Environmental Management Programme

Soventix South Africa (Pty) Ltd

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

File Reference Number:

GAUT002/22-23/E3528

Project Title:

The development of a ground-mounted 1.8MWp solar photo voltaic (PV) plant with associated infrastructure within the Element Six facility on erf 256 Nuffield Township, Registration Division I.R., with the approximate GPS co-ordinates of the centre point at 26°17'46.79"S, 28°27'31.00"E, in the City of Ekurhuleni Metropolitan Municipality, Springs region of Gauteng Province, South Africa.

Prepared for:

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Draft version (Rev00)

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Reg: 2006/023163/23

DOCUMENT CONTROL

Table 1: Document Control.

PHASE	AUTHOR	STATUS	REVISION	DISTRIBUTED ON	SIGNATURE
Author	Shaun MacGregor	Draft	00	03 April 2023	
Review	Justin Bowers	Draft	01		
Approved					

EXECUTIVE SUMMARY

The project involves the development of a 1.8MWp solar photovoltaic (PV) ground-mounted facility (Phase 2) to augment the existing Element Six roof-top solar PV installation (Phase 1). The EMPr aims to manage the impacts associated with the activities and aspects emanating from the project and provide mitigations and interventions to ensure desired environmental management outcomes are achieved.

This Environmental Management Programme (EMPr) is developed in compliance with section 24N of the NEMA, 1998, as amended and contains those requirements prescribed in the EIA Regulations, 2014, as amended, including section 23 and Appendix 4 of GN No. R. 326 of 7 April 2017.

The EMPr has been developed in conjunction with the Basic Assessment Report (BAR) providing detail on the affected environment as well as an impact assessment for the anticipated environmental impacts and the General Authorisation (GA) to be issued under the National Water Act (Act 36 of 1998).

Activities to be undertaken during the planning & development, pre-construction, construction and post-construction and rehabilitation phases (operational & decommissioning phases are outside the scope of the Environmental Authorisation).

The implementation of the EMPr within the project is not an optional additional or “add on” requirement. The EMPr is legally binding, integral to the contract and is as important as the engineering aspects of the contract. The EMPr is a working document to be used throughout the life of the project, until such time that closure is achieved.

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CHECKLIST

An environmental management programme (EMPr) must comply with section 24N of the NEMA, 1998, as amended and contain those requirements prescribed in the EIA Regulations, 2014, as amended, including regulation 23 and Appendix 4. The full suite of requirements is listed in Table 2, which have dictated the layout and content of this EMPr.

Table 2: Environmental Management Programme Checklist.

Content of Environmental Management Programme (EMPr)	Checked
1. (1) An EMPr must comply with section 24N of the Act and include-	☑
(a) details of	☑
(i) the EAP who prepared the EMPr; and	☑
(ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	☑
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	☑
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	☑
(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	☑
(i) planning and design;	☑
(ii) pre-construction activities;	☑
(iii) construction activities;	☑
(iv) rehabilitation of the environment after construction and where applicable post closure; and	☑
(v) where relevant, operation activities;	N/A
(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to -	☑
(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	☑
(ii) comply with any prescribed environmental management standards or practices;	☑

(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and	N/A
(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	N/A
(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	☑
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	☑
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	☑
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	☑
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	☑
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	☑
(m) an environmental awareness plan describing the manner in which-	☑
(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	☑
(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	☑
(n) any specific information that may be required by the competent authority.	☑
(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

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ABBREVIATIONS / ACRONYMS AND DEFINITIONS

Table 3: List of terms for abbreviations used in this document.

Abbreviation / Acronym	Term
BA	Basic Assessment as provided for in NEMA (Act 107 of 1998) and EIA Regulations (2014), as amended.
CA	Competent Authority
CAR	Corrective Action Report
CLO	Community Liaison Officer
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment as provided for in NEMA (Act 107 of 1998) and EIA Regulations (2014), as amended.
EIAr	Environmental Impact Assessment report
EMPr	Environmental Management Programme
EM	Environmental Manager
IEA	Independent Environmental Auditor
GA	General Authorisation as per Section 39 of the National Water Act (Act 36 of 1998)
HSO	Health and Safety Officer
I&APs	Interested and Affected Parties
LA	Listed Activity (EIA Regulations, 2014)
LN1	Listing Notice 1: GN. No. R. 983, 4 December 2014, as amended in GN. No. R. 327, 7 April 2017.
LN2	Listing Notice 2: GN R. 984, 4 December 2014, as amended in GN. No. R. 325, 7 April 2017.
LN3	Listing Notice 3: GN R. 985, 4 December 2014, as amended in GN. No. R. 324, 7 April 2017.
MS	Method Statement
NEMA	National Environmental Management Act (NEMA, Act 107 of 1998)
NHRA	National Heritage Resources Act (Act 25 of 1999)
NWA	National Water Act (Act 36 of 1998)
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency

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SDF	Spatial Development Framework
SEO	Site Environmental Officer
SOP	Standard Operating Procedure
WUL	Water Use License

Table 4: Definitions of some terms used in this document.

Term	Source	Definition
Aspect (environmental)	ISO 14001: 2015	Element of an organisation's activities or products or services that interacts or can interact with the environment. An environmental aspect can cause (an) environmental impact(s). A significant environmental aspect is one that has or can have one or more significant environmental impact(s).
Corrective Action	ISO 14001: 2015	Action to eliminate the cause of a non-conformity (or non-compliance in the case of an EMPr) and prevent recurrence.
Development	EIA Regulations (2014)	Means the building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.
Environmental Impact	ISO 14001: 2015	Change to the environment, whether adverse or beneficial, wholly or partially resulting an organisation's environmental aspects.
Maintenance	EIA Regulations (2014)	Means actions performed to keep a structure or system functioning or in service on the same location, capacity and footprint.

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Performance	ISO 14001: 2015	Measurable unit. Performance can relate either to quantitative or qualitative findings.
Regulated Area of a watercourse	National Water Act (Act 36 of 1998)	(a) The outer edge of the 1 in 100 year flood line and /or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam; (b) In the absence of a determined 1 in 100 year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or (c) A 500 m radius from the delineated boundary (extent) of any wetland or pan.
Significant impact	EIA Regulations (2014)	Means an impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence.
Watercourse	EIA Regulations (2014)	(a)A river or spring; (b)A natural channel in which water flows regularly or intermittently; (c)A wetland, pan, lake or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998); and A reference to a watercourse includes, where relevant, its beds and banks.

SECTION 1: DETAILS & EXPERTISE OF THE EAP AND APPLICANT

Details of –

(i) The EAP who prepared the report;

Environmental Assessment Practitioner	Ecoleges Environmental Consultants
Contact Person	Shaun MacGregor
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Facsimile	086 697 9316
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E-mail	shaun@ecoleges.co.za

Details of the Applicant;

Project Applicant	Soventix South Africa (Pty) Ltd
Trading Name (if any)	
Contact Person	Mr. Jean-Paul De Villiers
Physical Address	Portion Number 2, Farm Number 78, Devon Valley, Stellenbosch Road
Postal Code	7600
Telephone	+27(0)21 852 7333
Mobile	+27(0)82 550 6672
Fax	+27(0)21 852 5089
Email	jp.devilliers@soventix.com

(i) The expertise of the EAP to prepare the EMPr, including a curriculum vitae;

Name	Shaun MacGregor
Date of birth / ID No.	01 October 1976 7610015437089
Nationality	South African
Marital Status	Married with two children
Current Address	● Moditlo Wildlife Estate, Hoedspruit ● Mobile: +27 (0)64 885 2240 ● e-mail: shaun@ecoleges.co.za
Languages	English
Driver's Licence	Code 08
Specialisations	Undergrad: BSc – Grassland Science, Faculty of Agriculture Postgrad: MSc – Grassland Science, Faculty of Agricultre Key Fields: Ecologist (Pr.Sci.Nat.), Environmental Control Officer (ECO), Compliance Auditor, Environmental Assessment Practitioner (EAP).
Qualifications & Courses Attended	**1994-1997** BSc., University of Natal, Pietermaritzburg **1998-2001** MSc., University of Natal, Pietermaritzburg **2001-2002** Field Guides Association of Southern Africa (FGASA) Level 1 **2002-2005** FGASA Level 2 & 3 **2008** IEMA Approved Foundation Course in Environmental Auditing **2009** SAATCA Accredited Environmental Management System ISO 14001 Audit: A Lead Auditor Course based on ISO 19011 & ISO 17021
Memberships & Registrations	• South African Council for Natural Scientific Professions (SACNASP) (Pr. Sci. Nat. - Reg. No. 400222/08). • Grassland Society of Southern Africa (GSSA). • International Association for Impact Assessment, South Africa (IAIAsa) (Membership No. 6928). • Environmental Assessment Practitioner Association of South Africa (EAPASA, Reg. EAP No. 2019/1306)
Latest Publication	Alberts, R.C., Retief, F.P., Roos, C., Gillars, D.P., Moolman, J., Bowers, J., MacGregor, S., Weir, F.H. & Olivier, I. (2022). Beyond legal compliance: The environmental performance of luxury safari

	lodges. African Journal of Hospitality, Tourism and Leisure, 11(2): DOI: https://doi.org/10.46222/ajhtl.19770720.252
Career Summary	**Feb 2001 – Nov 2005** Professional Field Guide for Private Game Reserves in the Sabi Sand Wildtuin (Lionsands and Singita). **Dec 2005 – Mar 2007** Created and managed a small business. **Apr 2007 – Present** Environmental & Water Use Consultant, Environmental Assessment Practitioner, Ecologist, Environmental Control Officer and Auditor for Ecoleges.

SECTION 2: INTRODUCTION AND BACKGROUND

Generation of renewable energy is being implemented at the Element Six facility to reduce greenhouse gas emissions, reduce their environmental footprint and improve electricity supply assurance. The renewable energy electricity generating facility intends to accommodate a solar photovoltaic (PV) component and associated infrastructure. The solar PV facility will have a maximum export capacity (MEC) of 1.8MWp on an approximate footprint of 2.2 hectares.

The investment in renewable energy and energy efficiency is considered important to reduce the negative economic, social and environmental impacts of energy production and consumption in South Africa (Winkler, 2006). Many renewable energy projects are particularly well suited to off-grid applications and, certainly in South Africa, could improve the flexibility of the grid by distributing generation across the country, closer to some key loads (Winkler, 2006).

The Department of Energy (DoE) gazetted its White Paper on Renewable Energy in 2003 and introduced it as a "policy that envisages a range of measures to bring about integration of renewable energies into the mainstream energy economy." The White Paper proposed that this would be produced mainly from biomass, wind, solar and small-scale hydropower. Since the White Paper was gazetted, South Africa's primary and secondary energy requirements have remained heavily fossil-fuel-dependant, both in terms of indigenous coal production and use, as well as the use of imported oil resources. Whilst the medium-term power generation mix will continue to lean heavily on the use of fossil fuels, the Revised Balanced Scenario (RBS) of the 2010 Integrated Resource Plan (IRP) includes for a total additional supply capacity of 17.8GWe from renewable sources by 2030 (DEA, 2015).

Element Six has already installed rooftop solar PV on their buildings and this project aims to augment this capacity with additional ground-mounted renewable energy generation in an effort to reduce their carbon footprint, while improving electricity supply assurance with reduced Fossil Fuel dependency and minimising production interruptions.

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The project outcomes align with the national, local, and regional planning objectives in terms of economic development and sustainability. The project will enable the applicant to deal with the disruptive impact of load shedding on the manufacturing sector and assist in reducing the country's dependency on coal as a source of energy. The project is aligned with Ekurhuleni's 10 Point development plan in terms of manufacturing revitalisation and use of land for strategic development. The development is making use of undeveloped land inside the urban area, making the area less fragmented.

The project will not affect the environmental rights of any of the affected stakeholder groups and no-one's livelihoods will be affected in a negative manner. The project will not result in any unfair discrimination or affect the social and environmental rights of any of the stakeholder groups, should the mitigation measures be implemented as suggested. From a social perspective the positive impact that the project will have on the affected environment outweighs the negative impacts by far, and where there are negative impacts, it can be mitigated. The project has the potential to contribute to more integrative surrounding settlements. The proposed development is in an industrial area and will assist in maintaining job security in the area. Additionally, temporary jobs will be created during the construction phase as well as several permanent jobs during operation.

SECTION 3: DESCRIPTION OF THE ACTIVITY

(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.

The size of the development footprint is approximately 2.2ha. This area includes the 1.8MWp solar PV plant, with associated infrastructure, including inverters, transformers, fencing and lighting with a sub-surface 6.6kV cable connecting the solar PV plant to the Element Six electrical Ring Main Unit (RMU) located on the side of the Element Six building to the south of the plant (Figure 1). As the site is within a formally zoned industrial area, the site will have access to all necessary services including access to existing roads.

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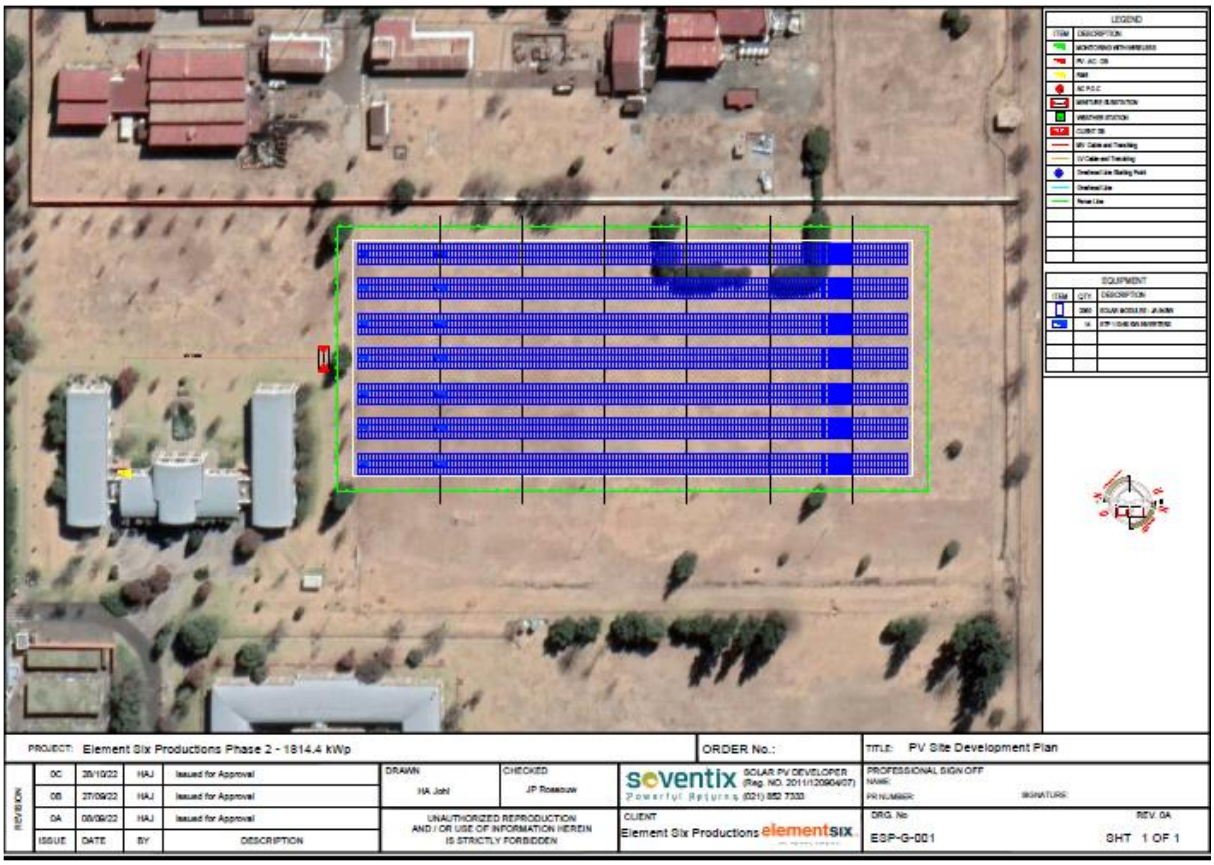

Figure 1. Solar PV facility presented relative to the Element Six buildings and alignment of 6.6kV sub-surface cable (red line) leading to the existing RMU (yellow polygon).

There were no alternative development footprints considered, as proximity to the RMU was a key financial and logistical component of the installation.

Photovoltaic Renewable Energy

Photovoltaic (PV) is a method of generating electrical power by converting solar radiation into direct current electricity. This is done by using semiconductors that exhibit the photovoltaic effect. Photovoltaic power generation employs solar panels composed of a number of solar cells containing a photovoltaic material. These materials exhibit this property known as the photoelectric effect that causes them to absorb photons of light and release electrons. When these free electrons are captured, an electric current results, that can be used as electricity.

Solar Panels

A single PV device is known as a cell. To boost the power output of PV cells, they are connected in chains to form larger units known as modules or panels using polycrystalline solar module technology. It is anticipated that the modules would have dimensions in the order of 1 m x 2 m (i.e. 2 m^2). Modules are connected to form arrays. The arrays are mounted onto mounting structures (or racks) that point panels toward the sun, in this case fixed-tilt structures orientated in a northerly direction, tilted at a 30'degree angle, with an offset at a maximum of 15 degrees either to the east or west and would have a maximum height of approximately 2.5 to 3 m (technology dependent) above ground level and placed approximately 7.4 m apart.

The results of the geotechnical piling test determined that the fixed tilt solar PV ground mount system foundations are to be comprised of lip C channels placed within predrilled/augured holes of a 250mm diameter and a depth of 1.0m filled with 15MPa to 20MPa concrete. This founding method and procedure is shown to be an adequate means of resisting the design loading reactions expected to be experienced by the structures during their 25-year design life.

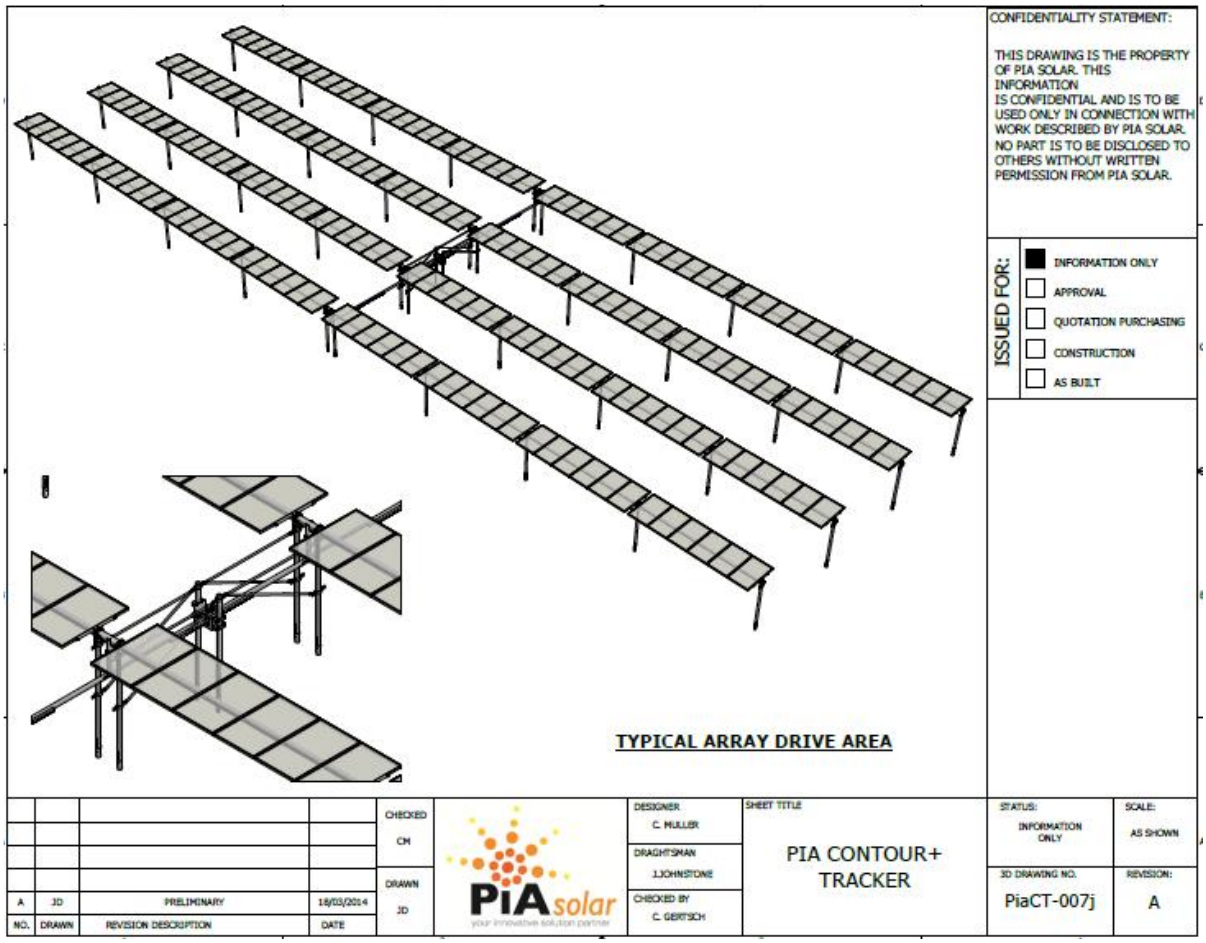

Figure 2. Indicative representation of a fixed-tilt solar PV system.

