered and leak proof. Placement must be within the development footprint and on hardened, impermeable surface.	Contractor	Once-off, continuous monitoring

6.4.8.3 Wastewater

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	All wastewater generated from the site must be disposed of in a suitable manner so as not to cause any sub-surface (soil and groundwater) pollution or hazards to human health and biota.	Contractor	Continuous monitoring
2.	Wastewater including sewerage or cement and hydrocarbon-contaminated water must not be allowed to enter any stormwater infrastructure and must be managed by the contractor to ensure that any existing water resources beyond the site footprint are not polluted by incremental pollution from site-based activities.	Contractor	Continuous monitoring
3.	Where applicable and possible, used oil / hydrocarbon-contaminated wastewater should be collected for recycling. Alternatively, disposal must be to an appropriately licensed	Contractor	As and when required

	hazardous wastewater treatment facility. All SDCs are to be obtained and maintained as records by the contractor.		
4	If applicable, any permanent wastewater infrastructure (for storage, transport, recycling, treatment or off-site disposal) required for the operational phase of the development must be pre-approved, authorised and constructed as per the final design and layout.	Contractor / Developer	If required, once-off

6.4.9 Emergency Preparedness

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	An emergency preparedness plan / method statement, emphasising fire prevention and control should be drafted before construction commences. Fire outbreaks pose a major risk to human life, property and vegetation in the surrounding area. Provision must be made to ensure preparedness toward preventing fires caused by construction activity or elsewhere to limit or prevent damage to surrounding areas. The plan must specify how fires will be prevented from breaking out causing damage to any surrounding areas during construction. Contact numbers for any local fire associations and / or fire-fighting authorities should be included.	Contractor	Once-off, continuous monitoring
2.	Training for emergency preparedness and potential emergency situations [<i>i.e.</i> fire outbreaks, floods, explosions, accidents, first aid, evacuations, snake bites, etc.] should be included in a Health and Safety plan for the development.	Contractor	Once-off, continuous monitoring

6.4.10 Heritage

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	If any heritage site, grave or artefact is uncovered or discovered on site, work in the immediate vicinity must be stopped immediately. Any identified site must be clearly marked as a “No-go” area. In the event that a historical grave or heritage site is exhumed / discovered, the Heritage Resource Authority (SAHRA) should be informed immediately. A specialist archaeologist will be required to facilitate any process pertaining to such a find / discovery.	Contractor	If required, as and when required
2.	The contractor must take reasonable precautions to prevent any person from removing or damaging any such artefact. Upon any discovery thereof, the contractor must immediately inform the ECO and Project Manager of such discovery who, in turn, must inform SAHRA.	Contractor	If required, as and when required
3.	Any permits, if necessary, shall be obtained from the relevant Heritage Resources Authority for the destruction/removal of any Cultural or Heritage Artefacts.	Contractor	If required, once-off

4.	Any mitigation measures which may be recommended by a specialist archaeologist must be followed. Work may only resume once clearance is given in writing by the authority and/or the archaeologist.	Contractor	If required, continual monitoring
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6.4.11 Noise Control

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Neighbouring landowners / residents / land users adjacent to the site must be notified of construction prior to commencement.	Contractor	Once-off
2.	All construction vehicles and equipment are to be kept in good repair and must be fitted with standard industry silencers prior to construction.	Contractor	Continual monitoring
3.	Where possible, stationary noisy equipment (for example compressors, generators, etc) must be encapsulated in acoustic covers, screens or sheds. Portable acoustic shields should be used in the case where noisy equipment is not stationary (e.g. for drills, angle grinders, chipping hammers).	Contractor	Continual monitoring
4.	Construction activities, and particularly excessively noisy activities, are to be limited to working hours during the day.	Contractor	Continual monitoring
5.	Any machines used intermittently must be shut down in the intervening periods between work or throttled down to a minimum.	Contractor	As and when required
6.	In general, operations must meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993).	Contractor	Continual monitoring
7.	Construction staff working in areas where the 8-hour ambient noise levels exceed 75dBA must wear ear protection equipment.	Contractor	As and when required
8.	Noise levels must be kept within acceptable limits. All noise and sounds generated must adhere to the relevant SANS standard.	Contractor	Continual monitoring
9.	No pure tone sirens or hooters may be utilised except where required in terms of SANS standards or in the event of emergencies.	Contractor	Continual monitoring
10.	Noise from the workforce must be controlled, toolbox talks should remind workers to keep noise to a minimum.	Contractor	Continual monitoring
11.	The contractor must take measures to discourage labourers from loitering in areas and causing noise disturbances. Where possible labourers must be transported to and from the site	Contractor	Continual (daily)

	by the contractor or by dedicated service providers using appropriate transport.		
12.	If applicable, neighbours are to be given at least three days warning prior to any blasting or piling activities.	Contractor	As and when required

6.4.12 Dust Control

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Any dust created during construction should not be allowed to adversely affect surrounding landowners, businesses, residents or any of the contractor's workforce. Dust should not reduce the visibility for private vehicles making use of the public road passing by the site.	Contractor	Continual monitoring
2.	All construction vehicles and equipment are to be kept in good working order.	Contractor	Continual monitoring
3.	Shade cloth fencing is to be used to reduce dust aggravation in any high usage/exposed areas, particularly during high wind conditions and in the drier season. In areas where there is a large potential for dust liberation, wet suppression using water and/or eco-friendly dust suppressants should be applied to the affected areas.	Contractor	As and when required
4.	Construction activities are to be contained to reasonable hours during the day avoiding periods of sunrise and sunset.	Contractor	Daily
5.	A dust suppression register (water and/or dust suppressant usage) as well as a complaint register need to be kept and updated.	Contractor	Daily, where required
6.	All complaints received need to be investigated with remedial action taken communicated to the affected party within 14 days.	Contractor	Where applicable, bi-weekly

6.4.13 Soil and Erosion Management

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Topsoil shall be removed from all areas cleared of vegetation and retained (stockpiled) for future rehabilitation use, where applicable. Topsoil shall be stockpiled in areas identified by the ECO and PM not greater than 2m in height (or in accordance with the engineering specifications) and may not be removed from site or used for any purpose other than in the final rehabilitation and levelling/landscaping of the site.	Contractor	Once-off, weekly monitoring
2.	Topsoil stockpiles must be kept free of contaminants, not be compacted, kept separate from any materials or equipment and domed at the top to promote water run-off. Topsoil should be transferred to its intended site of storage immediately following site clearance. The period between stockpiling of topsoil and its final re-use should be as short as practically possible.	Contractor	Weekly monitoring
3.	Where applicable, it is recommended that the cleared grass vegetation containing the existing seedbank be retained and stored in conjunction with topsoil stockpiles. Stockpiles that are to be stored for less than three (3) months should be covered with shade-cloth, Geotech materials or similarly suitable material to prevent erosion. If stockpiles are to be stored for more than three (3) months, a protective vegetation layer must be established on the topsoil in order to protect it against erosion, dust and desiccation. Vegetation should not consist of weeds but of indigenous grass cover. An Alien Invasive Management Plan/Method Statement must be compiled and implemented on site.	Contractor	Once-off, weekly monitoring
4.	Soil erosion on site must be prevented at all times and suitable erosion control measures must be implemented in areas sensitive to erosion such as water supply points and edges of slopes. Erosion prevention / run-off attenuation measures include sand bags, logs, silt fences, stormwater catch-pits, shade nets, rip-rap, stone pitching, brush packing or temporary mulching over denuded areas, as required on a case-by-case basis.	Contractor	As and when required, weekly monitoring
5.	Cognisance of the inherent erosion risk potential of all soil and ground surfaces on the site (particularly when exposed / free of vegetation) must be taken and appropriate control and preventative measures put in place. Both the contractor and developer must take responsibility for the development to conform to all environmental requirements in terms of erosion prevention. Effective rehabilitation of disturbed areas will minimise erosion during both construction and operations.	Contractor	Continual monitoring (monthly)
6.	Any soil must be exposed for the minimum time possible once cleared of vegetation to avoid prolonged exposure to wind and water erosion and to minimise dust generation.	Contractor	Weekly monitoring

6.4.14 Stormwater Management

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	A plan to control and prevent erosion by stormwater must be agreed between the developer, contractor and ECO prior to the commencement of any works, including site clearance on any portion of the site footprint. To this end, a stormwater management plan must be compiled specifying how stormwater infrastructure and control measures will be incorporated into the overall infrastructure design and layout.	Contractor, Developer, ECO	Once-off
2.	Earthworks on sites are to be kept to a minimum. Where any sloped embankments have to be created, stabilisation and erosion control measures must be implemented immediately. Construction activities should be scheduled to minimise the duration of exposed bare soils on site.	Contractor	As and when required, weekly monitoring
3.	No chemicals, fluids or hazardous substances are allowed to enter the stormwater drainage system as these could have a cumulatively detrimental effect on groundwater, soil and biota around the site. Regular inspections and monitoring around the site footprint and the immediate surrounding road network should be undertaken.	Contractor	Continual monitoring (weekly)
4.	The stormwater system must not be connected to any wastewater system on site.	Contractor	Once-off
5.	The contractor must regularly monitor the site for erosion damage after every rainfall event and rectify / rehabilitate any damage immediately. Construction activity during and after rainfall should cease. Only once the ground surface has dried out sufficiently should schedule construction activities resume.	Contractor	As and when required
6.	Any temporary erosion control and sediment trapping measures must only be removed once vegetation cover has successfully re-colonised the disturbed areas post-rehabilitation.	Contractor	Once-off, monthly monitoring

6.4.15 Floral and Faunal Management

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	The site should not be fenced with electric fencing which is near to the ground to minimise electrocutions.	Developer, Contractor	Once-off
2.	Any flora or fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person.	Contractor, ECO	As and when required
3.	Personnel should not be allowed to wander off the demarcated construction site to collect, hunt or harvest any plants or animals.	Contractor	Continual monitoring
4.	Fires are only allowed within 'fire-safe' demarcated areas.	Contractor	Continual monitoring
5.	No fuelwood collection should be allowed on-site.	Contractor	Continual monitoring

6.	No domestic animals should be allowed on site.	Contractor	Continual monitoring
7.	If the site must be lit at night for security purposes, this should be done with directional so as to reduce light pollution.	Contractor	Once-off
8.	Removal of indigenous vegetation must be restricted to the immediate area for construction and as instructed by the PM and ECO.	Developer, Contractor	Once-off, continual monitoring
9.	Any protected vegetation species identified by a botanist or ECO may not be removed or cut without a permit from the relevant Conservation Authority. The removal of indigenous/endemic shrubs or forbs must be kept to a minimum and only be removed after a <i>Search and Rescue</i> has been done and any necessary permits have been obtained (if applicable).	Developer, Contractor	Once-off
10.	Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. Where alien plants ingress and or establish on to the site, they must be removed immediately. Any cleared alien vegetation must be disposed of at a suitable landfill site. Invader species and weeds must be removed and disposed of in accordance with existing regulations on a regular basis in accordance with an Alien Invasive Management Plan or method statement.	Contractor	Continual monitoring
11.	Should the need arise for the open burning of alien vegetation during the site development phase of the project, an open burning permit must be applied for the disposal of alien vegetation in this manner. <i>Alternative means for disposal, where practically possible, must be investigated and implemented prior to considering open burning as a means of disposal of vegetation.</i>	Contractor	If required, once-off
12.	The contractor must develop an Action Plan/Method statement for the removal of alien invasive species and submit it to the ECO for review. Alien vegetation to be managed according to the method statement.	Contractor	Once-off, monthly monitoring
13.	No poaching of any animal or harvesting/collecting of any vegetation is permitted and no animal may be killed, destroyed, hunted, trapped, snared or captured for any purpose. Any dangerous animals, such as venomous snakes, should be handled only by a competent person. No killing of snakes is permitted.	Contractor	Continual monitoring
14.	The speed of vehicles to and around the site should be monitored / limited to avoid potential injuries and killing of fauna and to allow for a sufficient safety margin to avoid accidents and collisions.	Whole Project Team	Continual monitoring
15.	For the prevention of termite damage to infrastructure such as underground cabling, the Applicant should consider implementing preventative measures such as designing and installing physical barriers or via suitable chemical control.	Developer, Contractor	Once-off

6.5 POST-CONSTRUCTION / REHABILITATION PHASE

6.5.1 Site de-establishment

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	On completion of construction, the contractor shall ensure that all temporary structures, equipment, materials, waste, litter, rubble, notice boards and structures fences used during construction are removed with minimum damage to the surrounding area.	Contractor, ECO, Project Manager	Once-off
2.	The contractor shall clean and clear the site to the satisfaction of the PM and ECO.	Contractor	Once-off
3.	After construction completion, any remaining disturbed surfaces on the site footprint shall be rehabilitated by scarifying the surface and rehabilitating the areas according to the EA, EMPr and specialist recommendations.	Contractor	Once-off

6.5.2 Rehabilitation and Revegetation

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	A rehabilitation programme should be implemented as soon as practically possible after final completion of construction activity. Locally appropriate indigenous vegetation must be used for the site in accordance with a Rehabilitation Plan/Method Statement.	Developer, Contractor	Once-off (over a period of days/weeks)
2.	All disturbed surfaces compacted by construction activities should be ripped and scarified to allow organic contaminants to breakdown and to promote vegetation re-establishment.	Contractor	Once-off (over a period of days/weeks)
3.	Rehabilitation or re-vegetation of disturbed areas must take place during or immediately after construction is complete once no further disturbances will take place.	Contractor	Once-off (over a period of days/weeks)
4.	Only appropriate indigenous vegetation should be used for the rehabilitation and re-vegetation within the disturbed area in accordance to the Rehabilitation Plan.	Contractor	Once-off
5.	Final rehabilitation must be completed within a period specified by the PM and ECO.	ECO, Developer, Contractor	Once-off
6.	All disturbed areas must be rehabilitated immediately upon completion of the construction.	Contractor	Once-off
7.	Rehabilitation efforts must strive to ensure that no visible erosion scars remain after completion of the Contract.	Contractor	Once-off
8.	Disturbed areas of natural vegetation as well as any cut and fills must be rehabilitated to prevent soil erosion.	Contractor	Once-off
9.	Ideally, the timeframe for rehabilitation should be planned to coincide with the growing season to allow vegetation to establish successfully.	Contractor	Once-off
10.	It may be necessary that a botanical / ecological specialist or landscaper be consulted prior to the undertaking of rehabilitation and re-vegetation of all affected areas, as	Project Manager, ECO	Once-off

	identified by the ECO in consultation with the Project Manager.		
11.	Photographs of all affected and rehabilitated areas must be taken <i>before, during</i> and <i>after</i> rehabilitation in order to compare with the site condition <i>pre</i> -construction i.e. pre-disturbance.	Contractor, ECO	Once-off
12.	Rehabilitation is to be monitored by the contractor and ECO according to the requirements of the EMPr and specialist recommendations for a period of up to six months after construction is complete.	Contractor, ECO	Continual monitoring (monthly)
13.	Re-vegetation within the development footprint should be monitored for a consecutive period of one (1) year (one annual growing season of all seasons) at quarterly intervals or as specified by an ecological specialist to ensure that: <ul style="list-style-type: none"> • Erosion is not taking place and vegetation re-growth is successful. • Alien invasive vegetation is not emerging or spreading. • Any additional maintenance activities where intrusive works may be deemed necessary are adhering to the mitigation measures in this EMPr. 	ECO, Contractor, Developer	Quarterly (seasonally)
14.	Original topsoil retained and stockpiled during construction should be used during rehabilitation, where applicable.	Contractor	Once-off
15.	The contractor's Rehabilitation Method Statement should include details of the re-seeding and/or re-vegetation methods to be used for all affected areas where no hard surface infrastructure has been constructed. It may also be necessary for the developer / contractor to appoint a suitably experienced landscaping contractor / botanist who is familiar and experienced with the local vegetation community and appropriate rehabilitation methods. Such appointment must first be approved by the PM.	Contractor, ECO, Project Manager, Rehabilitation specialist/ landscaper	Once-off
16.	It is recommended that as part of the final layout of the development during the operational phase, as much natural vegetation (soft as opposed to hard surface) is retained / re-instated. Indigenous grass and plant species should be sourced from the original stripped grass on the site footprint and/ or a regional plant nursery.	Contractor, ECO, Project Manager, Rehabilitation specialist/ landscaper	Once-off (over a period of days/weeks)
17.	Rehabilitating disturbed areas by collecting seed from plants in the same community in nearby undisturbed vegetation for sowing on disturbed areas should be considered if deemed feasible. However, advice in this regard should be sought from a botanical specialist prior to implementation.	Contractor, Developer, ECO	Once-off (over a period of days/weeks)