Vegetation Clearance

Vegetation may be cleared from the physical footprint of the construction camp, inverters, field transformers, rack foundations, underground cables and water pipes (linear), and fencing posts.

Project phases

Construction Phase

Construction of the full project scope is not expected to take longer than 4 months.

It is anticipated that the construction equipment will include some of the following equipment and plant:

- Concrete mixers,

- Compaction equipment,
- Light delivery vehicles,
- Drilling rigs,
- Mobile pile ramming machines,
- TLBs,

Operational Phase

The operational phase is expected to last in excess of 20 years and falls outside the scope of this environmental authorisation process, so mitigations are not provided in the EMPr.

Decommissioning Phase

The decommissioning phase falls outside the scope of this environmental authorisation process. However, in the interest of Life Cycle understanding, the plant life expectancy is 20-25 years after which equipment would be renewed or the power plant decommissioned and the site rehabilitated. Extensions of the life of the plant of up to 10 to 20 years would depend on the choice of technology and the development of the technology over the first operational period. If the power plant is decommissioned the site would revert back to current land use activities.

Description of Associated Structures and Infrastructure

Transformer and inverter

Several solar PV arrays are connected to an inverter. Inverters convert the voltage from direct current (DC) to alternating current (AC). The inverters are cabled to field transformers.

Access roads

The existing public access roads will be used to access the site. Additional access tracks will occur between the parallel arrays during the construction phase and largely remain in place during the operation phase (lower frequency of use).

Buildings

No accommodation facilities will be constructed. Staff will be required to leave the site at the end of the day.

Lighting

The solar PV facility should not be permanently lit up at night. The fence line can be secured using multiple FLIR PTZ cameras which have a 2km range in absolute darkness. The obvious areas that would have lights is any control room and/or security office.

Fencing

The permitter of the facility will be fenced off with a suitable security fence. Access will be controlled using a security gate.

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Services

Water supply

Water will be supplied by Element Six, which is serviced with a municipal supply. Pipelines and tap points will be provided to the solar PV plant for construction and operational phases. On-site storage may be required and can be facilitated in above-ground JoJo type storage tanks.

Electricity supply

Electricity during construction will be obtained from the Element Six buildings, if required.

Sewerage & sanitation

No on-site wastewater treatment facilities will be constructed. During the construction phase chemical or E-loos will be utilised, and facilities within the Element Six buildings will be used during the operational phase.

Figure 3. Mobile E-Loos which can be used on site as a more environmentally friendly and lower risk option to chemical toilets.

Waste disposal

All non-recyclable waste would be disposed of at a licensed landfill site and hazardous waste removed and disposed of by a licensed operator. An Integrated Waste Management Plan will need to be compiled to implement the waste management hierarchy.

Listed and Specified Activities

An application for an EA was submitted to the Gauteng Department of Agriculture & Rural Development (GDARD) as the Competent Authority in terms of the EIA Regulations, 2014 as amended to undertake listed activities 11 and 27 of **Listing Notice 1** (GG No. 40772, GN No. 327, 07th April 2017) and specified activity 12 of **Listing Notice 3** (GG No. 40772, GN No. 324, 07 April 2017) (**Table 9**).

Table 5: All listed and specified activities triggered and being applied for.

LN1, Listed Activity 11 The development of facilities or infrastructure for the generation of electricity from a renewable resource where— (i) the electricity output is more than 10 megawatts but less than 20 megawatts; or (ii) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare; excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs— (a) within an urban area; or (b) on existing infrastructure.
LN1, Listed Activity 27 The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for – (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
LN3, Specified Activity 12 The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. c. Gauteng i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans; or iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.

Section 24E of NEMA requires that every EA must ensure that adequate provision is made for the ongoing management and monitoring of impacts of the activity on the environment throughout the life cycle of the activity. The life cycle of the activity is determined by the scope of the activity. If the activity requires EA for development only, the development phase is the scope of the activity. If the activity requires EA for development and operation, the development and operational phases make up the scope of the activity (Environmental Authorisation Validity Period Explanatory Document, 2018). Only when the activity includes such an operational component, the relevant Basic Assessment Report, Environmental Authorisation (including any conditions thereto) and the EMPr can include aspects regarding the operation scope of the activity e.g., mitigation actions for the operational phase (Environmental Authorisation Validity Period Explanatory Document, 2018).

None of the listed and/or specified activities that are triggered, and which require environmental authorisation, specifically include the term '*and related operation*' (Table 5). Consequently, the

scope of the activities pertaining to this project does not have an operational (or decommissioning) component.

The activities and associated environmental aspects, or elements of the contractor's activities that interact or can interact with the environment, are identified below (Table 6).

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Table 6: A description of the activities, sub-activities and aspects of the project that are covered by the EMPr.

PHASES, ACTIVITIES, SERVICES & PRODUCTS ON PREFFERED FOOTPRINT	SUB-ACTIVITY	ENVIRONMENTAL ASPECT
Planning & Design		
Compliance - Acquiring authorisations, permits and/or licenses for activities/uses undertaken during construction and operation	Water Use S21(c) and (i) ito NWA, 1998	Compliance Management
	Solar PV effects on civil aviation	Provisions of Civil Aviation Act (Act No. 13 of 2009)
	Development of solar PV facility and high-level OH lighting	Section 29 approvals from electronic communications network service licensees (e.g. Vodacom, Sentech, MTN, Cell C etc.) ito Electronic Communications (Act 36 of 2005)
Planning	Footprint area	Magnitude of physical disturbance
Pre-construction		
Planning	Compliance Monitoring (ECO Appointment)	Environmental Authorisation
	Invasive Species ito NEMBA, 2004	Compliance Management
	Traffic Management Plan	Traffic
Monitoring	Dust Monitoring	Dustfall
Contractor Readiness	Waste Management Plan	
	Acquiring permits, licenses, Letters of consent and permissions	**Permission:** Registration of renewable energy generation with NERSA.

	Paleontology Resource rescue and relocation	Sub-surface artefacts
	Employment of labour	Appointment
		Training
Site Establishment (Layout)	Compilation of Method Statements	
	Commencement	
	Noise genetating activities	Noise generation
	Perimeter/boundary fence	
	Lighting	
	Flammable and other hazardous substance stores	
	Laydown areas	Effects on vegetation
	Machinery Parking Area	
	Maintenance and workshop areas	
	Fuel storage and refuelling area	
	Sanitation/Ablutions	
	Accomodation	
Roads	Temporary access roads	
Concrete supply	Batching plant/Cement-mixing area	
Construction		
	Communicating	Noise generation

Employee management (including appointment, conduct and movement)	Abluting	Land contamination
	Keeping warm or cooking	Starting fires
	Harvesting muthi plants, collecting firewood and/or poaching	Removal of medicinal plants, dead wood and/or wildlife
Construction Plant Management including Deliveries	Driving/Transport	Generating dust
		Generating noise
		Damage to the environment
	Operating equipment	Generating noise
	Operating equipment	Causing spills
	Parking	Damage to the environment
	Maintenance	Land contamination
	Maintenance	Watercourse contamination
	Washing plant	Land contamination
	Washing plant	Watercourse contamination
Water management (abstraction, storage and use)	Storage in tanks	Overflow and surface water run-off
	Dust suppresion	Surface water run-off
	Mixing concrete on site	Runoff water
General and Hazardous Waste Management	Handling and Collection (incl. chemical & e-loo toilets)	Contamination
	Reuse	Health and safety
	Fuel Storage	Watercourse contamination

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	Storage	Unpleasant odours
	Transport	Contamination
	Separation & sorting	Waste classification
	Disposal	Contamination
Handling Hazardous Substances	Refuelling	Use of resources
		Causing spills
	Mixing concrete on site	Effluent (cement slurry) discharges and **land contamination**
		Effluent (cement slurry) discharges and **watercourse contamination**
		Waste arisings (cement bags)
	Importing Ready mix/Cleaning the cement trucks	Generating noise
		Generating emissions
		Land contamination
	Lubricating, Oil Storage and Disposal	Land contamination
	Oil-contaminated water Storage and Disposal	Land contamination
		Watercourse contamination
	Contaminated Soil Storage and Disposal	Land contamination

	Damaged Solar panel and other e-waste Disposal	Land contamination
Alien Plant Management	Disturbance to natural areas	Favourable conditions for alien plant/animal recruitment.
Fire Management	Wildfires	
Stormwater management and erosion control		
Health and Safety		
Linear infrastructure	Underground Pipelines and Cables	Clearing & Grubbing
		Installation
Clearing/Grubbing and Grading	Construction camp (incl. operational area), trenches for undergound cables and water pipes, holes for racks, fence posts, foundations for inverters and field transformers	Removal of vegetation
		Noise generation
		Destruction of artefacts
Earthworks	Excavations/Trenching	
Blasting		Noise generation, Dust generation, Fly Rock
Stockpiling and Storing (Laydown)	Mulch, topsoil, aggregate, spoil and infrastructure	Burying, smothering, impeding, sedimentation, emitting
Post-construction rehabilitation and monitoring		
Rehabilitation	Temporary structures and infrastructure	
	Pollution and Waste	Soil contamination (hydrcarbon spills)

	Disturbed areas - terresrial	Surface water hydrology (run-off)
		Bare ground
		Compaction
		Compromised topsoil
Maintenance and Monitoring		Erosion
		Compromised topsoil
		Revegetation
		Alien plant recruitment

SECTION 4: LAYOUT MAP OF PROPOSED ACTIVITY

(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.

"The Environmental Management Programme (EMPr) to be submitted as part of the EIAr must include the following:
ii. The final site layout map.
iv. An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.
v. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map."

Figure 4 provides a map of the site layout within the broader industrial and residential context, while Figure 5 provides a map of the proposed development footprint in the context of environmental sensitivities.

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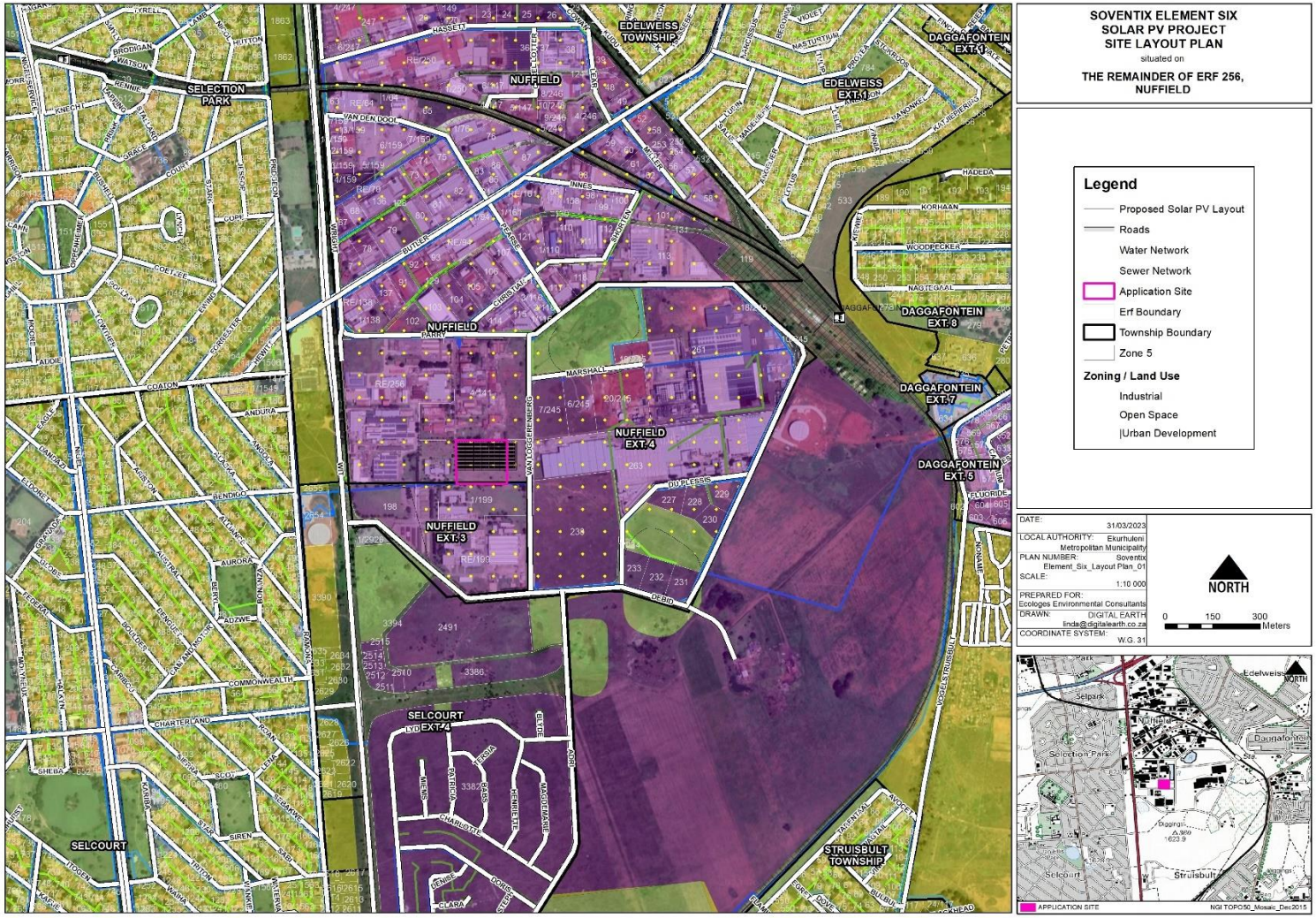

Figure 4. Layout plan of the Element Six solar PV project within the surrounding industrial & residential context.

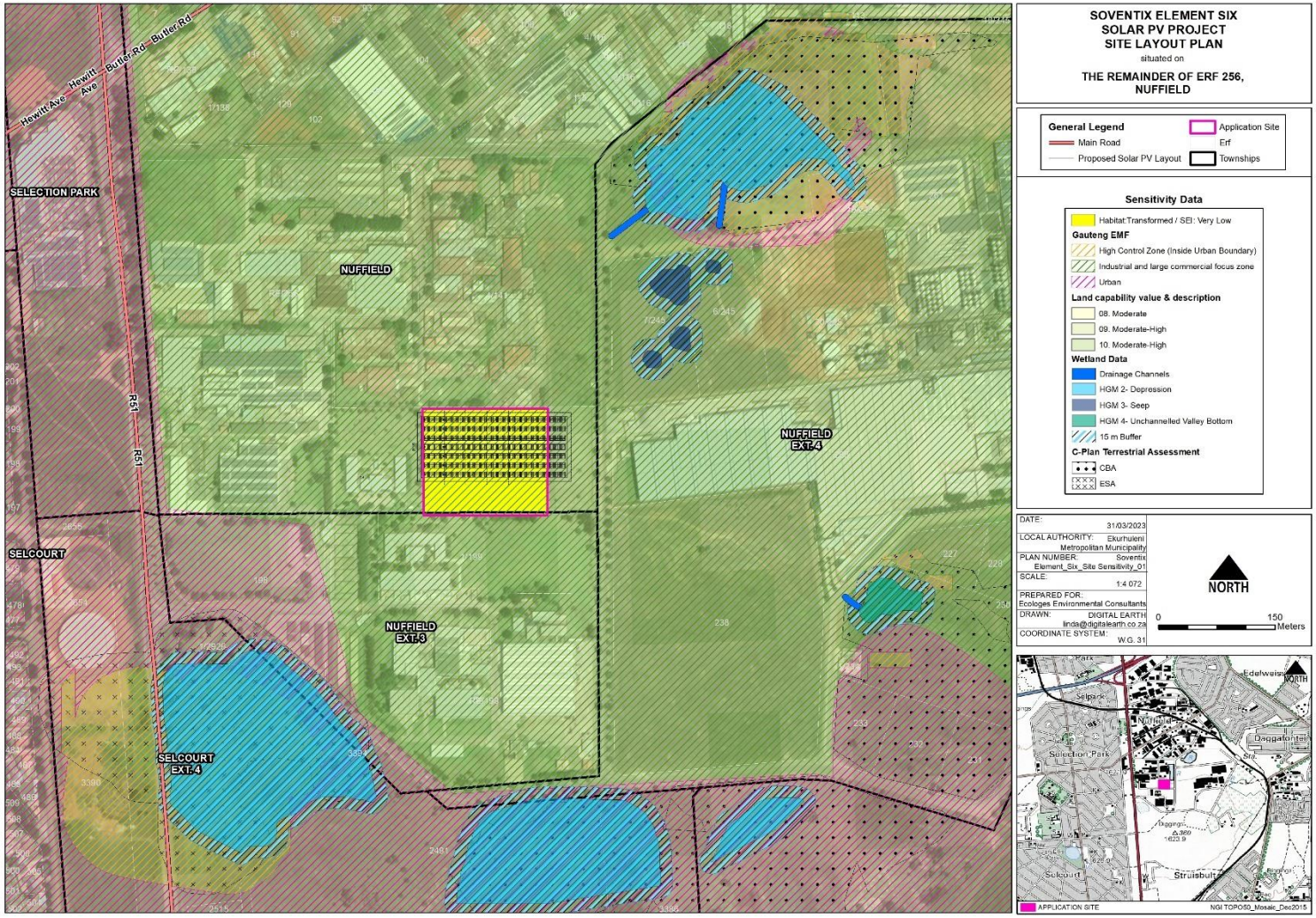

Figure 5. Site Sensitivity plan of the Element Six solar PV project.

SECTION 5: ACTIVITIES, ASPECTS AND IMPACTS AND THEIR MANAGEMENT, MITIGATION & DESIRED OUTCOMES

(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-
(i) planning and design;
(ii) pre-construction activities;
(iii) construction activities; and
(iv) rehabilitation of the environment after construction and where applicable post closure.
(e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d),

(f) a description of proposed impact management actions, identifying the way the impact management objectives and outcomes contemplated in paragraph (d) and (e) will be achieved, and must, where applicable, include actions to -
(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
(ii) comply with any prescribed environmental management standards or practices;
(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and
(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;

(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);
(l) a program for reporting on compliance, considering the requirements as prescribed by the Regulations;
(m) an environmental awareness plan describing the manner in which-
(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and
(ii) risks must be dealt with to avoid pollution or the degradation of the
environment; and
(n) any specific information that may be required by the competent authority.

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Reg: 2006/023163/23

The impacts are considered within the scope of the project, including but not limited to the Listed Activities. The relevant impacts resulting from listed activities and associated activities, including environmental, socio-economic and cultural heritage, are informed by a predetermined list of potential environmental impacts (generated by way of a Leipold Matrix), comments received from Interested and Affected Parties and the findings contained in specialist studies that were used to generate the EIR.