6.5.3 Erosion control measures

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Precautions should be taken to prevent soil erosion during the Rehabilitation Phase. Erosion control measures (e.g. application of straw mulches or soil binders to exposed soil) shall be put in place in all rehabilitated areas, including access roads, stockpiles and any other disturbed areas associated with the affected area operations.	Contractor	Once-off (over a period of days/weeks)
2.	If necessary, wind protection measures such as shade cloth screens should be erected to protect the soil and vegetation.	Contractor	Once-off (over a period of days/weeks)

6.6 OPERATIONAL PHASE

The operation of the BESS is expected to be long-term and fully functional once rehabilitation is complete. This component of the EMPr (*i.e.* operational) aims to provide the facility owner / end-user developer with guidance to ensure that potential negative impacts on the environment associated with the operations of the facility continue to be monitored and minimised. It aims to ensure that infrastructure is operated and maintained according to principles of environmental 'Best Practice'. It is further recommended that an environmental management system (EMS) such as the ISO14001 standard is considered for implementation at the facility during this phase.

6.6.1 Flora and Fauna Management

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Avoid encroachment of alien and invasive plant species. If necessary, an alien plant monitoring and eradication programme must be implemented.	Owner / End-user / Developer	Monthly monitoring
2.	Restrict losses of natural remaining vegetated footprints. Ensure rehabilitation efforts after construction have been successful to areas surrounding the development footprint and where necessary, re-instate vegetation and / or rehabilitate areas again.	Owner / End-user / Developer	As and when required
3.	Appoint trained ground-staff to maintain vegetation around the facility.	Owner / End-user / Developer	Once-off appointment Continual monitoring
4.	Restrict loss of any natural remaining habitats and establish a flora & fauna management protocol / plan to ensure protection and/or safe relocation of animals such as birds, reptiles, bees and any other species which may occur or be found, permanently or intermittently, on the facility's footprint.	Owner / End-user / Developer	Once-off As and when required
5.	The ongoing prevention of termite damage to infrastructure, such as underground cabling, is achievable by either suitable chemical control or maintaining physical entry barriers around the cabling.	Owner / End-user / Developer	Quarterly monitoring

6.6.2 Environmental Awareness

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Formalise worker / employee environmental awareness programmes on a regular basis and in accordance with EMPr Section 6.3.6.	Owner / End-user / Developer	Weekly

6.6.3 Soil and Erosion Management

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Cognisance of the inherent erosion risk potential of all soil and ground surfaces on the site (particularly when exposed / free of vegetation) must be taken and appropriate control and preventative measures put in place. The end-user / developer must take responsibility for erosion prevention as part of routine maintenance activities during the long-term operation of the BESS and when required, implement suitable erosion control measures in areas sensitive to erosion such as water supply points and edges of slopes and access roads. Other erosion prevention / run-off attenuation measures include sandbags, logs, silt fences, stormwater catch-pits, shade nets, rip-rap, stone pitching, brush packing or temporary mulching over denuded areas, as required on a case-by-case basis.	Owner / End-user / Developer	Quarterly

6.6.4 Fire management

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Implement a fire management plan and ensure that appropriate communication channels are established to be implemented in the event of a fire.	Owner / End-user / Developer	Continual / ongoing
2.	Provide adequate fire-fighting equipment at the facility.	Owner / End-user / Developer	Continual / ongoing
3.	Train internal staff and/or use external fire-fighting service-providers during operations.	Owner / End-user / Developer	Bi-annual training
4.	Contact details of emergency services should be prominently displayed.	Owner / End-user / Developer	Continual / ongoing
5.	Where and when required, firebreaks should be established, maintained and inspected. Cognisance must be taken of the relevant legislation when planning and burning firebreaks.	Owner / End-user / Developer	Continual; monthly monitoring

6.6.5 Waste management

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Develop and implement an integrated waste and water management plan (IWWMP).	Owner / End-user / Developer	Once-off
2.	Litter and general waste materials must be disposed of into pest/scavenger- and weather-proof bins.	Owner / End-user / Developer	Continual / ongoing
3.	Implementing a recycling programme is strongly recommended where several bins are colour-coded or marked differently according to the category of waste being recycled (e.g. paper, metals, plastics, glass, batteries, printer cartridges, timber, etc.)	Owner / End-user / Developer	Once-off
4.	As far as possible, any organic, biodegradable and non-toxic wastes e.g. vegetable/plant matter, soils, grass, wood chips, etc should be composted turned into manure for re-cycling on site.	Owner / End-user / Developer	As and when required
5.	Waste management and disposal should conform to that of the norms, standards and by-law of the Local Municipality as well as the NEMWA. Disposal of waste must be in accordance with relevant legislative requirements.	Owner / End-user / Developer	Continual / ongoing
6.	Avoid and/or minimise the use of plastics and other non-recyclable materials.	Owner / End-user / Developer	Continual / ongoing
7.	Materials used in Li-ion batteries are typically considered non-hazardous waste whereas VRF batteries have a cell stack which is generally environmentally benign with the exception of the ion exchange membrane which is composed of highly acidic or alkaline material. If any BESS infrastructure or materials become obsolete and/or require replacement / disposal (and cannot be re-used or recycled), it must be ensured that such disposal is lawful based on the types of the waste product to be disposed of.	Owner / End-user / Developer	As and when required

6.6.6 Stormwater and Erosion

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Stormwater discharge points must be protected against erosion and not allowed to concentrate water directly initiating erosion. Stormwater run-off from created 'hard surfaces' should be diverted / dissipated into vegetated terrestrial surfaces to allow even infiltration into the surrounding ground surfaces. Where practical, plant	Owner / End-user / Developer	Continual / ongoing monitoring

	appropriate grass species or install energy dissipation structures in stormwater drains around the BESS.		
2.	Develop a Stormwater Management Plan for operational infrastructure or modify / amend the construction Stormwater Management Plan.	Owner / End-user / Developer	Once-off / As and when required
3.	Maintain (and repair where necessary) any permanent erosion control measures implemented during the construction phase. Also maintain any temporary erosion control measures for as long after construction as practically possible (<i>i.e.</i> run-off attenuation on slopes, sand bags, logs, silt fences, stormwater catch-pits, etc).	Owner / End-user / Developer	As and when required

6.6.7 Vehicle movements / traffic

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Vehicle movements must be restricted to designated roadways and parking areas.	Owner / End-user / Developer	Continual / ongoing
2.	Operational activities most likely to generate traffic congestion and noise, <i>i.e.</i> vehicle deliveries to and from the facility, should be restricted to normal working hours.	Owner / End-user / Developer	Continual / ongoing

6.6.8 Plant and Equipment Maintenance

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Any heavy machinery and vehicles kept on site are to be stored in a dedicated vehicle maintenance yard be illustrated on a layout map/plan. The storage area should fall within the footprint of the BESS and/or the existing PV facility.	Owner / End-user / Developer	Continual / ongoing
2.	No equipment, machinery or vehicles may be extensively repaired anywhere on site other than in a dedicated maintenance yard, or alternatively, off site at an existing / established commercial service and repair workshop. A dedicated maintenance area must be demarcated, on an impermeable surface and contained viz. leading to an oil-water separator or containment sump. Any servicing of vehicles done on-site must be within a dedicated service bay which is impermeable, bunded and equipped with spill kit material, drip trays, etc.	Owner / End-user / Developer	As and when required
3.	All vehicles, equipment and machinery must be serviced regularly (as per manufacturer's specifications) to avoid the contamination of the area from fuel, oil and hydraulic fluid leaks, spills, etc. Machinery or equipment used on site must not constitute a pollution hazard in respect of hydrocarbon substances.	Owner / End-user / Developer	As and when required

4.	Access of all maintenance and material delivery vehicles must be strictly controlled by security personnel at the gate.	Owner / End-user / Developer	Continual / ongoing
5.	Any faulty equipment must be repaired or withdrawn from use and replaced if such equipment or machinery is continually polluting and/or irreparable.	Owner / End-user / Developer	As and when required
6.	Suitably covered receptacles must be available and conveniently placed for the disposal of wastes such as used oils, rags, filters, grease, hydraulic fluids or contaminated soil. Waste from these receptacles must be removed from the site on a regular basis for disposal at a registered / licensed disposal facility.	Owner / End-user / Developer	Continual / ongoing

6.6.9 Electricity use

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Minimise electricity use as far as possible e.g. use light efficient technologies and using renewable energy sources as far as practically possible.	Owner / End-user / Developer	Continual / ongoing

6.6.10 Water use

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Conserve water and minimise use as far as possible e.g. minimising water use during cleaning of any equipment at the facility.	Owner / End-user / Developer	Continual / ongoing
2.	Immediately repair any dripping or leaking taps, water connections and infrastructure using internal human resources if available or using external plumbing expertise if required.	Owner / End-user / Developer	As and when required
3.	Include as a topic of discussion water usage and conservation during environmental awareness training.	Owner / End-user / Developer	Weekly

6.6.11 Hazardous Substances / Chemical use

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Where applicable, adhere to and implement the actions as listed under the construction phase section of this EMPr [see section 6.4.6].	Owner / End-user / Developer	Continual / ongoing
2.	The use of insecticides and / or other harmful agricultural chemicals must be managed responsibly and those handling it must wear the appropriate protective clothing and equipment.	Owner / End-user / Developer	As and when required

	All necessary permits must be in place, or a must be applied by a certified Pest Control Officer (PCO).		
3.	Any agricultural chemicals or pesticides must be stored in a demarcated area that is bunded and on an impervious surface that will prevent the infiltration of any spills into soils. The area must be clearly marked with the proper warning signage.	Owner / End-user / Developer	As and when required
4.	Access to the storage area must be strictly controlled with only authorised personnel having access.	Owner / End-user / Developer	Continual / ongoing
5.	No toxic agricultural chemicals or empty containers may be disposed of to the environment. The disposal of any hazardous agricultural chemicals must be in accordance with NEMWA and the policies and procedures of the Department of Agriculture.	Owner / End-user / Developer	As and when required

6.6.12 Batteries and chemicals associated with BESS

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Handling of the battery modules must be undertaken in accordance to an Operating Manual and OEM instructions by suitably qualified, trained and competent personnel.	Owner / End-user / Developer	Continual / ongoing
2.	Compile and implement an operating and maintenance programme/plan which includes aspects such as the identification of battery overcharge, overheating and short circuit detection.	Owner / End-user / Developer	Once off; then continual
3.	Fire detection and suppression systems must be installed with appropriate fire extinguishers made available at all points of storage of flammable materials which are to be checked on a monthly basis to ensure they have not been used or damaged and serviced annually. Refer also to EMPr section 6.6.14 below.	Owner / End-user / Developer	Continual / ongoing
4.	Details of the closest fire department should be displayed at the facility and updated, where necessary, on a quarterly basis.	Owner / End-user / Developer	Continual / ongoing
5.	All staff must receive training on fire prevention and safety in the event of a fire and annual refresher courses must be presented to all staff.	Owner / End-user / Developer	Once off; then annually

6.6.13 Spills, Incidents and Pollution Control

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Where applicable, adhere to and implement the actions as listed under the construction phase section of this EMPr [see section 6.4.7] and implement a spill contingency plan.	Owner / End-user / Developer	Continual / ongoing
2.	Ensure drip trays are used under vehicles / machinery and spill control measures (e.g. spill kits) are available / implemented.	Owner / End-user / Developer	As and when required

6.6.14 Emergency Preparedness

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	An Emergency Preparedness Plan emphasising fire prevention should be drafted and implemented. Fire outbreaks pose a major risk to human life, property and vegetation in the surrounding area. Provision must be made to ensure preparedness toward preventing fires at the facility or elsewhere to limit or prevent damage to surrounding areas.	Owner / End-user / Developer	Once off; then review / amend plan annually
2.	Training (annual) for emergency preparedness and potential emergency situations <i>i.e.</i> fires, floods, explosions, accidents, first aid, evacuations, snake bites, etc. should be included in the Emergency Preparedness Plan. Carry out mock drills quarterly.	Owner / End-user / Developer	Annually (training) Quarterly (Mock drills)
3.	Contact numbers for any local fire associations and/or fire-fighting authorities should be included in the Plan and prominently displayed at the facility.	Owner / End-user / Developer	Continual / ongoing

6.6.15 Air Quality and Noise

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Roads must be maintained to a manner that will ensure that nuisance to the surrounding landowners / communities from dust is not visibly excessive.	Owner / End-user / Developer	As and when required
2.	Where applicable, appropriate dust suppressants with high moisture retention properties should be applied to any gravel roads as required minimise/control airborne dust.	Owner / End-user / Developer	As and when required
3.	Excessive speed of vehicles within the facility must be restricted as defined by a health and safety plan/policy with repeat offenders suspended from accessing the facility.	Owner / End-user / Developer	Continual / ongoing
4.	Vehicles, machinery and equipment must be maintained in a functional / road-worthy condition at all times.	Owner / End-user / Developer	Continual / ongoing
5.	Operational activities likely to generate the most noise, <i>i.e.</i> vehicle deliveries to and from the facility should be restricted to normal working hours.	Owner / End-user / Developer	Continual / ongoing

6.6.16 Complaints

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Maintain complaints register at the facility, implement a complaints procedure and manage complaints.	Owner / End-user / Developer	Once-off; then as and when required

6.6.17 Maintenance and efficiency of infrastructure

Action no.	Mitigation Measures and Actions	Responsibility	Monitoring Frequency
1.	Develop an operational management plan with forecasted budgetary / financial provisions to ensure the upkeep, maintenance and sustained performance [<i>i.e.</i> outputs and products] at the facility.	Owner / End-user / Developer	Once-off; then review/amend plan annually

7 CONFORMANCE WITH THE ENVIRONMENTAL SPECIFICATIONS

It is necessary for both the **developer** and **contractor** to make provisions as part of their budgets for the implementation of the EMPr. In terms of NEMA, every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment and is liable to pay costs both to the environment and human health and the preventative measures to reduce or prevent additional pollution and/or environmental damage from occurring. This is referred to as the Polluter Pays Principle. Section 28 of NEMA embodies the Polluter Pays Principle.

During **construction**, the developer (holder of the EA) and/or the contractor will be deemed not to have adhered with the Environmental Specifications/EMPr/EA if:

- Any unauthorised construction activities or unauthorised NEMA EIA listed activities knowingly take place in the context of those activities that are authorised for the Project.

During **construction**, the contractor is deemed not to have adhered with the Environmental Specifications/EA/EMPr if:

- There is evidence of contravention of clauses within and beyond the boundaries of the site footprint.
- Significant environmental damage is caused due to negligence.
- There is failure or ignorance to comply with corrective or other instructions issued by the PM or ECO within a specified time; and
- There is failure to respond to and adequately resolve reasonable complaints from members of the public or project stakeholders.