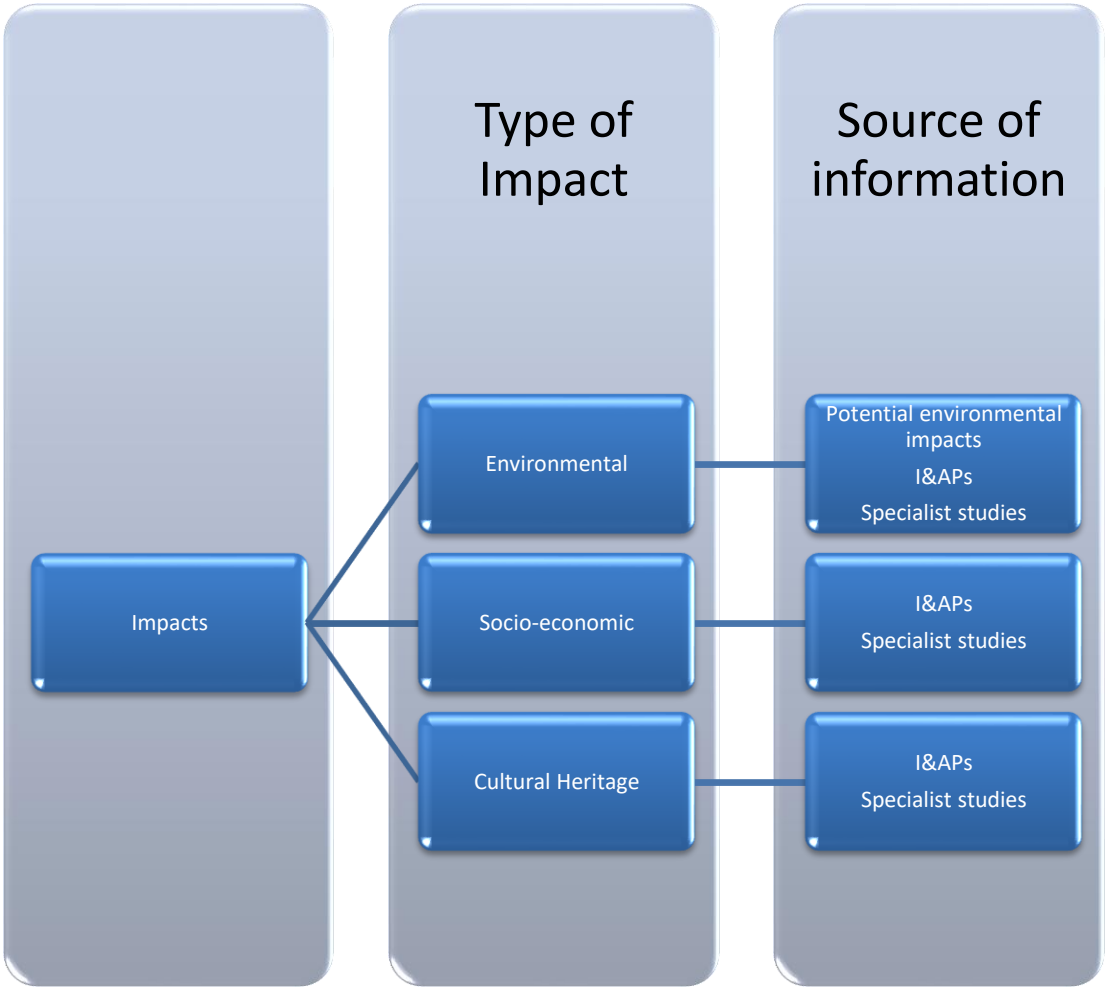

Figure 6. A breakdown of the different types of impacts including the resources used to identify them.

As stipulated in regulation 1(1)(d) of Appendix 4 of the EIA regulation (2014), as amended; the setting of desired impact management outcomes forms the principle objective of an EMPr. Outcomes are driven by impact management actions including measures and mitigations to avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; to comply with any prescribed environmental management standards or practices, including legal requirements and in some cases, “best practices” that the Implementer aspires to fulfil (e.g. Equator Principles). The outcomes are achieved by implementing and achieving measurable Targets (both quantitative and qualitative). Management and mitigation measures are set to afford guidance and parameters to the implementer to achieve the set outcomes.

Tables 7 to 9 provide a tabulated list of the aspects associated with the proposed activity that are covered by the EMPr, colour-coded by their risk significance assessed during the Impact Assessment process. Aspects are highlighted by colour by their assessed pre-mitigation & post-mitigation risk. These tables will further assist with future ECO and compliance audits of the EMPr, specifically where the auditor has to comment on the EMPr's ability to address Section 3(1) (e) of Appendix 7 of the EIA Regulations (2014) as amended specifically:

"an indication of the ability of the EMPr, and where applicable, the closure plan to—

(i) sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an ongoing basis;

(ii) sufficiently provide for the avoidance, management and mitigation".

Table 7: Impact Significance based on the combination of Impact Magnitude and Impact Importance for each aspect & impact anticipated during the Planning & Design Phase pre- and post-mitigation including the degree of impact reversibility, irreplaceability of resources and mitigatory potential as well as probability of impacts occurring.

ENVIRONMENTAL ASPECT	PHASE 1 IMPACT ASSESSMENT								PHASE 2 IMPACT ASSESSMENT				
	IMPACT SIGNIFICANCE	IMPACT MAGNITUDE	PROBABILITY	IMPACT IMPORTANCE	PROBABILITY	DEGREE OF			IMPACT SIGNIFICANCE	IMPACT MAGNITUDE	PROBABILITY	IMPACT IMPORTANCE	PROBABILITY
						REV	IRR	MIT					
Compliance Management	Significant	Non-significant	Improbable	Significant	Definite	Moderate	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Provisions of Civil Aviation Act (Act No. 13 of 2009)	Significant	Significant	Probable	Significant	Probable	High	High	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Section 29 approvals from electronic communications network service licensees (e.g. Vodacom, Sentech, MTN, Cell C etc.) ito Electronic Communications (Act 36 of 2005)	Significant	Significant	Probable	Significant	Probable	High	High	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable

Table 8: Impact Significance based on the combination of Impact Magnitude and Impact Importance for each aspect & impact anticipated during the Pre-Construction Phase pre- and post-mitigation including the degree of impact reversibility, irreplaceability of resources and mitigatory potential as well as probability of impacts occurring.

ENVIRONMENTAL ASPECT	PHASE 1 IMPACT ASSESSMENT								PHASE 2 IMPACT ASSESSMENT				
	IMPACT SIGNIFICANCE	IMPACT MAGNITUDE	PROBABILITY	IMPACT IMPORTANCE	PROBABILITY	DEGREE OF			IMPACT SIGNIFICANCE	IMPACT MAGNITUDE	PROBABILITY	IMPACT IMPORTANCE	PROBABILITY
						REV	IRR	MIT					
Permission: Registration of renewable energy generation with NERSA.	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	High	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Sub-surface artefacts	Significant	Significant	Probable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Appointment	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	High	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Significant	Significant	Probable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Training	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Method Statements	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Non-significant	Non-significant	Improbable	Non-significant	Probable	Moderate	High	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Commencement	Non-significant	Non-significant	Improbable	Non-significant	Improbable	High	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable

	Non-significant	Non-significant	Improbable	Non-significant	Improbable	High	High	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	High	High	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	High	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Noise generation	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Fencing	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Lighting	Non-significant	Non-significant	Probable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Storage	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Effects on vegetation	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Parking	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable

Workshops	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Refuelling	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	High	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Sanitation	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Accommodation	Significant	Significant	Probable	Non-significant	Improbable	Moderate	High	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Access Roads	Significant	Significant	Probable	Non-significant	Improbable	Moderate	High	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Significant	Significant	Probable	Non-significant	Improbable	Moderate	High	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Concrete batching	Significant	Significant	Probable	Significant	Probable	Moderate	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable

Table 9: Impact Significance based on the combination of Impact Magnitude and Impact Importance for each aspect & impact anticipated during the Construction Phase pre- and post-mitigation including the degree of impact reversibility, irreplaceability of resources and mitigatory potential as well as probability of impacts occurring.

ENVIRONMENTAL ASPECT	PHASE 1 IMPACT ASSESSMENT								PHASE 2 IMPACT ASSESSMENT				
	IMPACT SIGNIFICANCE	IMPACT MAGNITUDE	PROBABILITY	IMPACT IMPORTANCE	PROBABILITY	DEGREE OF			IMPACT SIGNIFICANCE	IMPACT MAGNITUDE	PROBABILITY	IMPACT IMPORTANCE	PROBABILITY
						REV	IRR	MIT					
Environmental Authorisation	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
Compliance Management	Significant	Non-significant	Probable	Significant	Probable	Moderate	High	High	Non-significant	Non-significant	Probable	Non-significant	Probable
Traffic	Significant	Significant	Definite	Significant	Probable	Moderate	High	Moderate	Non-significant	Non-significant	Probable	Non-significant	Probable
Dust fall	Significant	Significant	Probable	Non-significant	Improbable	Moderate	High	Moderate	Non-significant	Non-significant	Probable	Non-significant	Probable
	Significant	Significant	Probable	Non-significant	Improbable	High	High	High	Non-significant	Non-significant	Improbable	Non-significant	Probable
Readiness	Significant	Significant	Probable	Non-significant	Improbable	Moderate	High	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Readiness	Significant	Significant	Probable	Non-significant	Improbable	Moderate	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	High	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Definite
Permission: Registration of renewable energy generation with NERSA.	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	High	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
EMPr	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable

Other approvals	Non-significant	Non-significant	Improbable	Non-significant	Probable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Sub-surface artefacts	Significant	Significant	Probale	Significant	Probable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Appointment	Significant	Significant	Probable	Non-significant	Improbable	Moderate	High	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Significant	Significant	Probable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Probable
Training	Significant	Significant	Probable	Non-significant	Improbable	Moderate	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Significant	Significant	Probable	Significant	Probable	Moderate	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Probable
Site establishment	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Significant	Significant	Probable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Significant	Significant	Probable	Non-significant	Probable	Moderate	High	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	High	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	High	High	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Significant	Significant	Probable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable

	Non-significant	Non-significant	Improbable	Non-significant	Improbable	High	High	High	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	High	High	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Significant	Non-significant	Probable	Significant	Probable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	High	High	High	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	High	High	Non-significant	Non-significant	Improbable	Non-significant	Improbable
	Significant	Non-significant	Probable	Significant	Probable	Moderate	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Significant	Non-significant	Probable	Significant	Probable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Significant	Significant	Probable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Significant	Significant	Probable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Effects on vegetation	Significant	Non-significant	Probable	Significant	Probable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Site establishment	Significant	Non-significant	Probable	Significant	Probable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable

	Significant	Significant	Probable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Definite
	Significant	Significant	Probable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
	Non-significant	Non-significant	Improbable	Non-significant	Improbable	High	Moderate	High	Non-significant	Non-significant	Improbable	Non-significant	Definite
	Significant	Significant	Probable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Definite

Table 10: Impact Significance based on the combination of Impact Magnitude and Impact Importance for each aspect & impact anticipated during the Post-Construction Phase pre- and post-mitigation including the degree of impact reversibility, irreplaceability of resources and mitigatory potential as well as probability of impacts occurring.

ENVIRONMENTAL ASPECT	PHASE 1 IMPACT ASSESSMENT								PHASE 2 IMPACT ASSESSMENT				
	IMPACT SIGNIFICANCE	IMPACT MAGNITUDE	PROBABILITY	IMPACT IMPORTANCE	PROBABILITY	DEGREE OF			IMPACT SIGNIFICANCE	IMPACT MAGNITUDE	PROBABILITY	IMPACT IMPORTANCE	PROBABILITY
						REV	IRR	MIT					
Temporary structures and infrastructure	Significant	Significant	Probable	Significant	Probable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Temporary structures and infrastructure	Significant	Significant	Probable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Surface water hydrology (run-off)	Significant	Significant	Probable	Significant	Probable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Surface water hydrology (run-off)	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Bare ground	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Compaction	Significant	Significant	Probable	Significant	Probable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable

Compromised topsoil	Significant	Significant	Probable	Significant	Probable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Erosion	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Definite
Compromised topsoil	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Revegetation	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Alien plant recruitment	Non-significant	Non-significant	Improbable	Non-significant	Improbable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable
Alien plant recruitment	Significant	Significant	Probable	Significant	Probable	Moderate	Moderate	Moderate	Non-significant	Non-significant	Improbable	Non-significant	Probable

The following section describes management programmes for the different environmental attributes pertaining to the Project. As part of the Management Programmes, the section describes the potential environmental impacts which may result from the identified aspects / activities, the desired outcomes of mitigating these impacts as well as the targets used to measure the level of environmental compliance and performance.

The following legislation, guidelines, departmental policies, environmental management instruments and / or other decision-making instruments that have been developed or adopted by a competent authority in respect of activities associated with a development of this nature, were identified and considered in the preparation of the Basic Assessment Report and this EMPr:

1. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
2. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)
3. The Convention on Wetlands (RAMSAR Convention, 1971)
4. The National Environmental Management Protected Areas Act (Act No. 57 of 2003)
5. The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
6. The United Nations Framework Convention on Climate Change (UNFCC,1994)
7. Transvaal Nature Conservation Ordinance (Nature Conservation Ordinance, No 12 of 1983)
8. White Paper on Biodiversity
9. White Paper on Renewable Energy (2003)
10. White Paper on the Energy Policy of the Republic of South Africa (1998)
11. Conservation of Agricultural Resources Act (CARA, Act 43 of 1983). Government Gazette (GG) No. 8673, Government Notice (GN) No. 883, dated 27 April 1983; and subsequent regulations (including dealing with declared weeds and invader plants) under section 29 of the Act, in Government Notice R1048 in Government Gazette 9238, dated 25 May 1984, amended in Government Notice R2687 in Government Gazette 10029, dated 6 December 1985 and Government Notice R280 in Government Gazette 22166, dated 30 March 2001.
12. Constitution of the Republic of South Africa.
13. Convention on Biological Diversity (CBD, 1993).
14. DEA. 2010. Guideline on Need and Desirability, Integrated Management Guideline Series 9, Department of Environmental Affairs (DEA), Pretoria, South Africa.
15. DEA. 2010. Public Participation, Integrated Environmental Management Guideline Series 7, Department of Environmental Affairs, Pretoria, South Africa.
16. DEA. 2011. National list of ecosystems that are threatened and in need of protection. GN 1002, GG 34809, 9 December 2011.
17. DEA&DP Visual and Aesthetic Guidelines.
18. DEA&DP. 2010. Guideline on Alternatives, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning.
19. DEAT. 2002. Specialist Studies, Information Series 4, Department of Environmental Affairs and Tourism, Pretoria.
20. DWS. 2016. General Authorisation in GN No. 509, Government Gazette No. 40229 dated 26 August 2016.

21. EIA Regulations, GG No. 38282, GN No. R. 982, 983, 984, 985, 4 December 2014, amended in GN No. R. 324, R. 325, R. 326, R. 327, R. 328 in GG No. 40772, 07 April 2017, GG No. 41766, GN No. 706, 13 July 2018 and GG No. 43358, GN No. 599, 29 May 2020.
22. Ekurhuleni Bioregional Plan (2020).
23. Electricity Regulation Act (Act 4 of 2006). Government Notice 660 in Government Gazette 28992 dated 5 July 2006. As amended by: Electricity Regulation Amendment Act 28 of 2007, Government Notice 23 in Government Gazette 30676, dated 21 January 2008.
24. Environment Conservation Act (Act 73 of 1989), including Schedules 4 and 5 of the National Regulations regarding Noise Control made under Section 25 of the Environment Conservation Act, 1989 (Act 73 of 1989) in GN No. R 154 of Government Gazette No. 13717 dated 10 January 1992. (Note that this particular section of the Environment Conservation Act is not repealed by NEMA (107 of 1998)).
25. Gauteng Department of Agriculture and Rural Development (GDARD): Checklist for Biodiversity Assessments.
26. GDARD Mining and Environmental Impact Guide.
27. GDARD Requirements for Biodiversity Assessments (Version 3, 2014a).
28. Guidelines for Landscape and Visual Impact Assessment (GLVIA), Second Edition.
29. IDP 2018 – 2021, City of Ekurhuleni.
30. Integrated Resource Plan, 2010.
31. Minerals and Petroleum Resources Development Act (Act 28 of 2002). Gazette No. 23922, Notice No. 1273 dated 10 October 2002. As amended by: Minerals and Energy Laws Amendment Act 11 of 2005, Gazette No. 27897, Notice No. 824 dated 15 August 2005. Mineral and Petroleum Resources Development Amendment Act 49 of 2008, Gazette No. 32151, No. 437 dated 21 April 2009. Mineral and Petroleum Resources Development Amendment Act 49 of 2008, Gazette No. 32151, No. 437 dated 21 April 2009.
32. Municipal Systems Act (Act No. 32 of 2000)
33. National Biodiversity Framework (NBF, 2009).
34. National Energy Act, 2008 (No. 34 of 2008).
35. National Environmental Management Act (NEMA, Act 107 of 1998), Gazette No. 19519, Notice No. 1540. As amended by: National Environmental Management Act 56 of 2002 - Gazette No. 24251, No. 97. Mineral and Petroleum Resources Development Act 28 of 2002 - Gazette No. 23922, No. 1273. National Environmental Management Act 8 of 2004 - Gazette No. 26570, No. 842. National Environmental Management Act 46 of 2003 - Gazette No. 26018, No. 175. National Environmental Management Act 62 of 2008 - Gazette No. 31789, No. 22. National Environment Laws Amendment Act 44 of 2008 - Gazette No. 31685, No. 1318. National Environment Laws Amendment Act 14 of 2009 - Gazette No. 32267, No. 617. National Environmental Management Laws Second Amendment Act 30 of 2013 - Gazette No. 37170, No. 1019, dated 18 December 2013. National Environmental Management Laws Amendment Act 25 of 2014 – Government Notice 448 in Government Gazette 37713, dated 2 June 2014. National Environmental Management Laws Second Amendment Act 30 of 2013 - Gazette No. 37170, No. 1019, dated 18 December 2013.
36. National Environmental Management: Air Quality Act (Act 39 of 2004). Gazette No. 27318, Notice No. 163. As amended by: National Environment Laws Amendment Act 44 of 2008 - Gazette No. 31685, Notice No. 1318. National Environment Laws Amendment Act 14 of

2009 - Gazette No. 32267, Notice No. 617. National Environmental Management Laws Amendment Act 14 of 2013 – Gazette No. 36703, No. 530 dated 24 July 2013. National Environmental Management: Air Quality Amendment Act 20 of 2014 – Gazette No. 37666, No. 390 dated 19 May 2014; including the list of activities which result in atmospheric emissions which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage in Government Notice 893 in Government Gazette 37054 dated 22 November 2013. As amended by: Government Notice 551 in Government Gazette 38863 dated 12 June 2015. The National Dust Control Regulations are also relevant during the construction phase – GG No. 36974, GN No. R 827 dated 1 November 2013.

37. National Environmental Management: Biodiversity Act (Act 10 of 2004). Gazette No. 26436, Notice No. 700. As amended by: National Environment Laws Amendment Act 14 of 2009 – Gazette No. 32267, No. 617. National Environment Laws Amendment Act 14 of 2009 – Gazette No. 32267, No. 617. National Environmental Management Laws Amendment Act 14 of 2013 – Gazette No. 36703, No. 530 dated 24 July 2013; including the alien and invasive species regulations in Government Notice R598 in Government Gazette 37885 dated 1 August 2014, and species lists in GN No.599, amended in GG No. 40166, GN No .864 dated 29 July 2016, amended in GG No. 43386, GN No. 627 dated 03 June 2020.
38. National Environmental Management: Waste Act (Act 59 of 2008) ("NEM: WA"). Gazette No. 32000, Notice No. 278. As amended by: National Environmental Management Laws Amendment Act 14 of 2013 – Gazette No. 36703, No. 530 dated 24 July 2013. National Environmental Management: Waste Amendment Act 26 of 2014, Government Notice 449 in Government Gazette 37714 dated 2 June 2014. National Environmental Management Laws Amendment Act 25 of 2014, Government Notice 448 in Government Gazette 37713 dated 2 June 2014.
39. National Forest Act (Act 84 of 1998). Gazette No. 19408, Notice No. 1388 dated 30 October 1998. As amended by: National Forest and Fire Laws Amendment Act 12 of 2001 – Gazette No. 22479, No. 660. Forestry Laws Amendment Act 35 of 2005 – Gazette No. 28602, No. 220.
40. National Heritage Resources Act (Act 25 of 1999).
41. National Protected Areas Expansion Strategy (NPAES).
42. National Spatial Biodiversity Assessment (NSBA)
43. Natural Scientific Professions Act (Act No. 27 of 2003)
44. National Veld and Forest Fire Act, 1998 (Act 101 of 1998). Government Gazette No. 19515 dated 27 November 1998.
45. National Water Act, 1998 (Act 36 of 1998). Gazette No. 19182, Notice No. 1091. As amended by: National Water Amendment Act 45 of 1999 – Gazette No. 20706, No. 1476. National Water Amendment Act 27 of 2014 – Government Notice 450 in Government Gazette 37715, dated 2 June 2014; including Sections 27, 28,29,30,31 and 39 (Sections dealing with General Authorisations and Water Use Licenses).
46. South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
47. Sustainable Utilisation of Agricultural Resources (Draft Legislation).
48. Sub-Division of Agricultural Land Act (Act 70 of 1970) as amended by Subdivision of Agricultural Land Amendment Act, No. 55 of 1972, Subdivision of Agricultural Land

Amendment Act, No. 19 of 1974, Subdivision of Agricultural Land Amendment Act, No. 18 of 1977, Subdivision of Agricultural Land Amendment Act, No. 12 of 1979, Subdivision of Agricultural Land Amendment Act, No. 18 of 1981, Subdivision of Agricultural Land Amendment Act, No. 33 of 1984, Constitution of the Republic of South Africa Act, No 200 of 1993 (Proc. No. 100 of 31 October 1995), General Law Amendment Act, No 49 of 1996, Abolition of Racially Based Land Measures Act, No. 108 of 1991 (Proc. No. 116 of 24 June 1994).

49. World Heritage Convention Act (Act No. 49 of 1999).

The following management programme aims to set management actions to achieve stated desired outcomes for each environmental aspect, including quantifying the measurable targets. While the impacts and management and mitigations have been addressed under the various project development phases, they are not intended to be mutually exclusive, and impacts from one phase are likely to occur in subsequent phases; but in the interest of reducing redundancy they have not been repeated for each phase. Any appendices to this EMPr form part of the EMPr which must be implemented accordingly.

TABLE 11: COMPLIANCE MANAGEMENT.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
11.1	**Planning & Design Phase**						
11.1.1	**Water Use Authorisation for Activities within a Watercourse**						
11.1.1.1	Contravention of section 21 (c) and (i) of the NWA.	The commencement of water uses that are authorised in terms of the NWA, 1998 (Act No. 36 of 1998).	Confirmation letter from DWS on relevant General Authorisation registration (GN. No. 665, GG. No. 36820, 6 September 2013).	The applicant shall adhere to the conditions of the water use authorisation (GA or license) for section 21(c) and (i) water uses for diverting, altering, or impacting the beds and banks of a watercourse.	Applicant / EAP.	Prior to commencement of construction.	Compliance to be verified by ECO & SEO.
11.1.2.	**Other Approvals**						
11.1.2.1	Solar PV effects on civil aviation	Compliance with the provisions of the Civil Aviation	Letter of approval form CAA	(1) Lodge an Obstacle Application for assessment with ATNS to obstacles@atns.co.za at	Applicant / EAP.	Prior to commencement of construction.	Compliance to be verified by ECO & SEO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		Act (Act No. 13 of 2009)		least 120 days before the commencement of construction, preferably during the Planning and design phase once the engineers have determined the specifications of the structures (e.g., dimensions, co-ordinates, etc.) and completed the final layout plan. Refer queries to Yanga Nofuma, Obstacle Administrator | COO - Air Traffic Services, Bruma, T: 011 607 1474 • F: 086 695 2610 • E: obstacles@atns.co.za • W: www.atns.com. (2) The client will have to liaise with SACAA to finalise the "As build" and for any queries with the lighting.			

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				(3) Obtain a Specialist Civil Aviation Compliance Statement in support of the application.			
11.1.2.2	Development of solar PV facility and high-level OH lighting	Compliance with section 29 approvals from electronic communications network service licensees ito Electronic Communications (Act 36 of 2005)	Active engagement with all potential network service providers and approval where relevant.	Ensure all network service providers are registered as default I&APs and included in the distribution of all reports to ensure they can raise any potential conflicts with existing infrastructure and ensure conformance to any requirements they may impose to negate any damage to their structures or network.	Applicant / EAP	Prior to commencement of construction.	Compliance to be verified by ECO & SEO.
11.2	**Pre-Construction Phase**						
11.2.1	**Compliance Monitoring**						
11.2.1.1	Commencement of construction prior to the appointment of an ECO.	Ensure compliance with the EA, EMPr & GA from the onset of	Proof of ECO appointment prior to commencement of construction.	A qualified, suitably experienced and independent ECO must be appointed to monitor and report to the competent	Applicant.	Prior to commencement of construction and until the rehabilitated	To be verified by SEO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		construction and until the rehabilitated development is handed over to the Applicant for operation.		authorities on compliance with the EA, EMPr & GA, and where necessary oversee or facilitate the identification and permitting / licensing of protected species prior to clearing of any vegetation.		development is handed over to the applicant for operation. The minimum frequency for ECO inspections is bi-monthly.	
11.2.2	**Invasive Species Notification**						
11.2.2.1	In terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) – Section 73(2) "A person who is the owner of land on which a listed invasive species occurs must- (a) notify any relevant competent authority, in writing, of the listed invasive species occurring on	Compliance with Section 73(2) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).	Proof of notification to the competent authority.	(1) The landowner must notify the Minister (DFFE) and/or MEC (LEDET), in writing, of the listed invasive species occurring in the project area.	Applicant.	Prior to commencement of construction.	Compliance to be verified by ECO & SEO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	that land; (b) take steps to control and eradicate the listed invasive species and to prevent it from spreading; and (c) take all the required steps to prevent or minimise harm to biodiversity."						
11.2.3	**Land Use**						
11.2.3.1	Permission: Registration of renewable energy generation with NERSA.	Compliance with relevant provisions of the Electricity Regulation Act (Act 4 of 2006)	Proof of registration with NERSA.	Register with the Regulators, activities with a capacity of no more than 100MW in accordance with Annexure 2 of the Electricity Regulation Act in 2021 (GN No. 1000 of 5 October 2021), as amended.	Applicant / EAP	Prior to commencement of construction.	Compliance to be verified by ECO & SEO.

TABLE 12: CONSTRUCTION CAMP, LAYDOWN AREAS, STOCKPILES, STORES & EQUIPMENT.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
12.1	**Pre-Construction**						
12.1.1	Impacts on protected plants.	Comply with the relevant sections of the National Forest Act (NFA) (Act 84 of 1984), National Environmental Management: Biodiversity Act, 2004 (NEM:BA) (Act No. 10 of 2004), and the Gauteng Conservation Plan.	Obtain and provide proof of issuance of necessary permits for any listed species under NFA, NEMBA & C-Plan.	The applicant shall apply for and obtain the relevant licenses / permits from the appropriate authorities (DFFE, and/or Provincial Authority) prior to disturbing or destroying any protected species.	Applicant / Contractor to appoint botanist/ ecologist where SEO does not have the requisite qualification or experience.	Prior to commencement of construction.	Compliance to be verified by ECO & SEO.
12.2	**Construction Phase**						
12.2.1	Land surface pollution.	To avoid and reduce human induced environmental pollution.	Incident registers that indicate incidence and reduction in	Emergency breakdowns in the parking areas or along roads, must be addressed with immediate and adequate pollution containment measures including	Applicant / Contractor	Throughout construction.	SEO & ECO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			pollution events, from the operation of construction plant, equipment or other vehicles, over time.	preventative measures that are not limited to drip trays and spill kits. No washing of plant and equipment, and no repairs or servicing of construction plant, equipment or other vehicles, except for emergency breakdowns are permitted (with the necessary preventative containment measures in place). Refuelling of vehicles and plant may only take place at a designated and permitted above-ground fuel storage tank (from local Fire Chief) or mobile fuel bowser, under the guidance of a Specific Operating Procedure (SOP) that limits spillage and addresses remedial actions in the event of a spillage.			

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				The contractor shall restrict the following activities to the construction camp: - Sanitation, - Waste storage, - Parking, - Storing hazardous materials, - Emergency vehicle or plant repair and maintenance as far as practicable, - Designated concrete mixing area - Material stockpiles, and - Lay down areas. Use chemical toilets that contain the sewerage in a closed and removable 'tank', i.e. do not use open drums. Environmentally friendly toilets should also be considered e.g. E-loos. In the event that alternative ablution facilities are easily accessible,			

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				mobile ablutions will not be required.			
12.2.2	Noise pollution.	To avoid nuisance noise and reduce noise impacts to the environment.	Noise must fall within the parameters set by: **1.** (SANS) Standard 10103:2008: The measurement and rating of environmental noise with respect to annoyance and speech communication. **2.** DEA Regulations No. R.154. Noise Control Regulations	Noise generation must be managed, including the use of radios and other music playing appliances. Vehicles and plant must be in a good state of repair to limit noisy operations. Noise generating activities must be contained to normal working hours to avoid creating nuisance conditions.	Applicant / Contractor.	Following any noise complaints. Frequency of monitoring as stipulated in relevant regulation and standard, as amended from time to time.	SEO or appointed specialist service provider. Verification to be done by ECO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			promulgated in terms of Section 25 of the Environment Conservation Act, 1989 (Act No. 73 of 1989). GG No. 13717, 10 January 1992.				
12.2.3	Degradation of the environment outside of the development footprint.	To avoid impacts to the biodiversity integrity and ecological function of areas outside the development footprint.	No impacts outside the development footprint. All contraventions to be recorded in incident register.	No residues of stockpiled material must be left on site, that can impede restoration of ecological function and remain a visual intrusion on the landscape. Disturbed habitats resulting from construction-related activities must be rehabilitated immediately after the cessation of those activities on or near the disturbed habitats.	Applicant / Contractor.	Update to incident register following each contravention.	SEO & ECO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				The alignment of fences or roads and the placement of potential impediments, such as walls, laydown and material stockpile areas must not alter surface water runoff patterns (i.e. impede or increase surface water runoff) in a way that will cause ponding or erosion and sedimentation of a watercourse.			

TABLE 13: WASTE MANAGEMENT (generation, handling, storage, and disposal, including hazardous waste).

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
13.1	**Planning & Design Phase (including Pre-Construction)**						
13.1.1	Shortening the lifespan of the waste disposal site.	To minimise the generation of project-specific waste by implementing an effective waste management strategy based on the waste hierarchy.	Keep accurate records of waste volumes (litres, kg and / or m^3) generated by type in a waste recording system.	Implement an Integrated Waste Management Plan including avoidance, reduction, re-using, recycling and disposal, i.e. the production of hazardous waste can be **avoided** by providing drip trays, **reduce** waste by using the correct quantities, **re-use** excavated soil as back fill or **recycle** steel off-cuts and **dispose** of non-recyclable waste at a registered dump site. Induct all labourers on the waste management strategy and enforce it through regular (at least weekly) toolbox talks.	Applicant / Contractor (SEO).	Prior to commencement of construction with ongoing maintenance and updates to Strategy.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Keep accurate records of waste generated by type including building rubble, contaminated oil and general waste.			
13.2	**Construction Phase**						
13.2.1	Removal of inert waste and rubble. Loss of ecological function.	Maintain ecological function.	Zero concrete hard pan layers observed on the ground.	In the event of concrete hard pan layers, break up all concrete hard pan layers and dispose of appropriately (at a registered landfill site) or re-use the concrete (following permission from Competent Authority for reuse where required).	Applicant / Contractor (SEO).	For each disposal event.	ECO.
13.2.2	The high economic cost of disposing hazardous waste at authorised landfills, and potential	The reduced generation of hazardous waste and the avoidance of environmental	Indicators and trends in hazardous waste generation and management over time while	The contractor shall contain contaminated & dirty water for appropriate disposal.	Applicant / Contractor (SEO).	Throughout construction.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	contamination of land by illegal dumping.	(land and water) contamination.	considering amount of active construction to contextualise efforts. All waste waybills and landfill licenses in register and on file. Wastewater disposal according to relevant discharge/disposal regulations.	The contractor shall return used oil to the supplier or an oil recycling company.			
13.2.3	Solid and liquid waste can be harmful to fauna if swallowed / ingested or if the creature becomes	Healthy animals.	Zero incidence (in the incident register) of waste induced harm to wildlife.	Designate a temporary waste storage area and provide sufficient scavenger proof dust bins with black bags inside the construction camp.	Applicant / Contractor (SEO).	Throughout construction.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	entangled or impaled.		No litter observed in the development footprint and no-go areas.				
13.2.4	Improper handling, storage or disposal of waste can cause toxicity – the introduction of toxic or hazardous substances into a watercourse - spills can be washed into the watercourse by storm water run-off.	To ensure sound waste management practices that do not affect any aquatic environments.	Zero incidence (in the incidence register) of waste induced impacts on aquatic environments.	Hard-surfaces (e.g. concrete aprons, compacted soils) and parking areas with storm water outlets should not channel litter, oil, and fuel spills outside of the site which poses a risk to downstream bioregionally important wetlands. The contractor is prohibited from discharging wastewater, including domestic water from sanitation facilities.	Applicant / Contractor (SEO).	Throughout construction.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				The contractor shall store and contain hazardous chemicals within a secure, safe and bunded facility at the construction camp, to ensure spillages do not enter any aquatic environments.			
13.2.5	Construction activities will produce solid and liquid waste, which can contaminate the ground (litter, spillage) if improperly handled, stored, or disposed of.	To reduce contamination of the soil through improper management of waste.	Low incidence of waste induced ground contamination, with a trend indicating constant improvement over time (not just quantities but procedural improvements too). Suitable close-out of documentation	Do not mix concrete on open ground. Mix in a wheelbarrow, a mixing tray, on a level plastic sheet or similar containment measure. In the event of a leak or spill onto the ground, immediately remove contaminated soil to the depth of penetration and temporarily store in a designated solid hazardous waste container until	Applicant / Contractor (SEO).	Throughout construction.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			and reviews of SOPs & MS following significant contamination events.	sufficient volume warrants disposal at a registered hazardous waste dump site. Alternatively, onsite treatment of contaminated soil should be considered with a registered hazardous waste management company by way of bioremediation. The burning, burying or illegal dumping of waste is prohibited. When handling hazardous materials, the contractor shall implement appropriate precautionary measures, such as a ground cover or drip trays,			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				to prevent spills from contaminating the ground. The contractor shall prevent the run-off of slurry or cement contaminated water from concrete / plaster mixing sites. Adequate waste receptacles must be available, including those that track with the active work fronts, to ensure effective waste management. Remove ineffective danger tape / netting that has begun to litter the site or surrounding areas.			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Follow housekeeping rules to avoid littering (littering is likely to be more prevalent at designated eating / rest areas).			
13.2.6	The contamination of soil.	To reduce the amount of hazardous waste, specifically contaminated soil, that is generated during construction.	Sound management and disposal of contents of drip trays and / or utilisation of alternative hydrocarbon absorbents in drip trays. Zero sand observed in drip trays and bunds.	Drip trays must be regularly emptied, or they can be filled with hydrophobic hydrocarbon absorbent material to avoid the content from overflowing during rainfall events.	Applicant / Contractor (SEO & Plant Operators).	Throughout construction.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			Zero spills or leaks observed under or near stationary construction plant and equipment.				
13.2.7	The contamination of soil (and generation of waste) by undesirable practices.	To reduce the amount of hazardous waste, specifically contaminated soil, that is generated during construction.	Zero observations of spills covered with soil.	Do not cover spills with virgin soil. It merely increases the disposal cost for a greater volume of hazardous waste.	Applicant / Contractor.	Throughout construction.	ECO.

TABLE 14: FAUNA AND FLORA MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
14.1	**Planning & Design Phase (including Pre-Construction)**						
14.1.1	The establishment of laydown areas, stockpiles, service roads can destroy plants of conservation concern.	To reduce the impacts of construction activities including laydown areas, stockpiles and roads on fauna and flora.	The successful relocation of plants of conservation concern into suitable habitats.	Prior to the commencement, a search and rescue must be conducted by a suitably qualified specialist for protected fauna and flora and those of conservation concern, which must then be transplanted outside the works area in a comparative habitat type. Ascertaining similar habitat types may require soil sampling and analysis over and above above-ground similarities.	Applicant / Contractor.	Prior to & during construction.	SEO & ECO.
14.2	**Construction Phase**						
14.2.1	Increased risk of alien plant invasion to the detriment of the local ecology.	To effectively control the invasion of any alien plants.	No new alien plant recruitment (directly or indirectly resulting from construction activities) within the	All aggressive alien species should be removed. In terms of the Conservation of Agricultural Resources Act (CARA, Act No. 43 of 1984),	Applicant / Contractor.	Throughout construction.	SEO & ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			development footprint and neighbouring no-go areas or immediate surroundings.	and NEMBA (Act 10 of 2004) and Alien Invasive Regulations (GN No. 627 of 3 June 2020), alien species need to be managed and controlled in terms of their respective categories, where category 1 must be removed. Species specific and area specific eradication recommendations: • Control involves killing the plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion.			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				• Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.			
14.2.2	Construction activities (i.e. clearing and grading) have the potential to directly impact, that is damage / injure and destroy / kill, local fauna, and flora. (The impacts are exacerbated when the species affected are classified as protected, sensitive, rare, or	To reduce *in situ* losses of protected and conservation important flora & fauna.	Spatially explicit "Search and Rescue" register indicating the nature & position of all translocated flora & fauna.	All fauna and flora that are protected or of conservation importance must either be cordoned off and protected or translocated outside of the site establishment and development footprint, into habitats of a similar nature. Avoid direct contact with fauna, through clearing and grading as it can cause injury or death.	Applicant / Contractor. All search & rescue & translocation activities must be carried out by suitably qualified specialists.	Pre-Construction.	SEO & ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	threatened and endangered).						
14.2.3	Harvesting of: - indigenous plants for muthi - firewood; and - poaching of animals.	To ensure no harvesting of natural resources within and adjacent to the development footprint.	Zero incidence of harvesting/poaching. All incidences recorded in the incident register including close-out actions.	The harvesting or collection of any natural product(s) from the environment is strictly forbidden. "Problem" animals must be handled with assistance from the provincial conservation authority and in accordance with the Norms and Standards for the management of damage-causing animals (GN No. 749, 10 November 2016). Except for search and rescue operations, no mammal, bird, reptile, invertebrate or fish shall be intentionally caught, hunted	Applicant / Contractor.	Throughout construction and operation.	SEO & ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				or poached, within the development footprint and no-go areas.			
14.2.4	Impacts to avifauna life cycles.	Unaffected avifauna life cycles.	Construction work strictly contained to daylight and necessary adaptation of construction works to accommodate affected avifauna.	Schedule construction activities during least sensitive periods, to avoid migration, nesting and breeding seasons. Activities should take place during the day in these cases.	Applicant / Contractor.	Throughout construction.	SEO & ECO.

TABLE 15: WATER USE & MANAGEMENT (INCLUDING WATERCOURSES).

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
15.1	**Construction Phase**						
15.1.1	Altering bed, banks, or course of a watercourse. Impediments to surface water runoff of the man-made drainage systems and surrounding network of wetland areas which could be impacted adversely by the proposed project activities.	Prevent impacting the flow and water quality of the man-made drainage channels due to construction activities.	No physical and structural damage to the man-made drainage channels.	No covering of material or dumping of any rubble will be allowed inside or outside the project area.	Applicant / Contractor.	Throughout construction.	SEO & ECO.
15.1.2	Soil erosion and siltation of watercourses from disturbing the soil during the construction of	To retain as far as possible surface water hydrology.	Limited signs of erosion along haulage roads or resulting from the construction activities.	The contamination of water leaving the site could be controlled by the use of silt-fencing, rows of hessian bags,	Applicant / Contractor.	Throughout construction.	SEO & ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	roads, clearing areas, and creating bare patches, channelling stormwater and road run-off.		Due to the proximity of the drainage channels and associated wetland areas, erosion and siltation originating from construction activities could be impacted adversely by the proposed project activities.	mulch, brushwood and deflection berms. In any areas where the risk of erosion is evident, appropriate temporary or permanent works and water energy dispersion structures must be installed. Cleared or bare areas prone to erosion should be monitored and rehabilitation should be implemented wherever indications of potential erosion become evident.			

TABLE 16: AIR QUALITY MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
16.1	**Construction Phase**						
16.1.1	Old and poorly maintained vehicles cause the most air pollution from cars, specifically GHG emissions that are released to the atmosphere, contributing to global warming and acid rain.	To reduce the level of car or other combustion-related pollutants entering the atmosphere (by keeping well-maintained plant and equipment).	Evidence of servicing at required intervals. No visible evidence of excessive emissions.	Construction plant and equipment shall be kept in a good state of repair to reduce combustion-related emissions.	Applicant / Contractor.	During construction.	Plant Manager, SEO & ECO.
16.1.2	Negative effects on floral photosynthetic functioning and potential increase in breathing ailments of site staff, surrounding communities, and fauna.	To manage dust entrainment on access roads which may not exceed the thresholds stipulated in the National Dust Control Regulations.	Full compliance with National Dust Regulations. Acceptable Dust fallout rate ($mg/m^2/day$):	Ensure the effective implementation of the National Dust Control Regulations. Excessive vehicle movement, and the transport and off-loading of dispersive materials shall be avoided during windy conditions, unless additional dust suppression	Applicant / Contractor.	During construction, monthly.	Monitoring of dust fallout to be undertaken by a professional service provider if excessive emissions evident or

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			Residential area < 600 Non-residential area < 1200 Exceedance not more than twice in a year, not sequential months.	methods will ensure that the dust fallout does not exceed the acceptable limits. We suggest that the contractor take into consideration predicted wind speeds from a local weather station when planning construction-related activities with a high risk of generating dust. Dust suppressant must be prioritised for any drilling activities.			related complaints received, compliance to be verified by ECO & IEA.
16.1.3	Safety risks and road accidents due to reduced visibility.	To reduce vehicular accidents due to poor dust-induced visibility.	Full compliance with National Dust Regulations.	Dust suppression must be carried out on access & services roads where high dust entrainment is evident.	Applicant / Contractor.	During construction. Dust fallout evaluation monthly and dust suppression as conditions dictate.	Monitoring of dust fallout to be undertaken by a professional service provider if excessive emissions evident or

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
							associated complaints received, compliance to be verified by ECO & SEO.
16.1.4	Unpleasant odours.	To reduce unpleasant odours often associated with ablution facilities.	Records of regular servicing, and daily cleaning log.	Chemical toilets & E-loos shall be kept hygienic and cleaned daily to avoid unpleasant odours and provided at a staff: toilet ratio of 1:10.	Applicant / Contractor.	During construction.	SEO, HSO & ECO.