During **operations**, the developer is deemed not to have adhered with the Environmental Specifications/EA/EMPr if:

- Any unauthorised construction activities or unauthorised NEMA EIA listed activities knowingly take place in the context of those activities that are authorised for the development.
- There is evidence of environmental contravention within and beyond the boundaries of the development footprint.
- Significant environmental damage is caused due to negligence.

7.1 Non-Conformance

During construction, the contractor shall act immediately when any notice of non-conformance (NCR) is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and any actions of resolution taken. The ECO should be made aware of any complaints received. Any non-conformance to the procedures of this EMPr may also be deemed a transgression of the various statutes and laws that define the way the biophysical (natural) and socio-economic environment is managed. Any chronic or persistent negligence or failure to redress serious transgressions or contraventions shall be reported to the relevant authority for them to consider, mediate and officially advise upon on a basis that the authority deems to be environmentally fair, reasonable and justifiable.

It is recommended that the inclusion of a penalty clause in the contract documentation is implemented for incidents of major legal non-compliance or persistent negligence which significantly negatively impacts the environment. The contractor will be allowed one offence and a written warning issued by the ECO or PM. Failure to rectify the offence within two (2) working weeks of the issue of the warning or a repeat offence should result in a fine, as decided by the PM or ECO. The principle of any fines or penalties should be consistent with any clauses in the contractual documentation for the construction phase where fines or penalties may be issued to the contractor for any time delays/extensions or material or workmanship defects relating to the Project which are not allowed for in the contract and the associated budget.

It is recommended that the PM in collaboration with the ECO implement an integrated system of financial penalties and/or conditions for dismissal for less serious transgressions, and any others determined during the course of the construction phase, such as those listed below:

- Theft/removal and/or damage to any fauna, flora or cultural or heritage objects on site.
- Any persons, vehicles or equipment found within any of the designated “no-go” areas.
- Littering on site.
- Unlawful lighting of fires on site.
- Persistent or un-repaired fuel and oil leaks.
- Excess dust or excess noise emanating from site.
- Possession or use of intoxicating substances on site.
- Any vehicles being driven in excess of designated speed limits.
- Urination and defecation anywhere except at designated facilities.

It is recommended that any financial penalties are channelled to a local conservation fund or equivalent fund.

PREPARED BY:

Nick Gates & Craig Burne

NCC Environmental Services (Pty) Ltd

REVIEWED BY:

Nico-Ronaldo Retief

NCC Environmental Services (Pty) Ltd

Senior Environmental Assessment Practitioner

ANNEXURES

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Annexure A: Curriculum Vitae of Author

Nick Gates

Senior Environmental Consultant

Profession

Senior Environmental Consultant & Senior Manager

Qualification

BSocSci: Environmental and Geographical Sciences

- *University of Cape Town, 2007*

Short courses

SHEQ IMS Auditors Course

- *ISTEC Training, 2017*

Environmental Risk Assessment and Management based on ISO 31000 (NQF 6)

- *Centre for Environmental Management, 2014*

Project Management (NQF 8)

- *University of Stellenbosch Business School, 2014*

Integrated Water Resource Management in the Context of South African Legislation (NQF 7)

- *Centre for Environmental Management, 2011*

Basic GIS Training

- *Geocline, 2010*

Environmental Law (NQF 7)

- *Centre for Environmental Management, 2010*

Lead Auditing Course

- *DSQ, 2010*

Registration Bodies

- The Institute of Waste Management of South Africa: Registration No. 30116139
- International Association of Impact Assessment South Africa: Registration No. 5535
- Environmental Law Association: Registration No. 2018/198/WC

Years of Experience

- *14 years*

Key skills

Consulting, Project Management, Conflict Management, Problem Solving, Programme Implementation, Environmental compliance monitoring and implementation

Personal Details

- Gender: Male
- Date of Birth: 1983-07-31
- Nationality: South African
- Identity: 830102 5146 080
- Marital Status: Married
- Drivers Licence: Code B
- Languages: English

NCC Environmental Services (Pty) Ltd

2020 -Present

Service Line Manager: Environmental Consultant

2008 - 2020

Senior Environmental Consultant specializing in Water Use License Applications and Auditing

Current Duties

Project Manager of Legal Compliance Projects: Applying for various environmentally related licences, permits and authorizations; source, co-ordinate and manage specialist processes. Liaising with various Government Environmental Departments to meet minimum requirements of licenses. Liaising with clients to improve and speed up the application process.

Undertaking of various environmental compliance monitoring and implementation functions on various sites such as Environmental Control Officer, Environmental Manager, Auditor, compilation of Operational & Environmental Management Plans and Environmental Officer on a variety project mentioned below.

Projects

Auditing:

- Lead Auditor for Section 30A legal compliance audit for Saldanha Bay Municipality
- Lead Auditor for external legal compliance audits for Cape Agulhas Municipality Landfill and three drop off facilities
- Lead Auditor for external legal compliance audits for 14 City of Cape Town Drop Off Facilities
- Lead Auditor for external legal compliance audit of PetroSA's Waste Management Mossel Bay.
- Lead Auditor for external legal compliance audit of Saldanha Bay Municipality Vredenburg and Langebaan Landfills.
- Lead Auditor for external legal compliance audit of PetroSA's Voorbaai Water Use Licence
- Lead auditor for external legal compliance audit of Longyuan Mulilo De Aar Wind Facility operations
- Lead auditor for external legal compliance audit of Mulilo Sonnedix Prieska Photovoltaic Facility operations and Equator Principle Audit
- Lead auditor for external legal compliance audit of Exxaro's Grootegeluk Mine, various facilities.
- Polyoak Water Audit, Polyoak operating Facility
- Seaharvest Section 30A Audit, Seaharvest Saldanha Bay

Compliance Monitoring Projects (ECO/EO):

- KIPTS Project, Koeberg ESKOM
- Kusile Power Station EO, ESKOM
- SmartMatta Recycling Facility ECO, Smartmatta
- Saint Helena Airport Project ESO, Basil Read
- Mouille Point Sea Wall ECO, Ingerop Africa
- Mulilo Prieska Photovoltaic Facilities ECO, Mulilo
- Hydra Gamma 765kV ECO, ESKOM
- Medupi Spitskop 400kV, ESKOM
- Sishen South (Kolomela) Mining Project ECO, Kumba Iron Ore
- Vergelegen Erosion Rehabilitation Project ECO, Vergelegen Wine Estate
- WBHO Turbine Tower Facility ECO, Prieska, WBHO

Craig Burne

Senior Environmental Consultant

Profession

Environmental Consultant

Qualifications

MSc (Dissertation): Freshwater Ecology

- University of the Witwatersrand
2013-2015

BSc (Hons): Environmental Science

- University of KwaZulu-Natal
2007

BSc: Zoology & Environmental Science

- Rhodes University
2003-2005

Accredited SASSS Practitioner

- Departments of Water & Sanitation and Environmental Affairs
2019

Professional certification

Professional Natural Scientist (Pr. Sci. Nat.)