TABLE 17: SOIL MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
17.1	**Pre-Construction Phase**						
17.1.1	Loss of valuable topsoil.	To minimise disturbance and contamination of topsoil.	Compliance with site layout plans.	Clearing, and the location of topsoil stockpiles and / or windrows, shall take place in pre-authorised and clearly defined areas only.	Applicant / Contractor.	Prior to and during construction.	SEO & ECO.
17.2	**Construction Phase**						
17.2.1	Disturbing the soil during the construction of roads, clearing areas and creation of bare patches, channelling storm water and road run-off, will cause soil erosion.	To reduce erosion induced soil losses and consequential ecosystem degradation.	To record all areas prone and affected by erosion and implement suitable pre-emptive and remedial measures.	Areas disturbed and rehabilitated during construction shall be monitored for signs of erosion and if found to occur, immediately corrected ('source') and repaired ('symptom'). Bulk shape the areas where material is introduced to mimic or blend in with the surrounding, natural topography. Do not fine shape or rake because an uneven surface will impede surface water run-off and facilitate infiltration.	Applicant / Contractor (SEO).	During construction.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Correct any cause of erosion at the onset thereof by controlling / diverting storm water run-off, immediately repairing and stabilizing / rehabilitating impacted areas in the most appropriate manner. Ensure a quick and adequate cover with indigenous and local grass species. Ensure storm water run-off is adequately controlled on disturbed sites before rehabilitating them (ripping, replacing the topsoil and mulching/brush packing), i.e. cut-off berms.			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Grading of access roads must not be promoted, but tracks must be utilised as far as possible. Sediment traps may be necessary to prevent erosion and soil movement if there are topsoil or other waste heaps present during the wet season.			
17.2.2	Decline in soil organisms.	To maintain the biological integrity of disturbed soil.	Reinstatement of indigenous, locally-occurring plant species in place of exotic species, chosen for rehabilitation.	Hydro- or hand-seed disturbed areas after construction with grass seeds of naturally occurring plant species to create a functional and protective covering of exposed soil. A suitable fertiliser design must be compiled by a qualified soil scientist/agronomist where extensive areas have been affected.	Applicant / Contractor (SEO) / Agronomist.	Following construction or construction induced disturbance.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
17.2.3	Loss of valuable topsoil.	To retain all disturbed and cleared topsoil.	Comparative quantification of cleared and reinstated topsoil volumes.	Any topsoil removed during the establishment of parking areas, temporary roads, or any other cleared areas, must be quantified to ensure the same volume is reinstated at the end of construction; and must be protected from vehicular and construction impacts. Do not mix topsoil with cement and / or subsoil or let it be pulverised by trucks.	Applicant / Contractor (SEO).	During initial clearing and prior to reinstatement of topsoil.	ECO.
17.2.4	Potential sterilisation of the soil.	To maintain soil viability.	Use of only selective, environmentally friendly herbicides.	Where possible, refrain from using non-selective herbicides to control vegetation, depending on the active ingredient, it can sterilise the soil. Application of herbicides may only be applied by or under the supervision of a Certified Pest Control Officer.	Applicant / Contractor (SEO).	Every treatment episode.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
17.2.5	Soil contamination.	To reduce and avoid soil contamination.	Separately stockpiled / windrowed / designated soil horizons.	Soil horizons must be stockpiled or windrowed separately during excavation to ensure they can be reinstated in reverse order and ensure restored soil structure.	Applicant / Contractor (SEO).	During construction.	ECO.

TABLE 18: SOCIAL-ECONOMIC MANAGEMENT (HEALTH, SAFETY & SECURITY & COMMUNICATION).

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
18.1	**Planning & Design Phase (including Pre-Construction)**						
18.1.1	Community confusion, frustration, and lack of information.	To avoid creating false hope where job creation opportunities are concerned.	Development of an effective job seeker database.	Implementation of a community relations strategy until all activities on site cease and rehabilitation is completed. Develop a job seeker database to ensure job seekers' details are captured. As positions become available, this database can be searched for suitable skills within the local populous before positions are outsourced. These measures will reduce the potential nuisance factor to the landowner, caused by job seekers reverting to visiting the proposed site of development.	Applicant / Contractor / Operator	Prior to and during construction and operation.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				The proponent should manage these job expectations and there should be a central place, such as the entrance of the factory, where people can submit their applications, or an e-mail address or WhatsApp number where people could submit their queries to enable easy access to the job-seeker database or portal on which potential candidates can register. These platforms could also form part of a grievance mechanism where people could submit any issues regarding the development, especially in the construction phase.			
18.2	**Construction Phase**						

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
18.2.1	Increase in crime including damage to infrastructure and vandalism.	Reduce impacts associated with crime.	No perpetuating criminal activity. Improvements to security must be demonstrated following an incident.	Security must be appointed throughout construction to discourage criminal elements and trespassers accessing the project area.	Applicant / Contractor / Operator.	At commencement of construction, especially site establishment.	ECO & SEO.
18.2.2	Potential social pathologies (social unrest).	Reduce impacts associated with disgruntled staff.	No strike actions by staff. Improvements to engagement with staff must be demonstrated following an incident.	Ensure effective communication and engagement with staff and surrounding community *via inter* alia the appointment of a suitably qualified CLO. Transparent communication through the right channels to communicate with the community as to when and how their contracts will come to an end.	Applicant / Contractor / Operator (CLO).	At commencement of construction.	ECO & SEO.
18.2.3	Injury to site staff from construction,	To ensure effective Health	Appointment of a suitably qualified HSO	Implement a safety plan, access protocols, grievance mechanism and compensation policy.	Applicant / Contractor (HSO).	Construction.	Health & Safety Audits biannually.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	demolition and blasting activities.	and Safety implementation.	and compliance monitoring against the OHSA (Act 85 of 1993).	All staff must undergo a site induction that outlines the socio-environmental and health & safety constraints of the site.			
18.2.4	Injury to trespassers resulting in possible lawsuits.	To avoid inadvertent injuries to trespassers.	No recorded injuries to trespassers.	Adequate signage must be placed around the development warning uninformed people of the potential hazards and dangers associated with the project.	Applicant / Contractor.	Throughout construction	ECO & SEO.
18.2.5	Negative effects on the wellbeing of the local inhabitants and site staff as well as the potential outbreak of disease (including HIV/AIDS & COVID-19).	To avoid negative impacts on the health of the residents and occupiers.	Effective implementation of awareness training including measures to assess effectiveness of training.	AIDS / HIV & COVID-19 awareness training must be undertaken to ensure that the labour force is well informed on these matters. Dangerous fumes, noise, dust and water impacts must be avoided that may affect both the labour force and surrounding landowners and users.	Applicant / Contractor.	Ongoing	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
18.2.6	Potential increase in pedestrian and wildlife accidents.	To reduce impacts and injuries to pedestrian and wildlife.	No injuries recorded in incident register. Close-out Reports must demonstrate improvements to avert a recurrence.	Open excavations & holes must be secure and cordoned off to avoid accidental injury to humans and animals alike.	Applicant / Contractor.	Ongoing awareness.	ECO & SEO.
18.2.7	Runaway fires pose a risk to the surrounding community and the project area.	To manage the risks associated with uncontrolled veld fires.	Development and implementation of a fire management plan.	A fire management plan needs to be complied with and implemented to restrict the impact fire might have on the surrounding areas and the impact of outside fires on the project,	Applicant & SEO.	At commencement of construction.	SEO & ECO.

TABLE 19: CULTURAL, HERITAGE, ARCHAEOLOGICAL & PALEONTOLOGICAL MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
19.1	**Planning & Design Phase (including Pre-Construction)**						
19.1.1	Lack of awareness of heritage resources.	To promote awareness about heritage resources and their potential presence within the development area.	Procedures for incidental discovery of heritage artefacts in site induction and toolbox and awareness talks.	Include an awareness of heritage resources in the environmental induction & toolbox talks. Categories of heritage resources include, inter alia: • Evidence of archaeological sites or remains include remnants of stone-made structures, indigenous ceramics, bones, stone artifacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations. • Archaeological or paleontological sites over 100 years old, • Sites of cultural significance associated with oral histories, • Significant cultural landscapes or viewscapes, • Burial grounds, unmarked human burials, graves of victims of	Applicant / Contractor.	Throughout construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				conflict, and/or graves older than 60 years, • Structures older than 60 years, • Fossils.			
19.2	**Construction Phase**						
19.2.1	Loss of archaeological and palaeontological valuable artefacts.	To ensure construction activities do not disturb know or incidental heritage sites.	No loss of archaeological valuable artefacts. Any incidental "heritage" sites within the development footprint are suitably cordoned off.	Any archaeological artefacts unearthed during excavations must be protected and left *in situ*. Works must cease until the significance of the finding can be assessed by a qualified archaeological specialist.	Applicant / Contractor.	Throughout construction.	ECO & SEO.
19.2.2	Loss of cultural and heritage value to society.	To ensure correct procedures are followed following chance finds to	Adherence to protocols specified in management actions	Contact a professional archaeologist or Palaeontologist, depending on the nature of the finds, as soon as possible to inspect the findings.	Applicant / Contractor.	Throughout construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		preserve the heritage resource.	following a chance find.	In the event of discovering a heritage resource, stop reconstruction activities and alert the SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit immediately. Nokukhanya Khumalo, Heritage Officer T: +27 21 462 4502 | F: +27 21 462 4509 | C: +27 82 507 0378. E: nkhumalo@sahra.org.za			

TABLE 20: INFRASTRUCTURAL & TRAFFIC MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
20.1	**Construction Phase**						
20.1.1	Contamination from spills when refuelling, parking, driving, emergency repairing, operating plant or equipment to soil or nearby or within the watercourse.	To reduce contamination of soil from leaking plant and vehicles and upon occurrence is remediated promptly.	Spills are removed within 48 hours of event. Records of servicing by off-site workshop. Drip tray issued to all plant and recorded in a register.	Oil and fuel spills on roadways and parking areas must be removed to depth of penetration following their discovery and placed in a designated hazardous container for safe disposal. Drip trays must be placed under all plant that is parked overnight and extended periods not in operation.	Applicant / Contractor.	During construction.	Compliance to be verified by ECO & SEO.
20.1.2	Impact to local road users.	The effective implementation of measures to negate impact on local road users and ensure the safe haulage of material to site.	Development of a traffic management plan.	A traffic management plan needs to be developed following the detailed design process. This plan must include the following: • Traffic accommodation signage is to be implemented.	Applicant / Contractor / Logistics company.	During construction and deliveries.	Compliance to be verified by SEO & ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				• Flagmen must be positioned at intersections during days when deliveries are expected. • Daily checking of vehicles must be done to confirm they are clean, road worthy and have operational amber construction lights. • Construction lights on trucks must be visible from back and front of the vehicle by other vehicles behind or approaching.			

TABLE 21: VISUAL ASPECT MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
21.1	**Planning & Design Phase (including Pre-Construction)**						
21.1.1	Lighting impacts on nocturnal species	Lighting alternatives & technologies which reduce impacts on nocturnal species	Demonstration that the least impactful lighting options were selected.	Incorporate motion detection lights as much as possible to reduce the duration of illumination. Heights of light columns to be minimised to reduce light spill. Baffles, hoods, or louvres to also be used to reduce light spill. Facility lighting during construction & operation should be kept to a minimum and should make use of the latest technology to ensure that light disturbance is minimised. This will also reduce the attraction of insects (and in turn insectivorous birds) to the facility. Outside lighting should be designed and limited to minimize	Applicant / Contractor.	Prior to construction.	SEO & ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapour lighting should be avoided, and sodium vapour (green/red) lights should be used wherever possible.			
21.2	**Construction Phase**						
21.2.1	Impact of construction on visual receptors, including road users and local homesteads.	To manage the facility in a way that minimised its visual impacts on the surrounding environment.	Demonstration of effects to minimise visual impacts.	Managing the visual nuisance impact (glare) through erecting visual barriers such as trees. This should be done in consultation with the potentially affected parties. Tall trees can be planted to form a barrier or a screen between the receptors and the source of the nuisance. The trees should be planted a distance away from the panels as to not interfere with their working. All proposed buildings should be painted a grey-brown colour.	Applicant.	During Construction with many of the measures to persist throughout the project lifecycle.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Utilise fencing options that do not create a significant visual barrier e.g. “Truview-type” and black in colour. This offers some visual screening, as well as stopping wind-blown litter.			

SECTION 6: ENVIRONMENTAL AWARENESS PLAN

This section of the report is included in compliance with Section 24N(3)(c) of the NEMA and the EIA Regulations (2014) as amended.

The EMPr needs to include, inter alia:
An environmental awareness plan describing the manner in which-
(i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and
(ii) Risks must be dealt with to avoid pollution or the degradation of the environment;

Throughout the construction and operational phases environmental as well as health and safety awareness training should be provided to all employees to promote the effective implementation of the EMPr actions.

This section of the report focusses on the environmental awareness training. It provides a guideline as to the possible environmental risks that may be experienced as part of the project as well as way to avoid the risks and subsequent environmental degradation. The aim is to provide a guide to developing a comprehensive yet easily understandable awareness plan to present to employees of all education and skill levels which should be presented to the employees at least one week prior to commencement of construction. The following pointers are given for the environmental awareness training course:

- Environmental awareness training should be undertaken by the environmental and / or health and safety representative with the input of an EAP or ECO if required;
- Environmental awareness reminders should be undertaken at least bi-annually to ensure that employees and Contractors are kept aware of the risks and management thereof;
- It is recommended that awareness posters be developed and placed on site in highly visible areas to provide the required information when it needs to be referred to as well as reminding employees of their obligations regarding environmental protection;
- A slideshow can also be developed for initial awareness induction and for use as a reminder of the environmental risks and responsibilities at the site or induction of future Contractors; and
- Throughout the presentations (posters, meetings, slideshows, etc.), it is recommended that visual aids be used to explain the potential risks and management thereof as thoroughly as possible.
- All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good “housekeeping”.
- All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr. The avoidance and protection of the wetland areas must

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be included in a site induction. Contractors and employees must all undergo the induction and be made aware of the “no-go” to be avoided.

Should any new personnel be contracted or arrive on site during the construction period, they should attend the environmental awareness course. The environmental awareness training should be provided to all labourers, technical staff and any other Contractor appointed.

The awareness training forms part of this EMPr and should be implemented as part of the conditions of environmental management and risk prevention. Refer to the management measures in Tables 6 through 16 above for proposed management and mitigation actions to be undertaken to prevent or minimise the risks described below. Attention should be focussed on the following areas of sensitivity during the construction phase:

- Removal of vegetation during site clearance within a critical biodiversity area;
- Covering and clearing of riverine habitat leading to fragmentation;
- Altering bed, banks or course of seepage lines and riverine wetland network;
- Animal habitat disturbance due to vegetation clearance and noise;
- Soil erosion, siltation, and pollution of watercourses;
- Soil compaction;
- Health and safety;
- Degradation of roads; and
- Fire risks.

Other elements to be taken into consideration by the employees during both the construction and operational phases include:

- The presence of animals on site;
- Disturbances to neighbours due to noise and traffic;
- The positive impacts, of the greener technology being implemented, on the biophysical and socio-economic environments; and
- Awareness should be raised regarding the possible occurrence of sensitive plant and animal species and heritage features.

The awareness training for this project should aim to prevent, and where prevention is not possible, mitigate detrimental environmental impacts. It should promote awareness of environmental risks and management thereof. It should furthermore promote green thinking and provide information on alternative energy sources and energy consumption reduction.

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SECTION 7: RESPONSIBILITIES OF ROLE PLAYERS

The approved EMPr shall be printed, completed, and kept in an on-site file designated for all matters pertaining to environmental management. Co-operation is required between the applicant, contractor, and ECO to ensure that activities are managed in an amicable and responsible manner and in accordance with the philosophies of environmental legislation and principles of the EMPr.

This EMPr is predominantly compiled for the management of construction, once the Planning and Authorisation phases are complete. The tabulated management programmes assign responsibilities to one or more role player, the below descriptions identify responsibilities and accountabilities in the case of any uncertainty.

Applicant

The applicant remains ultimately accountable for ensuring that the development is implemented according to the requirements of the EMPr. Although the applicant delegates specific responsibilities to role players to perform functions on his / her behalf, the ultimate accountability cannot be delegated. The developer is responsible for ensuring that sufficient resources (time, financial, manpower, equipment, etc.) are available to the other role players (e.g. the contractor, SEO, etc) to efficiently perform their tasks in terms of the EMPr. The responsibility of restoring the environment in the event of any negligence, which leads to damage of the environment, also falls to the applicant.

The applicant must ensure that the EMPr is included in any documents (tender, appointment etc.) so that any contractor who is appointed is bound to the conditions of the EMPr. The applicant must appoint an independent Environmental Control Officer (ECO) prior to commencement of construction, to help identify pre-construction & construction criteria that need to be fulfilled timeously, to avoid non-compliance with the overarching authorisation conditions and/or legislation.

Contractor

The contractor, as the developer's agent on site, is bound to the EMPr conditions through his/her contract with the developer and is responsible for ensuring that she/he adheres to all the conditions of the EMPr. The contractor shall be responsible for the actions undertaken by all their employees including sub-contractors. The contractor must thoroughly familiarise him/herself with the EMPr requirements before coming onto site and must request clarification on any aspect of these documents, should they be unclear. The contractor must ensure that he/she has provided sufficient budget for complying with all EMPr conditions at the tender / appointment stage.

The contractor must comply with all instruction (whether verbal or written) given by the environmental manager, project manager or site engineer in terms of the EMPr.

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Site Environmental Officer (SEO)

The Site Environmental Officer (SEO) shall be appointed by the contractor to implement the EMPr daily. The SEO shall ensure that all construction activities are carried out in accordance with the relevant conditions of the EMPr, Environmental Authorisation (EA), General Authorisation (GA) (under the National Water Act), wayleaves, provincial ordinances and provincial bylaws.

Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) is appointed by the applicant as an independent monitor of the implementation of the EMPr, EA, and GA. He/she must form part of the project team and be involved in all aspects of the project planning that can influence environmental conditions on the site.

The ECO must attend relevant project meetings, conduct inspections to assess compliance with the EMPr, EA, and GA and be responsible for providing feedback on potential environmental problems associated with the development. In addition, the ECO is responsible for:

- Liaising with relevant authorities;
- Liaising with contractors regarding environmental management; and
- Undertaking routine monitoring and appointing a competent person / institution to be responsible for any specialist monitoring (if required).

The ECO has the right to enter the site and undertake monitoring and auditing at any time, subject to compliance with health and safety requirements applicable to the site (wearing safety boots, head gear, mouth mask etc.).

Independent Environmental Auditor (IEA)

An IEA shall be appointed by the Applicant to undertake EMPr, EA, and GA compliance audits at intervals stipulated in the EA and/or GA alternatively in accordance with Regulation 54A(3) of the EIA Regulations (2014), as amended. The purpose of conducting a periodic compliance audit would be to systematically check and evaluate progress on EMPr, EA, and GA implementation. The environmental audit will serve as a 'snapshot' of the environmental situation and progress at a given point in time. The purpose of the audit is to illustrate whether there has been any improvement or change over time.

The IEA will fulfil the auditing requirements by systematically auditing the Project's performance and compliance against the requirements of the EA, EMPr, and GA in a process that is carefully planned, structured and organised. The audit process must, on a sampled basis, track past actions, activities, events, and procedures through using existing documentation, conducting interviews with managers and personnel, and observing practices on site.

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SECTION 8. COMMUNICATION

At least monthly site meetings should be held where feedback can be given, and any potential problems identified and remedied. If they cannot be remedied then construction in that area should be stopped, until a suitable remedy is identified.

Monitoring Compliance

Pre-construction, Construction and Post-construction monitoring:

The ECO will be responsible for monitoring and reporting on compliance of the activity from pre- to post-construction.

Inspections and resulting compliance reports shall be a systematic, independent, and documented process for obtaining compliance evidence and evaluating it objectively to determine the extent to which the compliance criteria are fulfilled. The compliance criteria (or reference) against which the compliance evidence is compared shall include this EMPr, the Environmental Authorisation, and General Authorisations (under then National Water Act).

The ECO must undertake monthly inspections of the site and submit monthly environmental compliance reports to the Competent Authority) for this project, unless otherwise prescribed in the EA. The compliance reports must identify the actual and potential transgressions, describe the impacts, provide verifiable evidence (photographs, records, or statements) and recommend corrective and preventive actions (including completion dates). The compliance reports must measure the applicant/contractor's level of compliance against the aforesaid criteria. Performance scoring/reporting is optional.

The SEO shall maintain an on-site diary to record environmental aspects (elements of the construction activities that can interact with the environment) and environmental impacts (any change to the environment, whether adverse or beneficial, wholly or partially resulting construction activities), daily.

Environmental Awareness Plan

The applicant shall ensure that his project team, contractor, and labourers are adequately trained about the implementation of the EMPr, EA, & GA throughout construction.

Pre-construction

Environmental Awareness Inductions shall be targeted at two distinct levels of employment: management (applicant, architect, engineer, contractor / site agent) and labourers (including the site foreman). The SEO shall be responsible for preparing and presenting inductions appropriate to the audience. Inductions shall be undertaken prior to the commencement of construction. Where possible the presentation will be conducted in the language of the employees.

The Environmental induction for management shall include mitigations that are relevant to or require management's involvement prior to implementation including, but not limited to, the following:

- Measures required during the planning and design, and pre-construction phase, and
- Site establishment.

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The Environmental induction for the contractor's labourers and foreman shall, as a minimum, include the following:

- A description of the actual and potential environmental impacts,
- Standard operating procedures for undertaking construction activities (i.e. mixing concrete, driving, etc.) that can have an environmental impact,
- Staff conduct including sanitation and movement,
- The integrated waste management strategy,
- The steps to be taken should any item of perceived environmental importance including archaeological artefacts be located or unearthed, and
- The environmental emergency plans.

Construction

The SEO and ECO shall undertake an informal training needs analysis throughout construction to identify appropriate environmental topics and the appropriate labourers to target. The analysis shall be informed by the findings contained in the site diary and compliance reports. Training shall be given during toolbox talks.

The SEO and ECO shall keep records of the environmental inductions and subsequent toolbox talks in an on-site file designated for all matters pertaining to environmental management.

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SECTION 9: ADMINISTRATION OF INCIDENTS

The purpose of the National Environmental Management Act, 107 of 1998 (NEMA) is *inter alia*, to provide for co-operative environmental governance by establishing principles for decision making on matters affecting the environment, and specifically for the control of incidents involving hazardous substances that could have a detrimental impact on the environment. This is a measure to give effect to the provisions of section 24 of the Constitution regarding the protection of the environment.

The then Department of Environment Affairs (DEA) accordingly developed a guideline document providing guidance to Relevant Authorities on the administration of section 30 NEMA, which has in turn informed some of the content of this section.

Section 30 of NEMA deals with the reporting of and response to "incidents" and provides for certain statutory duties and responsibilities of the person responsible for the incident (the 'responsible person') and outlines the permissible actions of the 'relevant authority' to which the incident is reported. Section 30 deals with the reporting of and response to *an unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property* which is defined as an "incident" in section 30(1) of NEMA.

In terms of the National Water Act (Act 36 of 1998) an incident is defined as:
Any incident or accident in which a substance-

(a) pollutes or has the potential to pollute a water resource or
(b) has, or is likely to have, a detrimental effect on a water resource (NWA, 1998, section 20 (1))

The administration of section 30 of NEMA entails the management of information generated during an incident and extends to monitoring the clean-up and remediation undertaken by the responsible person and may involve enforcement action against the responsible person in the event of non-compliance.

Further clarity on some of the key concepts & terms contained in the definition of an "incident" are provided below:
"**unexpected"** – not expected or anticipated and/or surprising,
"**sudden"** – occurring or done unexpectedly or without warning, abrupt, hurried, hastily,
"**uncontrolled release"** – loss of containment, whether from the primary or any other containment (as the "containment" is what constitutes the "control"),
"forthwith" – immediately, without hesitation or delay"
"significant harm to the environment, human life or property" –

- **"significant"** – large enough to be noticeable or have noticeable effects,
- **"harm"** – damage or injury that is caused by a person or an event.

"hazardous substance" – a solid, liquid, vapour, gas or aerosol, or combination thereof, which is a source of danger to persons and to the environment, by reason of its toxic, corrosive, irritant,

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strongly sensitizing or flammable nature, or because it generates pressure through decomposition, heat or other means". The DEA guideline on the administration of incidents (2019) contains lists of a substances and volumes that are indicators of a substance being hazardous which can be used to determine if an incident has occurred or not.

9.1 WHAT CONSTITUTES AN INCIDENT?

An incident is an occurrence where all the key concepts as indicated in the definition are present. There would have to be an unexpected loss of containment of a substance that is identified as such in the list of hazardous substances in the guideline – the substance would have been placed into this list by virtue of the fact that the substance is regarded as hazardous and as having the potential for causing serious danger to the public and/ or serious pollution of the environment. The duration of the possible impacts of an incident is irrelevant as the definition incorporates both immediate and delayed impacts.

Some of the more typical hazardous substances and volumes are listed below in Table 22, but the full list must be kept on site for quick and ease of reference.

Table 22: Typical hazardous substances and volumes listed in the guideline (Annexure 3) as constituting an "incident" when a lack of containment occurs.

NO.	NAME	CAS CODE	RQ
358	Air, compressed	None	10
364	Alcoholic Beverages, with more than 70% alcohol by volume		10
590	Batteries, containing sodium	UN 3292	10
591	Batteries, dry, containing potassium hydroxide solid	UN3028	10
592	Batteries, wet, filled with acid, or alkali	UN 2795	10
593	Battery fluid, acid	UN 2796	10
594	Battery fluid, alkali	UN 2797	10
611	Benzene	71-43-2	5
780	Caffeine	58-08-2	10
982	Creosote	8001-58-9	0.5
983	Creosote	8021-39-4	0.5
1130	Diesel fuel	68334-30-5	100
1131	Diesoline	68334-30-5	100
1415	Gasoline	86290-81-5	100
1561	Kerosene	64742-82-1	100
1562	Kerosene	8008-20-6	100
1680	Methane	74-82-8	5000
1885	Nitroglycerin	UN3064	10
1985	Organophosphorous pesticides and herbicides with an LD50 value above 50 mg/kg	130538-97-5	10

2011	Oxygen, compressed	UN1072	10
2018	Paraffin	64742-82-1	100
2019	Paraffin	8008-20-6	100
2066	Petrol	86290-81-5	100
2068	Petroleum Thinners (Turpentine)	8006-64-2	100
2167	Printing ink, flammable or printing ink related material (including printing ink thinning or reducing compound) flammable	UN1210	10
2176	Propane	74-98-6	5000
2363	Sulphuric acid	7664-93-9	500

Legend:
RQ – Reportable Quantity (lt)
CAS - Chemical Abstracts Service

The actual and potential pollution that the incident may cause includes, as per the definition of 'pollution' in NEMA, any change to the environment caused by substances, radioactive or other waves, noise, odours, dust and heat.

The receiving environment that may be impacted upon includes, as per the definition of 'environment' in NEMA, the aquatic, terrestrial, built and atmospheric components of the environment.

Table 23: Incident identification checklist (adapted from DEA&DP, 2010).

No.	CRITERIA	YES/NO	COMMENT
1.	Was the incident unexpected, sudden and uncontrolled?		
2.	Did the incident involve a release of a hazardous substance from a major emission, fire or explosion?		
3.	Did the incident have a potential to release of a hazardous substance from a major emission, fire or explosion?		
4.	Was the incident reported in the media?		
5.	Have there been any public complaints relating to the incident?		
6.	Did anyone have to receive medical attention as a result of the incident?		
7.	Is it practically possible that someone may have been in serious danger as a result of the incident?		
8.	Is it possible that someone may, in the future, be exposed to serious danger as a result of the incident?		

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9.	Is it possible that, under different, but feasible, circumstances (e.g. weather conditions, proximity to schools, etc.) someone could have been exposed to serious danger as a result of the incident?		
10.	Did the incident result in a change to the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people?		
11.	Is it possible that the incident could have resulted in a change to the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people?		
12.	Is it possible that the incident may be the cause of any future change to the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people?		
13.	Is it possible that, under different, but feasible, circumstances (e.g. weather conditions, proximity to rivers, wetlands, etc.) the incident may have caused a change to the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people?		
14.	Has the incident had an impact on water?		

Interpretation of checklist:

i. If the answer to questions 1 and 2 is "yes", then the incident must be regarded as an emergency occurrence and, as such, all the provisions of Major Hazards Installation (MHI) Regulations (GN No. R. 692, 30 July 2001) Section 7, in terms of the Occupational Health & Safety (OHS) Act (Act 85 of 1993) as amended apply.
ii. If the answer to questions 1, 2 and any of the remaining questions is "yes", then the incident must be regarded as an emergency & incident and, as such, all the provisions of Section 30 of NEMA and MHI Regulations Section 7 apply.
iii. If the answer to questions 1, 2, 3 and any of the remaining questions is "yes", then the incident must be regarded as an emergency & incident and, as such, all the provisions of Section 30 of NEMA, MHI Regulations Section 7 and Water Act Section 20 apply.
iv. In accordance with the precautionary principle, all fires, explosions or emissions involving an unknown or unlisted substance and/or quantity of substance, must be reported. Where limited information is available regarding the composition of the mixture or the waste, it should be

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assumed to consist entirely of the most toxic known component and reporting should be done accordingly. As a final measure, reporting should take place where any of the hazard codes or hazard phrases (in Table 24) according to the Global Harmonised System (GHS) and/or SANS 10234 appear on the Safety Data Sheet (SDS) for that substance.

Table 24: List of hazard codes and RQ values (adapted from DEA&DP, 2010).

HAZARD CODE	HAZARD STATEMENT	PROPOSED RQ (KG)
H200	Unstable explosive	0.5
H201	Explosive; mass explosion hazard	0.5
H220	Extremely flammable gas	50
H222	Extremely flammable aerosol	50
H224	Extremely flammable liquid and vapour	50
H225	Highly flammable liquid and vapour	500
H226	Flammable liquid and vapour	2500
H250	Catches fire spontaneously if exposed to air	0.5
H251	Self-heating; may catch fire	0.5
H260	In contact with water releases flammable gases that may ignite spontaneously	0.5
H270	May cause or intensify fire; oxidizer	0.5
H271	May cause fire or explosion; strong oxidizer	0.5
H300	Fatal if swallowed	0.5
H301	Toxic if swallowed	5

9.2 PROCEDURES & ACTIONS FOLLOWING AN INCIDENT

Section 30 of NEMA consists of 10 subsections and at least eleven (11) possible actions can be identified within these ten subsections (Table 20). For every incident, the 11 actions can be regarded as falling into one of two stages; namely a containment stage and a review stage (Figure 9).

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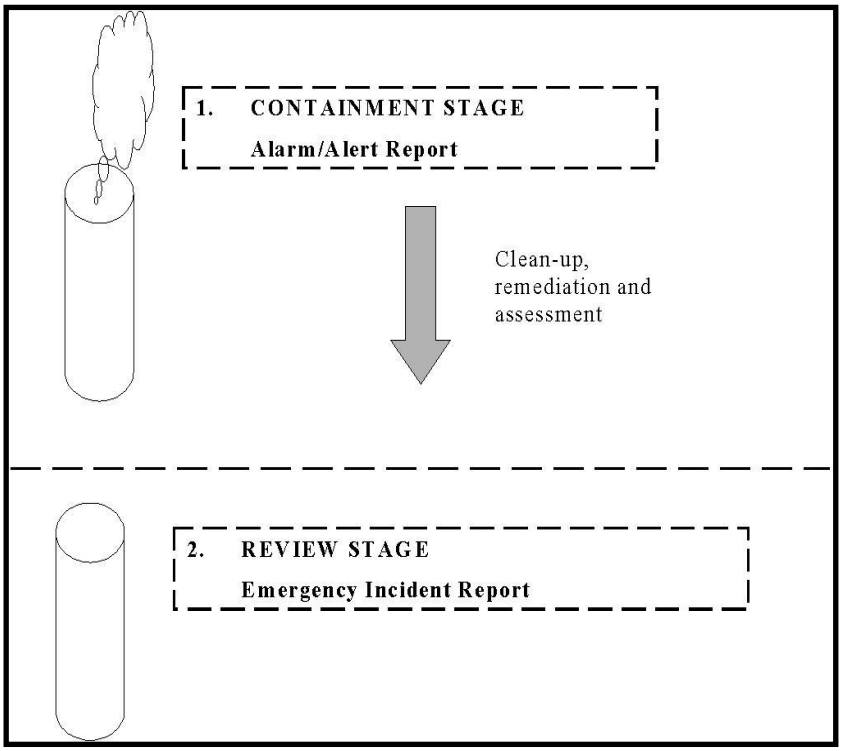

Figure 7. The two stages of an environmental incident (DEA & DP, 2010).

The containment stage is the response stage in which the focus is upon the containment, clean up, remediation and preliminary assessment of the incident. Sections 30(2) to 30(4) are relevant to this stage of the incident.

Section 30(5) is specific to the review stage of the incident. The focus of this stage is the post-clean up assessment of the incident and reporting of the relevant information to the authorities. This information is critical for future prevention and management of incidents.

Subsections (6) and (7) provide relevant authorities with the legislative mandate to enforce the need for responsible persons to report, clean up, remediate and assess the long-term impacts of the incident. Relevant authorities could invoke these subsections in either the containment stage or the review stage.

Lastly, subsections (8) to (10) make provision for the authority to intervene and undertake the clean-up, remediation and assessment activities on behalf of the responsible person and to claim reimbursement for expenses incurred in this process from the responsible person. This action is likely to begin in the containment stage and to be concluded in the review stage.

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Table 25: List of actions and role players in section 30 of NEMA.

ACTION NO.	ACTION	RESPONSIBILITY	REFERENCE
1	Initial reporting of the incident to the authorities	Responsible person	Section 30(3)
2	Containing and minimising the effect of the incident to the environment, health, safety and property of persons	Responsible person	Section 30(4a)
3	Undertaking clean up procedures	Responsible person	Section 30(4b)
4	Remedying the effects of the incident	Responsible person	Section 30(4c)
5	Assessing the immediate and long-term effects of the incident on the environment and public health	Responsible person	Section 30(4d)
6	Initial evaluation reporting within 14 days of the incident	Responsible person	Section 30(5)
7	The issuing of a directive by a relevant authority for actions 2-6 above	Relevant authority	Section 30(6)
8	Confirmation of a verbal directive in writing	Relevant authority	Section 30(7)
9	Undertaking of actions 2-4 by the relevant authority where the responsible person fails to act	Relevant authority	Section 30(8)
10	Claiming reimbursement of all reasonable costs from every responsible person	Relevant authority	Section 30(9)
11	Comprehensive reporting by a relevant authority which has exercised actions 7-9 above	Relevant authority	Section 30(10)

9.2.1 Typical equipment that must be available to assist in the containment of an incident

The following equipment is required to successfully implement this procedure. It must be ensured that the equipment is supplied to or is readily available for all living quarters, site offices, kitchen areas, workshop areas, stores and on site.

1. A spill kit including hydrocarbon absorbent fibres, mats and booms (preferably hydrophobic)
2. A net
3. A whistle
4. Adequate lighting for night shifts
5. Spades
6. Sand bags
7. Designated hazardous waste drums
8. (Trained personnel with) protective clothing for extinguishing fires

9. Fire extinguishers
10. Fire beaters
11. Water carts/tankers with pumps and hoses
12. Water pumps and pipes (for fires started at the watercourse crossings)

9.3 REPORTING PROCESS

The reporting process will only commence if the occurrence qualifies as an "incident", as previously described. The process flow for the response to an incident in terms of section 30 of NEMA is illustrated in Figure 10.

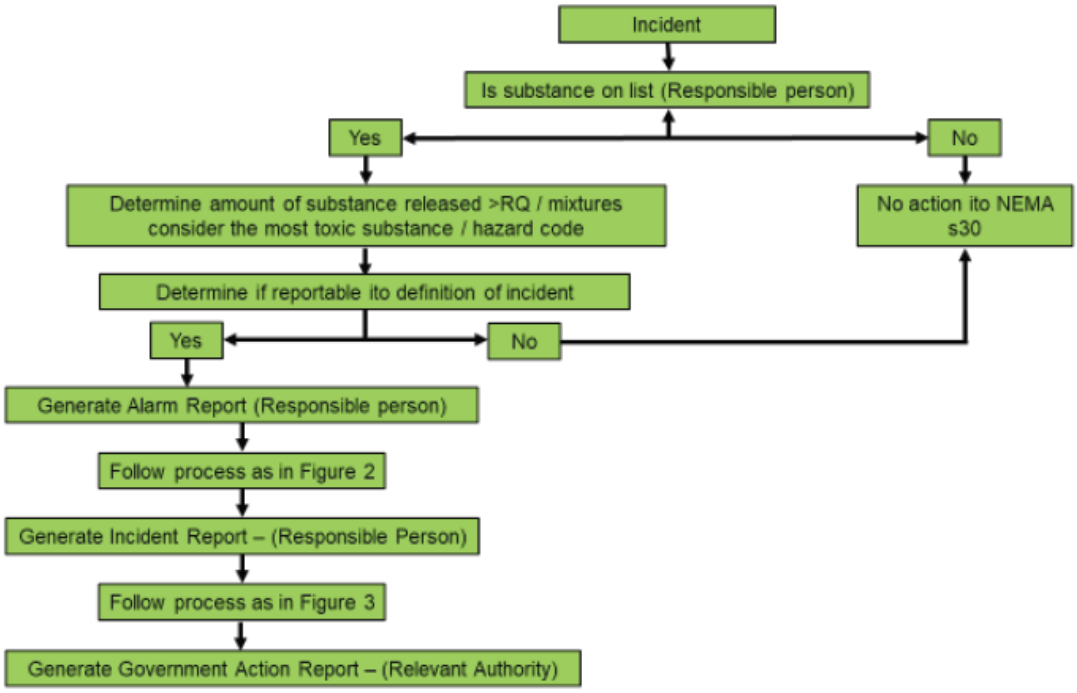

Figure 8. Process flow of an incident in terms of section 30 of NEMA.

9.3.1 TYPES OF REPORTS

Two types of reports are required following an incident as described below.

9.3.1.1 Alarm Report (section 30(3))

The Alarm Report represents the first reporting step in the incident process and must be compiled immediately and without delay. The purpose of this report is for the responsible person to notify relevant authorities that an incident has occurred and to provide basic information on the nature of the incident so that decisions can be made as to the most effective way of dealing with the incident.

The Alarm Report must be compiled by the either the responsible person or the employer of the responsible person. The Alarm Report must be submitted by the responsible person to the following relevant authorities:

- The Director-General (Department of Forestry, Fisheries and the Environment (DFFE))

- The South African Police Service (SAPS) and the relevant emergency services
- The relevant provincial head of department or municipality
- All persons whose health may be affected by the incident.

Section 30(3) of NEMA requires the responsible person to report the following minimum information in the Alarm Report:

- The nature of the incident
- Any risks posed by the incident to public health, safety and property
- The toxicity of substances or by-products released by the incident and
- Any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment.

In order to be able to take such steps, the following information should ideally be disclosed:

- Responsible person name, location, organisation, and telephone number
- Name and address of the party responsible for the incident
- Date and time of the incident
- Location of the incident
- Medium (e.g. land, water) affected by release or spill
- Number and types of injuries or fatalities (if any)
- Weather conditions at the incident location
- Name of the carrier or vessel, the railcar/truck number, or other identifying information
- Whether an evacuation has occurred
- Other departments notified or about to be notified and
- Any other information that may help emergency personnel respond to the incident

A crucial aspect of the administration of a section 30 incident is the sharing of information relating to the specific incident. It is therefore important that the authorities be kept informed of the incident.

9.3.1.2 Incident Report (section 30(5))

The Incident Report is compiled after the containment, clean up, remediation and preliminary assessment of the long-term residual impact of the incident have been completed. The report must be submitted to all relevant authorities within 14 days of the incident occurring. The purpose of this report is to inform the relevant authorities of the containment and remediation process that was followed and the results of the preliminary assessment of the long-term impacts of the incident. This report also provides information on the cause of the incident and the responsible person's proposed measures to prevent the recurrence thereof.

The Incident Report must be compiled by the responsible person and submitted to the following:

- The Director-General (DFFE)
- The relevant provincial head of department
- The relevant municipality

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Section 30(3) of NEMA requires the responsible person to report the following information in the Incident Report:

- The nature of the incident
- The substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects
- Initial measures taken to minimise impacts
- The causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure
- The measures taken and to be taken to avoid a recurrence of such incident

It is recommended that as much of the following information as possible is also provided in the Incident Report:

- Responsible person name, location, organisation, and telephone number
- Name and address of the party responsible for the incident
- Date and time of the incident
- Location of the incident
- Medium (e.g. land, water) affected by release or spill
- Number and types of injuries or fatalities (if any)
- Weather conditions at the time of the incident
- Name of the carrier or vessel, the railcar/truck number, or other identifying information
- Whether an evacuation occurred
- Other departments which have received an Incident Report or who will receive an Incident Report
- Any other information that may help authorities undertake an initial evaluation of the incident

9.3.1.3 Government Action Report (section 30(10))

A Government Action Report (GAR) which is compiled by the relevant authority should demonstrate the necessity for the intervention by the relevant authority and should in terms of section 30(10) be compiled as soon as practically possible and submitted to all parties.