- South African Council for Natural Scientific Professions (SACNASP)
- Registration no: 115213

Short courses

Environmental Law

- Centre for Environmental Management; 2010

Lead Auditing Course: ISO 14001

- DQS; 2010

Years of experience

- 13.5 years

Key skills/knowledge areas

- Freshwater (aquatic and wetland) ecology
- Water quality assessment/reporting
- Freshwater macroinvertebrate assessment
- Aquatic assessment & biomonitoring
- Wetland assessment & monitoring
- Alien vegetation assessment & monitoring
- Environmental management (ISO14001)
- Environmental compliance monitoring
- Environmental risk assessment
- Environmental permitting/licensing
- Auditing & EMS implementation
- Scientific report writing
- Technical proposal writing
- Basic statistical techniques
- Basic mapping
- Applied and basic research

Personal Details

Gender: Male

Date of Birth: 26.10.1982

Nationality: South African

Drivers Licence: Code EB

Id. No.: 8210265850088

Languages

English (native) Afrikaans (basic)

NCC Environmental Services (Pty) Ltd

Feb 2008 – present

Previous and current roles and responsibilities

Aquatic and water quality assessments, aquatic biomonitoring, delineation and assessment of freshwater resources, compilation of river rehabilitation and alien vegetation management plans, river rehabilitation monitoring, alien vegetation monitoring and environmental/risk assessment. Participation in the coordination of environmental assessments, EMPRs & environmental license/permit applications. Undertaking environmental legal compliance monitoring and implementation functions on various projects across South Africa. Compilation and implementation of environmental method statements, site-specific rehabilitation plans, environmental risk assessments (ERAs) and construction work procedures. Preparing, undertaking and reviewing customised environmental audits for various projects/clients, stakeholder and authority engagement, public participation facilitation, management; mentoring and advice to internal staff on multiple projects, conducting rehabilitation assessments and cost estimates post-construction, closure reporting, coordination of waste management and recycling programmes on civil and building construction sites, management and resourcing of sub-contractors.

Current and previous projects

Consulting Projects

- Freshwater assessment (wetland and aquatic) and risk assessment for Athene-Invubu 400kV Transmission line guy anchor refurbishment, KZN - 2020-2021
- Freshwater assessment (wetland and aquatic) and risk assessment for proposed development of Amaoti Secondary School, KZN - 2021
- Freshwater Assessment (wetland and aquatic) and risk assessment for a proposed hydroponic facility on farm Klein Dassenberg 39/20, Western Cape - 2019-2020
- Freshwater Assessment (wetland and aquatic) and risk assessment for the upgrade of provincial road D4407 between Hluvukani and Timbavati, Mpumalanga - 2020
- Freshwater Assessment (wetland and aquatic) and risk assessment for the proposed Modelkloof X18 Township Development, KZN - 2020
- Seasonal Aquatic Biomonitoring Mhlathuze River, KZN - 2019-2020
- Environmental Management Programme for proposed hydroponic facility on farm Klein Dassenberg 39/20, Western Cape - 2019-2020
- Wetland rehabilitation monitoring, aquatic habitat assessment, wetland assessment, aquatic biomonitoring (fish and macroinvertebrates) and water quality monitoring for N2 Road Upgrade, KZN - 2017-2020
- Sabi Game Reserve Watercourse Risk Assessment, Mpumalanga - 2019
- Surface water verification assessment for erf 803 and 804 in the Newcastle Local Municipality, KZN - 2019
- Thembinkosi Primary School Basic Assessment, KZN – 2019-2020.
- SANS 241-1:2015 drinking water quality assessment, monitoring & reporting in the Port of Durban - 2019-current
- Water resource use licensing & SANS water interpretation for 'Rocking the Daisies 2018', W. Cape - 2018
- Environmental screening/feasibility assessment Kalahari Films, N. Cape - 2017
- Participation in basic assessment for D281 road upgrade, Mpumalanga - 2015-2016

ECO Compliance Monitoring Projects

- Makaula Substation, Eastern Cape - 2020-2021
- Dube Tradeport Corporation (DTPC) Agrizone, KZN - 2018-2020
- DTPC Hlawe/Tonga Trunk Sewer Line, KZN - 2018-2019
- Daggakraal D281 Road Upgrade, Mpumalanga - 2018-2019
- Cornubia Sigma and Cornubia II, Durban, KZN - 2018-2019
- Crown Cornubia Cold Storage Facility, Durban, KZN - 2017
- Ingula Pumped Storage Scheme, KZN - 2016
- Everest-Merapi 400kV transmission line construction, Free State - 2016
- Lower Thukela Bulk Water Supply Scheme, KZN - 2016
- SANBI Botanical Garden Upgrade, Durban & Pietermaritzburg, KZN - 2015-2017
- Cornubia BFS Cold Storage Facility, Durban, KZN - 2015
- NCC Team Manager for Eskom and Transnet Infrastructure Projects - 2012-2017
- Medupi 400kV Transmission Integration: Phase Alpha, Limpopo & NW - 2010-2012
- Majuba-Mfolozi 765kV transmission line construction, KZN - 2009
- Mercury 765kV Substation, Free State - 2008
- VRESAP Bulk Water Pipeline, Gauteng and Mpumalanga - 2008
- VRESAP Bulk Water Pump Station, Vaal Dam, Gauteng - 2008

Annexure B: Content of an EMPr

CONTENT OF AN EMPr¹

¹The content of this EMPr for is consistent with the requirements as set out in Section 19 (4) of the 2014 NEMA EIA Regulations [as amended] in terms of Appendix 4 of GN R982.

NEMA requirements [Sec 24N] for EMPrs		
Appendix 4 clause	Content as required by NEMA	EMPr Section
1[a]	(i) details of the EAP who prepared the EMPr; and	Sec 1.3 & Annexure A
	(ii) details of the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	
1[b]	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Sec 3 & 4
1[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 any areas that should be avoided, including buffers;	Sec 3
1[d]	a description of the impact management objectives, 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 -	As below:
	(i) planning and design;	Sec 6.2
	(ii) pre-construction activities;	Sec 6.3
	(iii) construction activities;	Sec 6.4
	(iv) rehabilitation of the environment after construction and where applicable post closure; and	Sec 6.5
	(v) where relevant, operation activities;	Sec 6.6
1[e]	a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Sec 6
1[f]	a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to -	As below:
	(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Sec 6
	(ii) comply with any prescribed environmental management standards or practices;	Sec 6
	(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and	Sec 6
	(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	Sec 6
1[g]	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Sec 5, 6
1[h]	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Sec 5, 6
1[i]	an indication of the persons who will be responsible for the implementation of the impact management actions;	Sec 5, 6
1[j]	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Sec 5, 6
1[k]	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Sec 5, 6
1[l]	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Sec 5
1[m]	an environmental awareness plan describing the manner in which –	As below:
	(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	Sec 6, Annexure D & G
	(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	
1[n]	any specific information that may be required by the competent authority.	EA Pending
2	Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	N/A

Annexure C: Maps

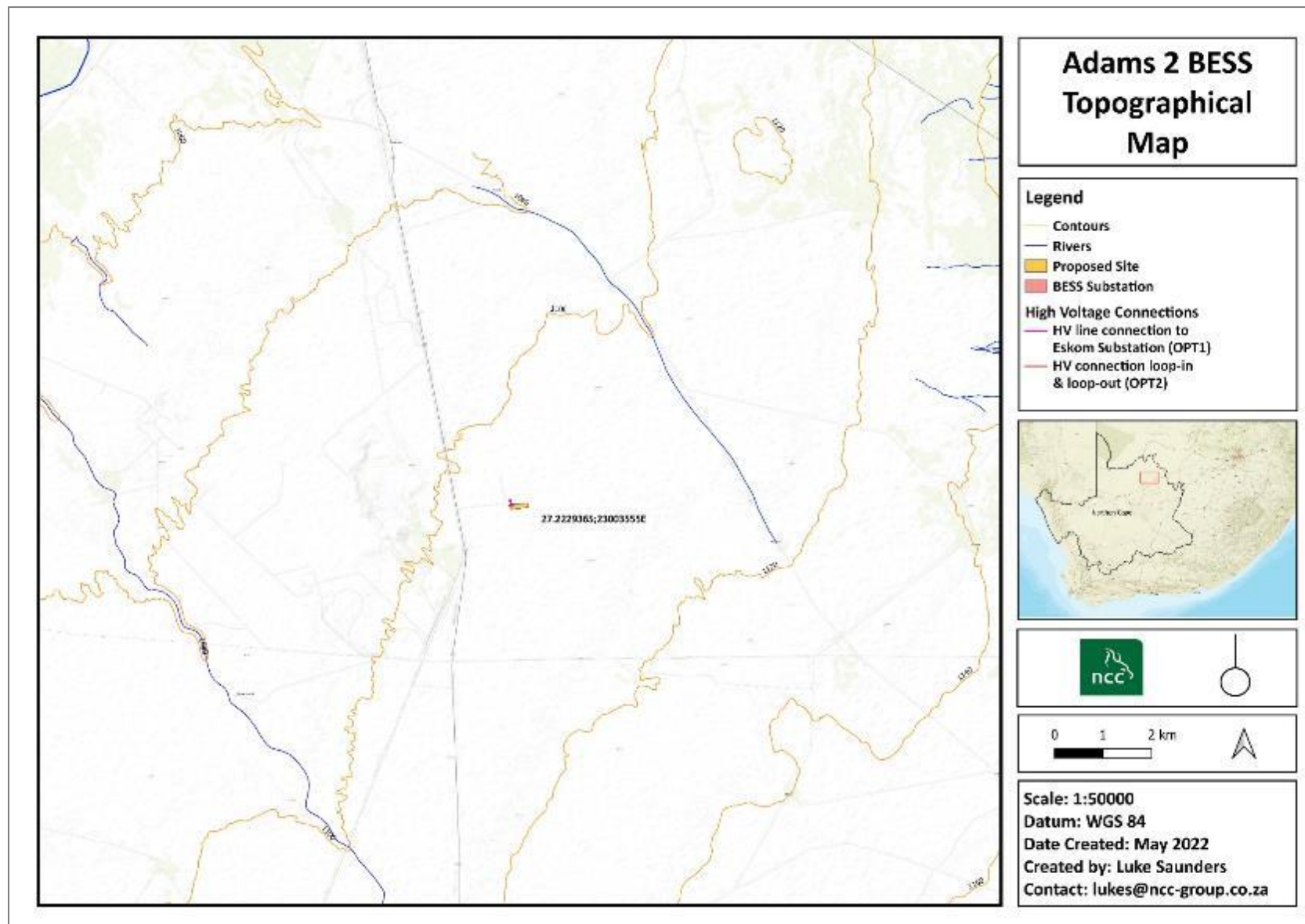
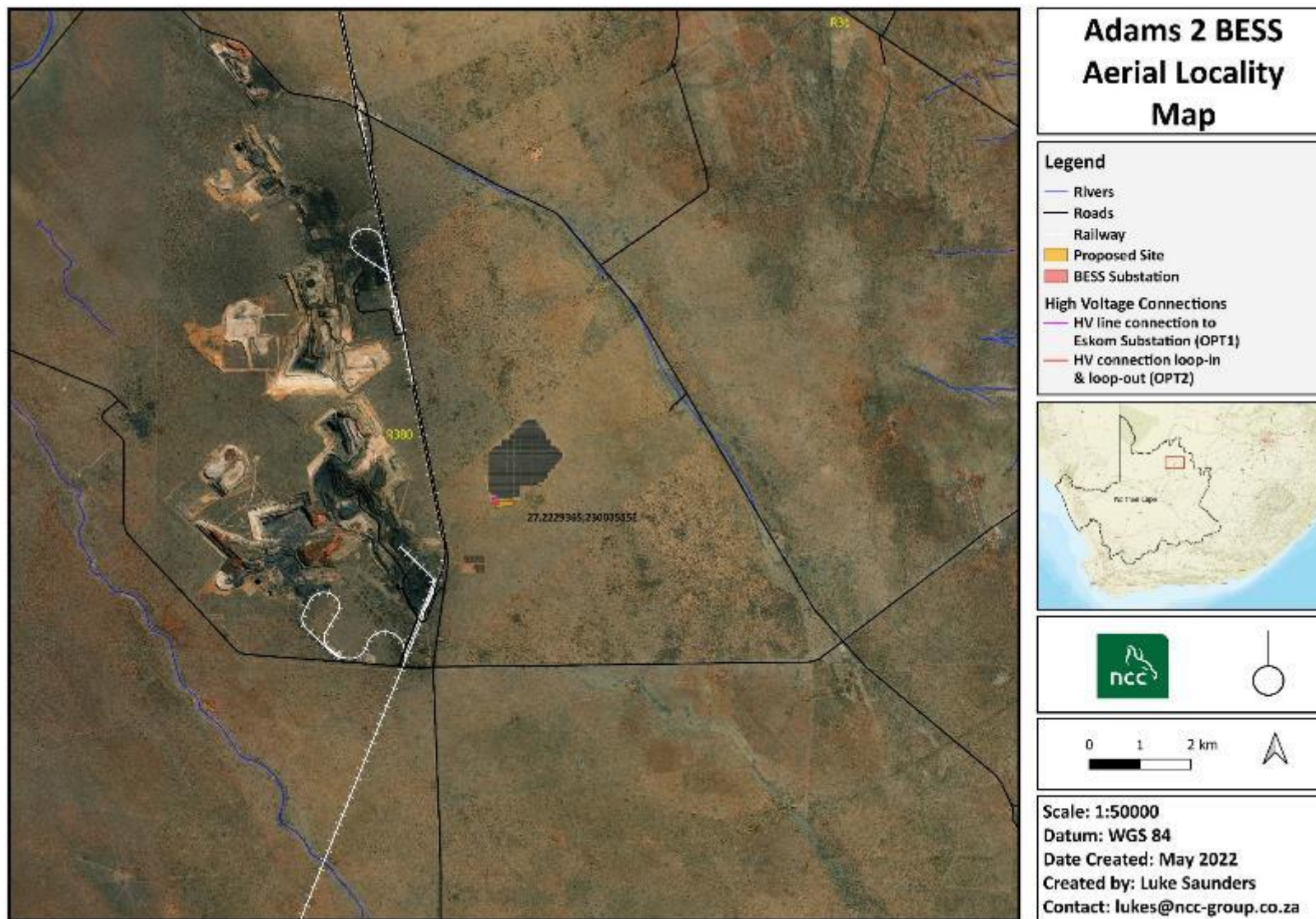