In addition to the information provided in the Incident Report, the relevant authority should ideally include as much of the following information as possible in the GAR:

- The factors which influenced the decision by the relevant authority to intervene
- The financial and other costs associated with the intervention
- The proposed plans to recover the costs from the responsible person (if applicable)

9.3.2 ROLE OF EACH ORGAN OF STATE

The role of the various spheres of Government is described in section 30(1)(c) in the definition of "relevant authority" as follows:

(i) A municipality with jurisdiction over the area in which an incident occurs;

(ii) A provincial head of department or any other provincial official designated for that purpose by the MEC in a province in which an incident occurs;

(iii) The Director-General (of Environment Affairs); and
(iv) Any other Director-General of a national department.

Section 30(2) provides a measure of co-ordination between the various relevant authorities in that it establishes a hierarchy of response. In this hierarchy, individual relevant authorities only exercise their authority in terms of section 30 if the authority preceding them has not exercised its authority. The responsibility of relevant authorities to take steps is set out in the manner it has been in the NEMA. By implication, it places a responsibility on all relevant authorities who become aware of an incident to confirm that the other authorities are aware thereof, as well as who must be involved in a particular incident (Figure 11). Cooperation amongst relevant authorities must be promoted throughout in the management of an incident.

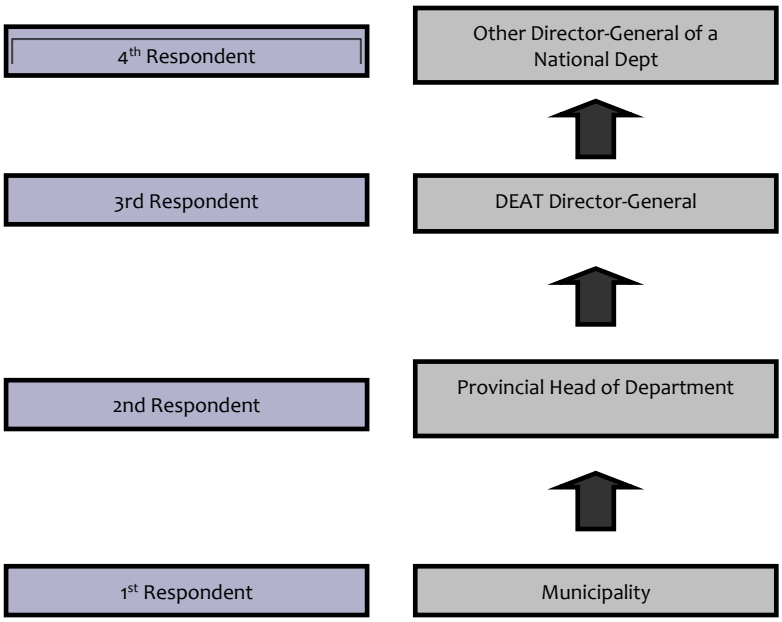

Figure 9. Hierarchy of Response by Relevant Authorities as per Section 30(2) of NEMA ((DEA & DP, 2010).

Similarly, the sharing of information regarding an incident must be promoted for every incident between those relevant authorities involved. Most notable, is the sharing of the AR, IR, GAR, initial evaluation of incidents and closure reports. Table 26 provides a list of known contacts that may be relevant to an incident and required for effective communication and reporting purposes.

The process following the receipt of the Alarm & Incident Report by the relevant authority is illustrated in Figure 12 & 13, respectively.

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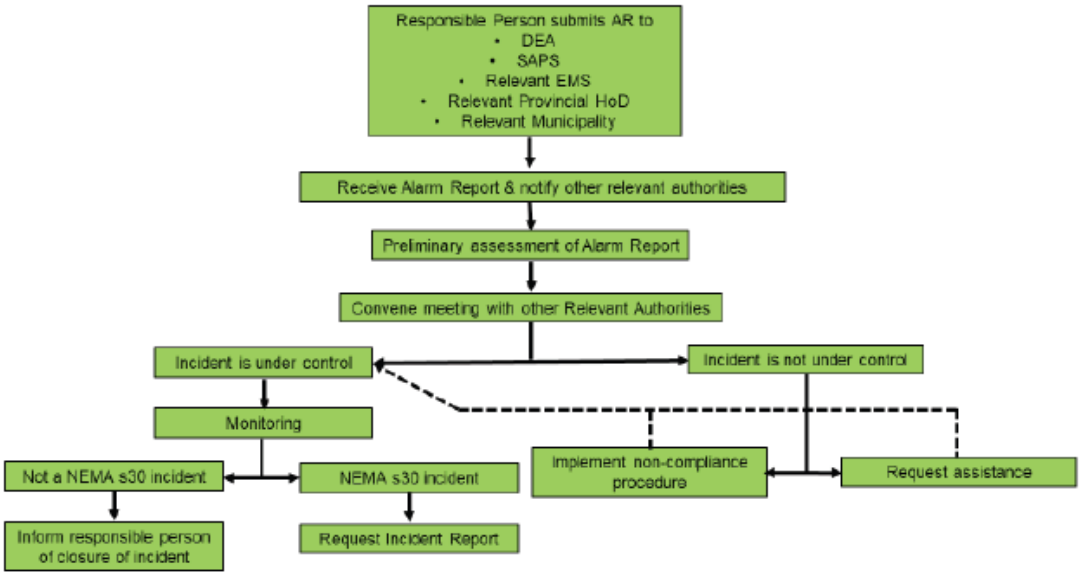

Figure 10. Flow diagram of the process following receipt of the Alarm Report by the relevant authority.

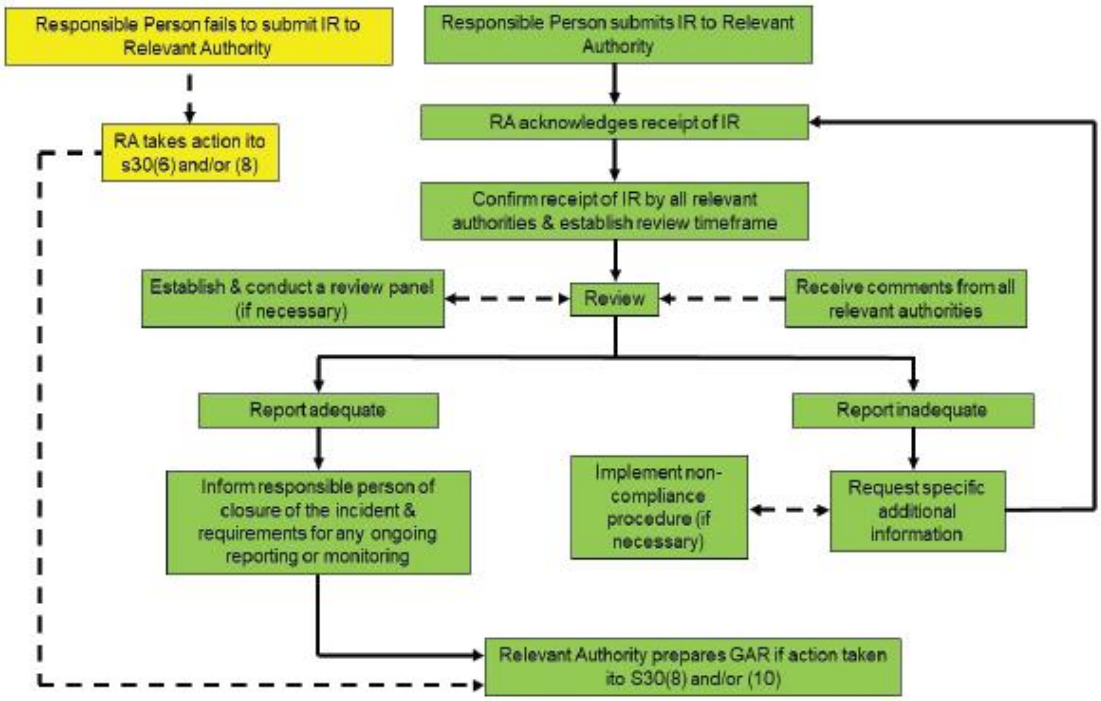

Figure 11. Flow diagram of the process following the receipt of the Incident Report.

Table 26: Contact details for persons relevant to an incident.

Organisation	Name	Contact details
Project Personnel		
Applicant	Soventix Pty (Ltd) – Mr Jean-Paul De Villiers	021 852 7333
Engineer		
Contractor		

HSO		
SEO		
ECO		
ESKOM	24hr Customer Contact Centre	086 003 7566
Interested and Affected Parties		
Landowner	Element 6 - Kobus Odendaal	Kobus.Odendaal@e6.com
Adjacent Landowner:	Nampak Ltd:Bevcan - Tsika Nhlapo (Safety Manager)	011 8178605
Adjacent Landowner:	Infinity Diamond Wheel Manufacturing (Pty) Ltd - Marius Joubert	010 880 7456
Adjacent Landowner:		
Adjacent Landowner:		
Adjacent Landowner:		
Adjacent Landowner:		
Adjacent Landowner:		
Adjacent Landowner:		
Emergency Services		
Spill Clean-up Service Provider		
Fire Department		
Chief Fire Officer (Fire Chief)		
SA Police Services		
Disaster Management Centre		
Local Municipality		
District Municipality		
Irrigation Board		
Water Catchment Management Agency		
Water Treatment Works		
DWS (Regional Head of Department / Chief Director)		
DWS (Regional Director: Water sector Regulation & Use)		
DFFE (Provincial Head of Department)		
DFFE (Director: Environmental Compliance and Enforcement)	Mr Sonnyboy Bapela	Tel: 012 399 9422 Email: sbapela@environment.gov.za
	Ms Frances Craigie	Tel: 012 399 9460

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		Email: fcraigie@environment.gov.za
DFFE (Director General)	Ms Vanessa Bendeman	Tel: 012 399 9337 Email: vbendeman@environment.gov.za
DFFE (Director: Environmental Impact Evaluation)	Mr Sabelo Malaza	Tel:012 3998792 Email: smalaza@environment.gov.za

The following tables provide guidance on what actions to implement in the event of context specific incidents.

Table 27: Spillage in a watercourse.

ACTION TO BE TAKEN		
Personnel	**Responsibility**	**Action**
Employee	Reporting	The person responsible for, or who discovers, a hazardous substance spill must report the incident to their immediate Supervisor.
Supervisor	Reporting	Report the incident to the SEO, HSO and Resident Engineer. ● Note that the SEO will take control of all relevant actions once he/she arrives on the scene.
HSO	Reporting	Report the incident to an Inspector (designated under section 28 of the Occupational Health & Safety Act, 1993) within the prescribed period and manner.
Supervisor / SEO	Initial investigation	Determine the extent of the spill, i.e. its boundaries, by observing for the following: 1. Any visual indication of pollution, 2. Any odours or emissions detected, 3. Any indication of the source of pollution, 4. Any sign of damage to the natural system. ● The Supervisor / SEO should provide lighting if working at night.
Supervisor / SEO	Co-ordination	Sound an alarm/whistle. ● The designated response team consisting of area specific personnel and including the environmental leader, will congregate at the spill kit.

		● All other employees who do not have specific duties to perform are to evacuate the affected area to a location designated by the Supervisor / SEO.
Supervisor / SEO	Co-ordination	Minimise the effects of the incident on the environment and persons by removing the source of the spill at least 100m away from the watercourse or cut-off the supply of the spill if the source is not moveable.
Supervisor / SEO	Co-ordination	Contain the spill by laying an absorbent sock or boom across the width of the watercourse AT A PRE-DETERMINED LOCATION downstream of the construction area (spill). ● A series of parallel booms may be required.
Supervisor / ECO	Co-ordination	Secure the affected area with danger tape.
HSO	Co-ordination	The site shall not be disturbed and no article or substance may be removed (without the consent of the inspector) if there is or likely to be a death, or if there is a loss of limb or part of a limb. However, action can be taken to prevent a further accident, to remove the injured or dead or rescue persons from danger.
Engineer / SEO / HSO	Decision-making	The Engineer will assess the situation in consultation with the SEO and HSO and act as required. ● The risk involved shall be assessed before anyone approaches the scene of the incident. ● The HSO will consult the MSDSs. ● The scale of the spill will dictate whether the spill will be cleaned up by using the on-site spill kit and in the prescribed manner, or by contacting a Spill Clean-Up Service Provider for assistance. ● The SEO will take photographs of the affected area. ● No person shall be allowed to approach a spill unless he/she is equipped with the personal protective clothing.
SEO	Directions	If a Spill Clean-Up Service Provider is used, assist the emergency services by clearly marking the route to be taken to the spill site.
SEO	Co-ordination	Take such measures as the Catchment Management Agency may either verbally or in writing direct within the time specified by such institution.

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REMOVAL AND REMEDIATION MEASURES TO BE IMPLEMENTED		
Personnel	**Responsibility**	**Action**
SEO	Co-ordination	Remove the contaminated sock or boom from the surface of the water. If lose fibres were scattered on the surface to capture hydrocarbons in shallow (still) pools, 'fish' it out with a net.
SEO	Co-ordination	Remove the contaminated soil from the banks of the watercourse, to the depth of penetration using a spade or shovel.
SEO	Co-ordination	Temporarily store the contaminant in the designated hazardous waste facility at the construction camp.
SEO	Co-ordination	Contact a licensed hazardous waste service provider to collect and transport the waste to a licensed hazardous waste landfill site.
SEO	Co-ordination	Rehabilitate the banks of the watercourse by replacing the topsoil and planting indigenous plants.
SEO	Monitoring	Immediately follow any known spillage of toxic substances into a stream or river with monitoring of the receiving streams or rivers and public health.
SEO	Co-ordination	Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice must be sought for appropriate treatment and remedial procedures to be followed.
SEO	Monitoring	Take photographs of the affected area during rehabilitation.
INTERNAL & EXTERNAL COMMUNICATION PLAN		
Personnel	**Responsibility**	**Action**
Employee	Reporting	The person responsible for, or who discovers, a hazardous waste spill must report the incident to their immediate Supervisor.
Supervisor	Reporting	Report the incident to the SEO, HSO and Resident Engineer.
HSO	Reporting	Report the incident to an Inspector (designated under section 28 of the Occupational Health & Safety Act, 1993) within the prescribed period and manner.

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SEO	Reporting	Report the incident to the Site Agent and / or Manager and the ECO.
SEO	Reporting	If the spill is too big for the spill kit, contact a Spill Clean-Up Service Provider.
SEO	Reporting	If the spill is going to affect downstream users, inform the Land Owner, the Irrigation Board and water treatment works (if applicable). ● Provide the following information to the water treatment works: 1. The exact location of the spillage, 2. The time of the spillage, 3. As much information about the nature of the pollution, 4. The name and telephone number of the person contacting them. ● Irrigation Boards control river structures and may be able to divert/or impound the river to protect 'water supply intakes'.
SEO	Reporting	Report the incident to the following authorities within 24 hours. 1. DFFE (Director General), 2. DWS (Director General and Chief Director), 3. SA Police Services, 4. Fire Department, 5. Catchment Management Agency, 6. DFFE (provincial Head of Department) or Local Municipality, and 7. Any persons whose health may be affected by the incident.
SEO	Reporting	Provide the following information: 1. The nature of the incident, 2. Any risks posed by the incident to public health, safety & property, 3. the toxicity of substances or by-products released by the incident, and 4. any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment.

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ECO / Applicant / Site Agent / CRE	Reporting	If the nature of the impact constitutes a gross violation of the EA or any legislation: ● The ECO must report the incident to the applicant. ● The applicant must report the incident to the Local Municipality, DFFE, and DWS. ● The Site Agent and / or Manager must report the incident to their Environmental Group Manager, Divisional MD and CEO. ● The Resident Engineer must report the incident to his Superiors.
PRESCRIBED REPORTING PROCEDURE		
Incident recording		
Personnel	**Responsibility**	**Action**
SEO	Investigation	Conduct an investigation, including interviews, and record all details of the incident. ● The cause must be investigated.
SEO	Reporting	Complete an Environmental Incident Report and forward it to all key project personnel, with the exception of the Emergency Services.
SEO	Reporting	Within 14 days of the incident, report the incident to the following authorities. 1. DFFE (Director General), 2. DFFE (Provincial Head of Department), 3. Local Municipality, 4. DWS (Regional Director).
SEO	Reporting	Provide the following information: 1. The nature of the incident, 2. The substances involved and an estimation of the quantity released and their possible acute effect on persons & the environment & data needed to assess these effects, 3. Initial measures to minimise impacts, 4. Causes of the incident, whether direct or indirect including equipment, technology, system or management failure, and 5. Measures taken & to be taken to avoid a recurrence of such incident.
SEO	Reporting	Submit an action plan within 14 days, or a shorter period of time, if specified by the Regional Director (DWS).

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SEO	Reporting	The action plan must include the following information: 1. A detailed time schedule of measures taken to: 1.1 Correct the impacts resulting from the incident; 1.2 Prevent the incident from causing any further impact; and 1.3 Prevent a recurrence of a similar incident.
Progress reporting		
SEO	Revising Procedures	Identify methods for preventing the incident from re-occurring and revise method statements and/or procedures for implementing as early as possible.
SEO	Training	Conduct either a toolbox talk or environmental awareness training/re-induction to the all employees and include additional mitigations to avoid a re-occurrence. ● Keep the program, including a signed attendance register, in the on-site environmental file.

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Table 28: Spillage on land.

ACTION TO BE TAKEN		
Personnel	**Responsibility**	**Action**
Employee	Reporting	The person responsible for, or who discovers, a hazardous substance spill must report the incident to their immediate Supervisor.
Supervisor	Reporting	Report the incident to the SEO, HSO and Resident Engineer. ● Note that the SEO will take control of all relevant actions once he/she arrives on the scene.
HSO	Reporting	Report the incident to an Inspector (designated under section 28 of the Occupational Health & Safety Act, 1993) within the prescribed period and manner.
Supervisor / SEO	Initial investigation	Determine the extent of the spill, i.e. its boundaries, by observing for the following: ● Any visual indication of pollution, ● Any odours or emissions detected, ● Any indication of the source of pollution, ● Any sign of damage to the natural system. The Supervisor / SEO should provide lighting if working at night.
Supervisor / SEO	Co-ordination	Sound an alarm/whistle. ● The designated response team consisting of area specific personal and including the environmental leader, will congregate at the spill kit. ● All other employees who do not have specific duties to perform are to evacuate the affected area to a location designated by the Supervisor / SEO.
Supervisor / SEO	Co-ordination	Minimise the effects of the incident on the environment and persons by removing the source of the spill at least 100m away from the watercourse or cut-off the supply of the spill if the source is not moveable.
Supervisor / ECO	Co-ordination	Contain the spill to a confined area to prevent the spreading of the spilled chemical or substance. ● Use sand bags or construct earth berms. ● If relevant, close off all storm water drains with absorbent mats. ● Do not wash the spill with water as it will cause the spill to spread.

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Supervisor / ECO	Co-ordination	Secure the affected area with danger tape.
HSO	Co-ordination	The site shall not be disturbed and no article or substance may be removed (without the consent of the inspector) if there is or likely to be a death, or if there is a loss of limb or part of a limb. However, action can be taken to prevent a further accident, to remove the injured or dead or rescue persons from danger.
Engineer / SEO / HSO	Decision-making	The Engineer will assess the situation in consultation with the SEO and HSO and act as required. ● The risk involved shall be assessed before anyone approaches the scene of the incident. ● The HSO will consult the MSDSs. ● The scale of the spill will dictate whether the spill will be cleaned up by using the on-site spill kit and in the prescribed manner, or by contacting a Spill Clean-Up Service Provider for assistance. ● The SEO will take photographs of the affected area. ● No person shall be allowed to approach a spill unless he/she is equipped with the personal protective clothing.
SEO	Directions	If a Spill Clean-Up Service Provider is used, assist the emergency services by clearly marking the route to be taken to the spill site.
REMOVAL AND REMEDIATION MEASURES TO BE IMPLEMENTED		
Personnel	**Responsibility**	**Action**
SEO	Co-ordination	Remove the contaminated soil to the depth of penetration using a spade or shovel.
SEO	Co-ordination	Temporarily store the contaminant in the designated hazardous waste facility at the construction camp.
SEO	Co-ordination	Contact a licensed hazardous waste service provider to collect and transport the waste to a licensed hazardous waste landfill site.
SEO	Co-ordination	Rehabilitate the area cleared of hazardous waste by replacing the topsoil and planting indigenous plants.
SEO	Monitoring	Immediately follow any known spillage of toxic substances with monitoring of the receiving environment, and public health if necessary.