Figure C1: Topographical survey map



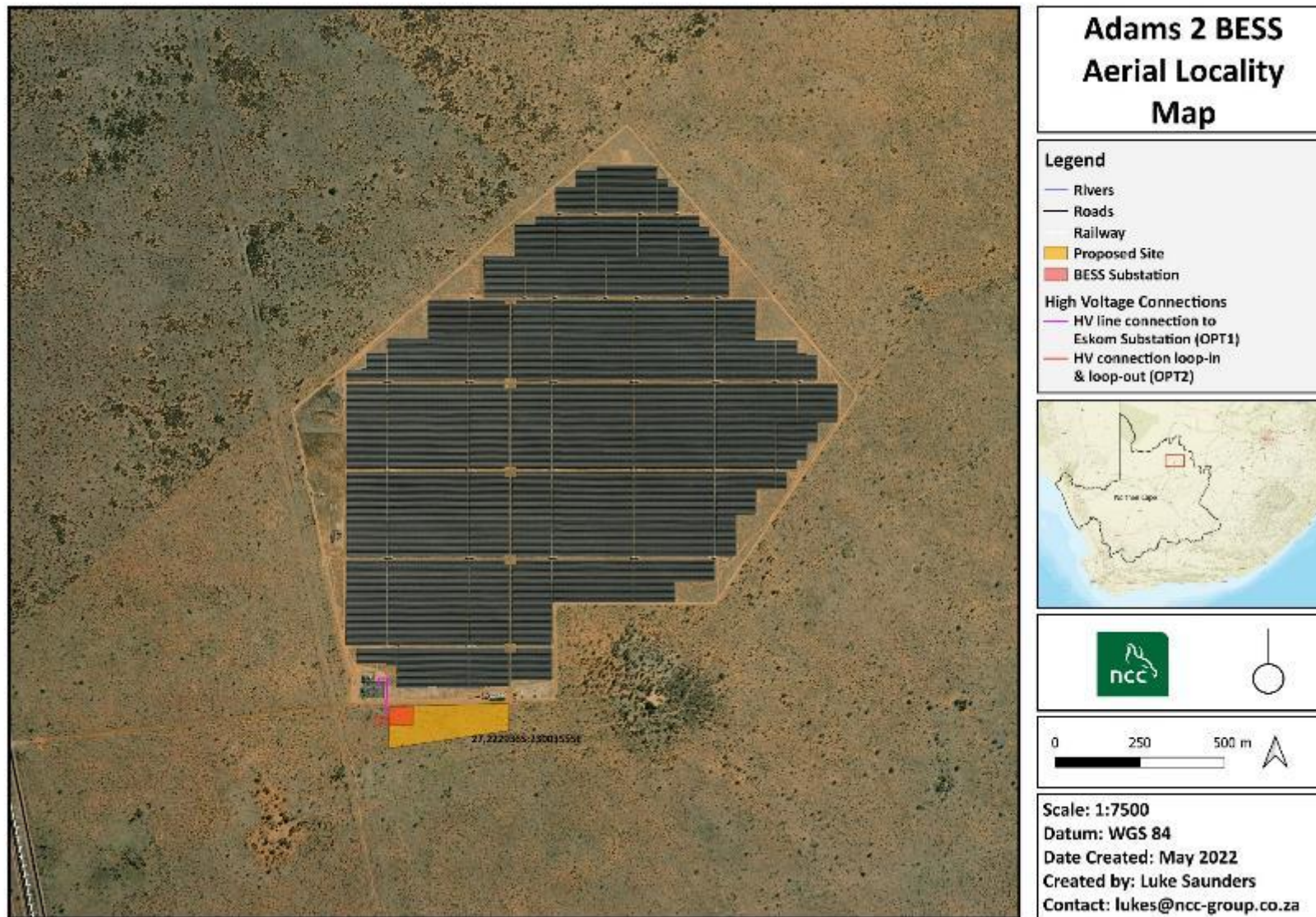


Figure C2: Aerial map

Annexure D: Awareness Training (Example)

Basic Environmental Awareness Training



Workers & equipment must stay inside the site boundaries at all times.



Do not harm any animals on the site.
Report any animals on site to the site manager.



Report any petrol, oil & diesel leaks or spills to the Site Supervisor.
Use a drip tray under vehicles & machinery during refueling.



Put cigarette butts in designated bin.
Do not smoke near gas, paints or petrol.
Do not throw cigarettes into veld.



Know all the emergency phone numbers.



Do not light any fires.
Know the positions of fire fighting equipment.
Report all fires to the site supervisor.
Do not burn rubbish/vegetation.



Avoid producing dust – keep to speed limit.



Use the toilets provided.
Report full or leaking toilets to site supervisor.



Do not make loud noises around the site, especially near homes/business.
No employees to be using headphones/earphones on site.
Report noisy vehicles or machinery to the site supervisor.



Do not litter – put all rubbish into the bins provided.
Report full bins to site supervisor.



Always keep to the speed limit.
Drivers - check & report leaks.
Ensure loads are secure & do not spill.
NO vehicle/machinery washing is permitted.



Do not damage or cut down any trees or plants without the necessary permissions.
Do not pick flowers.



All employees entering site must have appropriate Personal Protective Equipment (PPE) on them at all times.



Report any breaks, floods, fires, leaks and injuries to the site supervisor.
Ask questions!

Annexure E: Environmental Registers (Example)

WATER USAGE TEMPLATE

ENVIRONMENTAL INCIDENT / SPILL / NCR REGISTER TEMPLATE

No.	Date	Source/ Originator	Responsible party / Contractor	Type	Impact	Location	Estimated volume of spill	Significance Classification	Repeated Offence	Description of Incident	Cause	Remedial Action		Action Date	Status	Escalated to NCR
								Minor/ Moderate/ Major		What, Where, When, How, Why did it happen?		Immediate Corrective Actions	Preventative measures			
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																

COMPLAINTS REGISTER TEMPLATE

Annexure F: EMPr Acceptance

LETTER OF ACCEPTANCE OF THE EMPr – CONSTRUCTION

This letter is to be signed by the developer/infrastructure owner, ECO, principal contractor and project manager / agent / engineer, printed and kept on site.

Acceptance of the Environmental Management Programme			
<p>Dear Sir/Madam,</p> <p>This is to state that the undersigned have received a copy of the approved Environmental Management Programme (EMPr) developed for the Adams BESS Facility by NCC Environmental Services (Pty) Ltd dated _____. The undersigned parties hereby agree to implement and abide by the conditions and environmental specifications of the EMPr. Any contraventions of the EMPr should be recorded and appropriate corrective actions duly carried out.</p> <p>Any suggested amendments and/or changes to the EMPr should be motivated and approved by the appointed Environmental Control Officer (ECO) in conjunction with the relevant authority. Any such changes are to strictly be made in writing in terms of Chapter 5 of the 2014 NEMA EIA Regulations (as amended).</p>			
<p>As Agreed on this day _____ of _____ (Month) _____ (Year)</p>			
Environmental Control Officer (ECO)			
Name		Date	
Signature			
Principal Contractor			
Name		Date	
Signature			
Site Engineer/Agent/Project Manager			
Name		Date	
Signature			
Developer/Client			
Name		Date	
Signature			

LETTER OF ACCEPTANCE OF THE EMPr – OPERATIONS

This letter is to be signed by the developer/infrastructure owner and where applicable, any other operational end-users at the facility, printed and maintained at the facility.

Acceptance of the Environmental Management Programme			
<p>Dear Sir/Madam,</p> <p>This is to state that the undersigned have received a copy of the approved Environmental Management Programme (EMPr) developed for the Adams BESS by NCC Environmental Services (Pty) Ltd dated _____. The undersigned parties hereby agree to implement and abide by the conditions and environmental specifications of the EMPr. Any contraventions of the EMPr should be recorded and appropriate corrective actions duly carried out.</p> <p>Any suggested amendments and/or changes to the EMPr should be motivated and approved by the relevant environmental authority. Any such changes are to strictly be made in writing in terms of Chapter 5 of the 2014 NEMA EIA Regulations (as amended).</p>			
As Agreed on this day _____ of _____ (Month) _____ (Year)			
Developer/Infrastructure owner			
Name		Date	
Signature			
End-user operations contractor [if applicable]			
Name		Date	
Signature			
End-user operations contractor [if applicable]			
Name		Date	
Signature			

Annexure G: Method Statement Guideline & Basic Template

GUIDELINE FOR METHOD STATEMENTS

Environmental method statements must be prepared by the Developer/Agent/Contractor and submitted to and approved by the ECO and Project Manager and updated/revised as may be necessary. Environmental method statements must contain minimum information on the following basic aspects:

- **Title** - a title of the activity relating to method.
- **Activity Description** - a brief description of the specific activity.
- **Location** - a brief description of the location of the activity.
- **Specifications** - referencing relevant documents such as South African Bureau of Standards, the EMPr, the Environmental Authorisation, Legislation, etc.
- **Drawings** - where relevant.
- **Major Equipment** - listing the major equipment that will be involved in the specific construction or operational activity.
- **Timeframe/Programme** - identifying when the activity is expected to take place.
- **Method** - detailing the method and sequence that will be followed.
- **Resources** - resources that will be required for the activity.
- **Environmental** - information regarding awareness, training, precautions, etc., and
- **Declarations** - signatures of approval of method statements by relevant project role-players.

Example layout for 'Declarations' shown below:

1) PROJECT MANAGER / ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed) (Print name)

Dated: _____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed) (Print name)

Dated: _____

3) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement:

(Signed) (Print name)

Dated: _____

BASIC METHOD STATEMENT EXAMPLE TEMPLATE

METHOD STATEMENT TEMPLATE

CONTRACT: _____

DATE: _____

PROPOSED ACTIVITY (give title of method statement and reference number from the EMPr):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date: _____

End Date: _____

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated maps and plans where possible):