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SEO	Monitoring	Take photographs of the affected area during rehabilitation.
INTERNAL & EXTERNAL COMMUNICATION PLAN		
Personnel	**Responsibility**	**Action**
Employee	Reporting	The person responsible for, or who discovers, a hazardous waste spill must report the incident to their immediate Supervisor.
Supervisor	Reporting	Report the incident to the SEO, HSO and Resident Engineer.
HSO	Reporting	Report the incident to an Inspector (designated under section 28 of the Occupational Health & Safety Act, 1993) within the prescribed period and manner.
SEO	Reporting	Report the incident to the Site Agent and/or Manager and the ECO.
SEO	Reporting	If the spill is too big for the spill kit, contact a Spill Clean-Up Service Provider.
SEO	Reporting	Report the incident to the following authorities. 1. DFFE (Director General), 2. SA Police Services, 3. Fire Department, 4. DFFE (Provincial Head of Department) or Local Municipality, and 5. Any persons whose health may be affected by the incident.
SEO	Reporting	Provide the following information: 1. The nature of the incident, 2. Any risks posed by the incident to public health, safety & property, 3. the toxicity of substances or by-products released by the incident, and 4. Any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment.
ECO / Applicant / Site Agent / RE	Reporting	If the nature of the impact constitutes a gross violation of the EA or any legislation: ● The ECO must report the incident to the applicant. ● The applicant must report the incident to the Local Municipality, DFFE, and DWS.

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		● The Site Agent and/or Manager must report the incident to their Environmental Group Manager, Divisional MD and CEO. ● The Resident Engineer must report the incident to his Superiors.
PRESCRIBED REPORTING PROCEDURE		
Incident recording		
Personnel	**Responsibility**	**Action**
SEO	Investigation	Conduct an investigation, including interviews, and record all details of the incident. ● The cause must be investigated.
SEO	Reporting	Complete an Environmental Incident Report and forward it to all key project personnel, with the exception of the Emergency Services.
SEO	Reporting	Within 14 days of the incident, report the incident to the following authorities. 1. DFFE (Director General) 2. DFFE (Provincial Head of Department), and 3. Local Municipality.
SEO	Reporting	Provide the following information: 1. The nature of the incident, 2. The substances involved and an estimation of the quantity released and their possible acute effect on persons & the environment & data needed to assess these effects, 3. Initial measures to minimise impacts, 4. Causes of the incident, whether direct or indirect including equipment, technology, system or management failure, and 5. Measures taken & to be taken to avoid a recurrence of such incident.
Progress reporting		
SEO	Revising Procedures	Identify methods for preventing the incident from re-occurring and revise method statements and/or procedures for implementing as early as possible.
SEO	Training	Conduct either a toolbox talk or environmental awareness training/re-induction to the employee(s) responsible for the spill and include additional mitigations to avoid a re-occurrence.

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		● Keep the program, including a signed attendance register, in the on-site environmental file.

Table 29: Fire event.

ACTION TO BE TAKEN		
Personnel	**Responsibility**	**Action**
Employee	Reporting	The person who starts or discovers a fire must report it to their immediate Supervisor.
Supervisor	Reporting	Report the incident to the SEO, HSO and Resident Engineer. ● Note that the SEO will take over co-ordination of all relevant actions once he/she arrives on the scene.
SEO	Reporting	If there is potential for a fire to spread and endanger life, property or the environment, alert the landowner and Fire Department.
Land Owner	Reporting	Alert the owners of adjacent land.
HSO	Reporting	Report the incident to an Inspector (designated under section 28 of the Occupational Health & Safety Act, 1993) within the prescribed period and manner.
Supervisor / SEO	Co-ordination	Sound an alarm/whistle. ● The designated response team consisting of area specific personnel and including the environmental leader, will congregate at the fire-fighting equipment. ● All other employees who do not have specific duties to perform are to evacuate the affected area to a location designated by the Supervisor / SEO.
SEO	Directions	Assist the Fire Department by clearly marking the route to be taken to the fire.
SEO	Co-ordination	Extinguish the fire or assist in doing so.
SEO	Co-ordination	Stop the spread of the fire.
SEO	Co-ordination	Provide assistance to a fire protection officer or forest officer in the event that they take control over the fighting of a fire.
HSO	Co-ordination	The site shall not be disturbed and no article or substance may be removed (without the consent of the inspector) if there is or likely to

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		be a death, or if there is a loss of limb or part of a limb. However, action can be taken to prevent a further accident, to remove the injured or dead or rescue persons from danger.
REMEDIATION MEASURES TO BE IMPLEMENTED		
Personnel	**Responsibility**	**Action**
SEO	Assessment	Immediately follow any fire with an assessment of the effects on the environment, public health, safety and property.
SEO	Search	Search the scorched earth for reptiles and other creatures that can be rehabilitated and saved. ● Use only a licensed rehabilitation facility.
SEO	Monitoring	Monitor for signs of erosion after the first few rains and new flush. ● Manage erosion resulting from a loss in plant basal or aerial cover. ● Ensure that the control measures are not destructive.
SEO	Managing	No Vehicles or plant are permitted to drive through burnt areas.
INTERNAL & EXTERNAL COMMUNICATION PLAN		
Personnel	**Responsibility**	**Action**
Employee	Reporting	The person who starts or discovers a fire must report the incident to their immediate Supervisor.
Supervisor	Reporting	Report the incident to the SEO, HSO and Resident Engineer. ● Note that the SEO will take control over all relevant actions once he/she arrives on the scene.
SEO	Reporting	Report the incident to the Site Agent and/or Manager and the ECO.
SEO	Reporting	If there is potential for a fire to spread and endanger life, property or the environment, alert the landowner and Fire Department.
Land Owner	Reporting	Alert the owners of adjacent land.
HSO	Reporting	Report the incident to an Inspector (designated under section 28 of the Occupational Health & Safety Act, 1993) within the prescribed period and manner.

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SEO	Reporting	Report the incident to the following authorities. 1. DFFE (Director General), 2. SA Police Services, 3. Fire Department, 4. DFFE (Provincial Head of Department) or Local Municipality, and 5. Any persons whose health may be affected by the incident.
SEO	Reporting	Provide the following information: 1. The nature of the incident, 2. Any risks posed by the incident to public health, safety & property, 3. the toxicity of substances or by-products released by the incident, and 4. any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment.
ECO / Applicant / Site Agent / RE	Reporting	If the nature of the impact constitutes a gross violation of the EA or any legislation: ● The ECO must report the incident to the applicant. ● The applicant must report the incident to the Local Municipality, DFFE, and DWS. ● The Site Agent and / or Manager must report the incident to their Environmental Group Manager, Divisional MD and CEO. ● The Resident Engineer must report the incident to his Superiors.
PRESCRIBED REPORTING PROCEDURE		
Incident recording		
Personnel	**Responsibility**	**Action**
SEO	Investigation	Conduct an investigation, including interviews, and record all details of the incident. ● The cause must be investigated.
SEO	Reporting	Complete an Environmental Incident Report and forward it to all key project personnel, with the exception of the Emergency Services.
SEO	Reporting	Within 14 days of the incident, report the incident to the following authorities. 1. DFFE (Director General), 2. DFFE (Provincial Head of Department), and 3. Local Municipality.

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SEO	Reporting	Provide the following information: 1. The nature of the incident, 2. The substances involved and an estimation of the quantity released and their possible acute effect on persons & the environment & data needed to assess these effects, 3. Initial measures to minimise impacts, 4. Causes of the incident, whether direct or indirect including equipment, technology, system or management failure, and 5. Measures taken & to be taken to avoid a recurrence of such incident.
Progress reporting		
SEO	Revising Procedures	Identify methods for preventing the incident from re-occurring and revise method statements and/or procedures for implementing as early as possible.
SEO	Training	Conduct either a toolbox talk or environmental awareness training/re-induction to the employee(s) responsible for the spill and include additional mitigations to avoid a re-occurrence. ● Keep the program, including a signed attendance register, in the on-site environmental file.

9.3.3 Incident Report Template

This form provides a template for the emergency incident report required in terms of section 30(5) of the National Environmental Management Act (Act No. 107 of 1998) (as amended) (hereinafter "NEMA") in which the responsible person or, where the incident occurred in the course of that person´s employment, his or her employer, must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including: (a) the nature of the incident; (b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects; (c) initial measures taken to minimise impacts; (d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and (e) measures taken and to be taken to avoid a recurrence of such incident.

In terms of section 30(1)(a) of NEMA, an "incident" means an unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property. In line with section 24 of the Constitution of the Republic of South Africa (Act No. 108 of 1996), "serious" is taken to be a measure of the impact of an incident where such an

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incident has had, could have had, is having, or will have a negative impact on human health or well-being.

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[Insert Name of Company]	**Document type:**	**Incident Report**	
	Title for the incident:		
	Date of the incident:		
Reference:		**Initial submission date:**	
Revision No.:		**Compiled by:**	
1. RESPONSIBLE PERSON			
In terms of section 30(1)(b) of NEMA, the "responsible person" includes any person who: (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control of any hazardous substance involved in the incident at the time of the incident			
1.1 Name:		**1.2 Designation:**	
1.3 Postal address:		**1.4 Physical address:**	
1.5 Telephone (B/H):		**1.6 Telephone (A/H):**	
1.7 Fax:		**1.8 Email:**	
1.9 Nature of business:			
2. EMERGENCY INCIDENT SUMMARY INFORMATION			
Mark the appropriate boxes			

2.1 Fire:		**2.2 Spill:**		**2.3 Explosion:**		**2.4 Gaseous explosion:**	
2.5 Injuries:		**2.6 Reportable injuries:**		**2.7 Hospitalisation:**		**2.8 Fatalities:**	
2.9 Open water impacts:		**2.10 Groundwater impacts:**		**2.11 Atmospheric impacts:**		**2.12 Soil impacts:**	
2.13 Own emergency response involved:		**2.14 Fire prevention services involved:**		**2.15 Government hazardous materials emergency response involved:**		**2.16 More than 1 governmental emergency response service involved:**	
2.17 Emission of non-toxic substances at low concentrations:		**2.18 Emission of non-toxic substances at high concentrations:**		**2.19 Emission of toxic substances at low concentrations:**		**2.20 Emission of toxic substances at high concentrations:**	
2.21 No evacuation required:		**2.22 Immediate area evacuated:**		**2.23 Immediate surrounds evacuated:**		**2.24 Evacuation of the general public:**	
25. Others:							

3. INITIAL INCIDENT REPORT				
In terms of section 30(3) of NEMA, the responsible person or, where the incident occurred in the course of that person´s employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available: (a) the nature of the incident; (b) any risks posed by the incident to public health, safety and property; (c) the toxicity of substances or by-products released by the incident; and (d) any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to: (i) the Director General; (ii) the South African Police Services and the relevant fire prevention service; (iii) the relevant provincial head of department or municipality; and (iv) all persons whose health may be affected by the incident.				
3.1 Description	3.2 Date:	3.3 Time:	3.4 Medium:	3.5. Name and contact details:

Relevant fire prevention service: (in case of fire)	[submission date]	[submission time]	[Fax, phone, SMS, letter, etc.)	[Who was the report made to?]	
LOCAL:					
PROVINCIAL: (Those that deal with Environmental issues)					
DIRECTOR GENERAL: (DFFE)					
Any other Director General of National Department, E.g. DWS					

4. INCIDENT DETAILS

In terms of NEMA section 30(5)(a) and (d), the responsible person must report on the nature of the incident as well as the causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure

4.1 Location of the incident	[Provide physical address of the location where the incident happened including the GPS co-ordinates]		
4.2 Incident start date and time:		**4.3 Incident duration:**	
4.4 Duration of exposure:			
4.5. Incident description:			
Background of the incident:			

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Operation:					
Incident type:					
Root cause of the incident:					
Contributory factors to the incident:					
Conclusion:					
4.6 Wind speed and direction		**4.7 Ambient air temperature**			
4.8 Weather conditions		**4.9 Other relevant meteorological conditions**			
5. POLLUTANTS RELEASED DURING INCIDENT					
In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity.					
List all the pollutants directly released during the incident (i.e. exclude those pollutants that resulted from mitigation measures, e.g. flaring, treatment, dilution etc.)					
5.6 Substance or mixture of substances	**5.2 Reference Number**	**5.3 Phase eg solid, liquid or gas**	**5.4 Total Quantity emitted/ released**	**5.5 Units eg Kg, L etc**	**5.6 Nature of emission/ release**

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[The namerecognisedby any nationalor internationallyrecognisedchemicalreferencingsystem]	[Referencetoany nationalor internationallyrecognisedchemicalreferencingsystem]	[solid,semi-solid,liquid orgas]	[the totalmeasuredor estimatedquantityreleasedinto the environment]	[the unit ofmeasure inrespect tothe quantity]	[Emittedfrom truck,undergroundpipe, stack,etc.]
6. SECONDARY POLLUTANTS RESULTING FROM INCIDENT					
In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity released.					
List all the pollutants that resulted from mitigation measures, e.g. flaring, treatment, dilution etc.					
6.1 Substance or mixture of substances	**6.2 Reference Number**	**6.3 Phase**	**6.4 Total Quantity emitted/released**	**6.5 Unit**	**Nature of emission**

[The name recognised by any national or internationally recognised chemical referencing system]	Reference to any national or internationally recognised chemical referencing system]	[solid, semi-solid, liquid or gas]	[the total measured or estimated quantity released into the environment]	[the unit of measure in respect to the quantity]	[Emitted from truck, underground pipe, stack, etc.]

7. POLLUTANT CONCENTRATIONS					
In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity released.					
List all the pollutants detailed in previous section:					
7.1 Substance or mixture of substances	**7.2 Reference Number**	**7.3 Estimated pollutant concentration on different radius**			
		7.3.110m	**7.3.2100m**	**7.3.3500m**	**7.3.4>2000m**

[The name recognised by any national or internationally recognised chemical referencing system]		[Reference to any national or internationally recognised chemical referencing system]	[estimate the concentration of the pollutant in water, soil and/ or air within a 10m radius of the epicentre of the incident] [provide the units used in a case of estimating concentration (e.g. ppm]		[estimate the concentration of the pollutant in water, soil and/ or air within a 100m radius of the epicentre of the incident] [provide the units used in a case of estimating concentration (e.g. ppm)]	[estimate the concentration of the pollutant in water, soil and/or air within a 500m radius of the epicentre of the incident] [provide the units used in a case of estimating concentration (e.g. ppm)]	[estimate the concentration of the pollutant in water, soil and/or air within a > 2000 m radius of the epicentre of the incident] [provide the units used in a case of estimating concentration (e.g. ppm)]
NOTE: Include 1. Concentration at the plume and 2. Concentration that was falling on the ground.							
8. INCIDENT IMPACT							
In terms of NEMA section 30(5)(b), the responsible person must report on possible acute effects on persons and the environment and the responsible must provide data needed to assess these effects;							
8.1 Minor injuries		[Describe the number and types of any minor injuries that resulted from the incident or efforts to manage the incident or the impacts thereof]					

8.2 Reportable injuries	[Describe the number and types of any injuries requiring statutory reporting that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.3 Hospitalisation	[Describe the number and types of any injuries that required professional medical care that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.4 Fatalities	[Describe the number and cause of any fatalities that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.5 Biological impacts	[Describe any impacts on biological life, other than human life, e.g. fish kills, plant mortality, etc.]
8.6 Impact area	[Describe the area possibly affected by the incident or the impacts thereof including: (i) size of the area; (ii) socio-economic context; (iii) population density; (iv) sensitive environments (if any), etc.]
8.7 Data	Attach relevant impact reports, medical reports, death certificates, post mortem reports, environmental monitoring data, etc. as Annexes C1, C2,… to this report
9. EXISTING PREVENTION PROCEDURES AND/OR SYSTEMS	
9.1 Foresight	[Briefly describe whether the incident could have, or had, been foreseen, e.g. was it included in any environmental impact assessment, risk assessment, health and safety plan, etc.]
9.2 Procedures and/or systems	Attach any relevant safety, health and environmental plans (including any statutory planning requirements) that detail what actions should be taken in the event of the incident that is the subject of this report
9.3 Procedure and/or systems failures	[Describe any failures or shortfalls in procedures and/or systems that may have contributed to the incident] All procedures and checklist in place and signed off.
9.4 Technical measures	[Describe any technical measures, equipment, 'fail-safe' devices, etc. that are in place to prevent the occurrence of the incident] Communications & discussions in place.

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9.5 Technical failure	[Describe any failures of technical measures, equipment, 'fail-safe' devices, etc. that are in place to prevent the occurrence of the incident]		
10. INITIAL INCIDENT MANAGEMENT			
In terms of NEMA section 30(5)(c), the responsible person must report on initial measures taken to minimise impacts.			
10.1 Evacuation	[Describe any evacuation activities including information on the number of people evacuated and whether these people were staff or otherwise]		
10.2 Technical measures	[Describe all technical measures taken to address the incident]		
10.3 Mitigation measures	[Describe all measures taken to minimize the impact] SOPEP gear activated		
10.4 Emergency Services	[Describe any governmental emergency services involvement] SAMSA/TNPA advised		
11. CLEANUP AND/OR DECONTAMINATION			
In terms of NEMA section 30(5)(c), the responsible person must report on initial measures taken to minimise impacts.			
11.1 Cleanup and/or decontamination	[Report on initial cleanup and or decontamination (remediation) measures taken to minimise the impact of the incident on human health and the environment. Provide copy of safe disposal certificate (if any) and details of the company that undertook the cleanup]		
11.2 Permissions and Instructions			
Provide details of any permission and/or instructions received from any organ of state during initial incident management, cleanup and/or decontamination			
In terms of NEMA section 30(5)(c), the responsible person must report on initial measures taken to minimise impacts.			
11.3 Type	11.4 Statute	11.5 Issued By	11.6 Name and contact details

[Describe the nature or type of permission or instruction]	[Provide a reference to the legal mandate for the permission or instruction]	[Provide contact details for the permitting or instructing authority]	[provide a summary of the activities carried out in terms of the permission or instruction]
12. MITIGATION MEASURES			
In terms of NEMA section 30(5)(e), the responsible person must report on measures taken and to be taken to avoid a recurrence of such an incident.			
12.1 Measure	**12.2 Objective**	**12.3 Cost**	**12.4 Timing**
[Briefly describe each of the measures taken, and to be taken, to avoid a recurrence of such incident]	[Briefly describe the objective of the measure, i.e. the desired outcome of the measure]	[Estimate the cost of the measure in terms of capital costs and/or recurrent costs]	[Provide information on the timing for the full implementation of the measure]
13. AUTHORISATIONS			
Provide details on all authorisations (including permits, licenses, certificates, etc.) in respect of the activity to which this incident relates.			
13.1 Type	**13.2 Statute**	**13.3 Issued By**	**13.4 Issue & Expiry Date**
[Describe the nature or type of authorisation, e.g. Registration Certificate]	[Provide the reference for the authorisation, e.g. section X of the National Environmental Management Act (Act No. 107 of 1989)]	[Provide contact details for the issuing authority]	[provide the date of issue and expiry]
14. HISTORY			

Provide details of all similar incidents involving the responsible person in the past (i.e. from 1998). Similar incidents include those that: (i) involved similar circumstances; (ii) involved similar emissions; (iii) involved similar personnel; and/or (iv) involved similar impacts.			
14.1 Incident title	**14.2 Report reference**	**14.3 Date of incident**	**14.4 Summary of event**
[Provide the title used in the relevant emergency incident report]	[Provide the reference in respect of the relevant emergency incident report]	[Date of incident]	[Provide a summary of the event]
Signed by, or as a mandated signatory for, the responsible person:		Date:	

APPENDIX 1: List of affected people as results of the incident				
NAME	**ADDRESS**	**PHONE**	**FAULT**	**REMARKS**

APPENDIX 2 Layout map of the area likely to be affected or affected as a result of the incident

DISCLAIMER **Any other information not covered in the reporting template must be included.**
CAUTION
In terms of section 30 (11) of NEMA as amended, you are further advised that failure to comply with subsections (3), (4) and (5) above constitutes an offence and you may be liable on conviction to a fine not exceeding R5 million or to imprisonment for a period not exceeding 5 years, and in the case of a second or subsequent conviction to a fine not exceeding R10 million or to imprisonment for a period not exceeding 10 years, and in both instances to both such fine and such imprisonment.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat) & S.D. MacGregor (MSc., Pr.Sci.Nat., Reg. EAP.)
Reg: 2006/023163/23