

REPORT

DEVELOPMENT OF A 40MW PHOTOVOLTAIC PLANT ACROSS SITES 2B, 3B, 3C, 4B AND 5B ASSOCIATED WITH THE TUBATSE FERROCHROME PLANT, STEELPOORT, FETAKGOMO TUBATSE LOCAL MUNICIPALITY

Environmental Management Programme

Client: TFC Solar (Pty) Ltd

LEDET Reference 12/1/1/9/2-GS88

Status: Draft/01

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Project related

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Acronyms

Acronym	Acronym description
AC	Alternating Current
AIP	Alien Invasive Plants
BBBEE	Broad-Based Black Economic Empowerment
BESS	Battery Energy Storage System
CLO	Community Liaison Officer
DC	Direct Current
dEC	Developers Environmental Coordinator
dEO	Designated Environmental Officer
DFFE	Department of Forestry, Fisheries and the Environment
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EM	Environmental Manager
EMPr	Environmental Management Programme
EO	Environmental Officer
FGTM	Fetakgomo Tubatse Local Municipality
GA	General Authorisation
I&APs	Interested and Affected Parties
KPI's	Key Performance Indicator's
LEDET	Limpopo Department of Economic Development, Environment and Tourism
MSDS	Material Safety Data Sheets
NEMA	National Environmental Management Act, 1998 (Act No, 107 of 1998) (as amended)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) as amended
NHRA	National Heritage Resources Act
NWA	National Water Act, 1998 (Act No. 36 of 1998) (as amended)
MW	Megawatt
PM	Project Manager
PV	Photovoltaic
RoW	Right of Way

SADC	Southern African Development Community
SDC	Safe Disposal Certificates
SAHRA	South African Heritage Resource Agency
SARTSM	South African Road Traffic Signs Manual
SDGs	Sustainable Development Goals
SDM	Sekhukhune District Municipality
SEMA	Suite of Environmental Management Acts
SPV	Special Purpose Vehicle
SWMP	Stormwater Management Plan
TFC	Tubatse Ferrochrome

Glossary

Glossary Term	Glossary Text
Accident	An unfortunate incident that happens unexpectedly and unintentionally, typically resulting in damage or injury.
Activity (Development)	An action either planned or existing that may result in environmental impacts through pollution or resource use. For the purpose of this report, the terms 'activity' and 'development' are freely interchanged.
Alien Species	(a) A species that is not an indigenous species; or (b) an indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention as set out in the National Environmental Management: Biodiversity Act (Act No. 10 of 2004).
Applicant	The project proponent or Developer responsible for submitting an environmental application to the relevant environmental authority for environmental authorisation.
Buffer	A buffer is seen as an area that protects adjacent communities from unfavourable conditions. A buffer zone is usually an artificially imposed zone included in a management plan.
Building and Demolition Waste	Building and demolition waste means waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition.
Client's Project Manager	The person appointed by the client who is responsible for the construction site as a whole.
Contractor	Companies appointed on behalf of the Developer to undertake activities, as well as their sub-contractors and suppliers.
Construction Project Management Team	The team consists of a Project Manager as well as a Designated Environmental Officer.
Culvert	A pipe or box intended to convey water under a highway, railroad, canal, or similar facility.
Degradation	The lowering of the quality of the environment through human activities or other activities e.g. river degradation, soil degradation.
Domestic Waste	Domestic waste means waste, excluding hazardous waste, that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes.
Emergency	An undesired event that results in a significant environmental impact and requires the notification of the relevant statutory body such as a local or provincial authority.
Environment	In terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998)(as amended), "Environment" means the surroundings within which humans exist and that are made up of: <ul style="list-style-type: none"> (i) the land, water and atmosphere of the earth;

		<ul style="list-style-type: none"> (ii) micro-organisms, plants and animal life; (iii) any part or combination of (i) of (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Aspect		An environmental aspect is any component of a Contractor's construction activity or process that is likely to interact with the environment.
Environmental Control Officer		An individual appointed through the Developer to be present on-site to act on behalf of the Developer in matters concerning the implementation and day to day monitoring of the EMPr and conditions stipulated by the authorities.
Environmental Impact		A change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.
Environmental Management Programme		A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts, and, limiting or preventing negative environmental impacts are implemented during the life-cycle of a project. It is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction and operation, long-term maintenance, and, decommissioning of a project are prevented and that positive benefits of the projects are enhanced.
General Waste		General waste means waste that does not pose an immediate hazard or threat to health or to the environment, and includes - <ul style="list-style-type: none"> (i) domestic waste; (ii) building and demolition waste; (iii) business waste; and (iv) inert waste.
General Landfill Site	Waste	A waste disposal site that is designed, managed and permitted to allow for the disposal of general waste.
Hazardous Landfill Site	Waste	A waste disposal site that is designed, managed and permitted to allow for the disposal of hazardous waste.
Impact		Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.
Mitigation		Measures designed to avoid, reduce or offset adverse impacts.
Principal Agent		The principal agent is appointed by the Developer to oversee the overall project management and the management of the professional project team.
Re-use		To utilise articles from the waste stream again for a similar or a different purpose without changing the form of properties of the articles.
Recycle		A process where waste is reclaimed for further use, this involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material.
Rehabilitation		Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re-vegetation of a disturbed area and the insurance of a stable land surface. Re-vegetation must aim to accelerate the natural succession

processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

Road Reserve A corridor of land, defined by co-ordinates and proclamation, within which the road, including access intersections or interchanges, is situated. A road reserve may, or may not, be bounded by a fence.

Safety, Health and Environmental (SHE) Officer The SHE Officer is a Contractor representative, responsible for the safety, health and environmental aspects during construction. The SHE Officer will be responsible for the day-to-day monitoring of the EMPr and Health and Safety Plan (maybe identified as the dEO).

Waste Waste means any substance, whether or not that substance can be reduced, re-used, recycled and recovered -

- (i) that is surplus, unwanted, rejected, discarded, abandoned or disposed of;
- (ii) which the generator has no further use of for the purposes of production;
- (iii) that must be treated or disposed of; or
- (iv) that is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but—
 - o a by-product is not considered waste; and
 - o any portion of waste, once re-used, recycled and recovered, ceases to be waste.

Waste Facility Disposal Waste disposal facility means any site or premise used for the accumulation of waste with the purpose of disposing of that waste at that site or on that premises.

Workforce The entire project team including people employed by the Principal Agent or the Contractor, persons involved in activities related to the project, or person present at or visiting the construction area, including permanent contactors and casual labour.

1 Introduction

Samancor Chrome Ltd's core business is the mining and smelting of chrome ore. With an annual production capacity of 2.4 million tons of ferrochrome, Samancor Chrome is one of the largest integrated ferrochrome producers in the world. The ferrochrome produced is used in areas of the stainless-steel smelting process. Samancor Chrome has been, and continues to be, a major player in ferrochromium production. The company's total chromite resources exceed 900 million tons and are expected to support current mining activity for well over 100 years at the current rate of extraction. Some ores and concentrates are exported, but main allotments are destined for conversion into ferrochrome at the alloy plants.

The Tubatse Ferrochrome (TFC) Plant was initially built as a three-furnace operation in 1975 as a joint venture between Gencor Ltd and Union Carbide Inc. (USA). In the same year, the Union Carbide Inc. shareholding was taken over by Samancor Chrome, and in 1989, Samancor Chrome acquired the Gencor Ltd shareholding. During the years 1989 – 1990, the plant was expanded to five furnaces with the sixth furnace being built in 1996. The plant is situated in Steelpoort, Limpopo Province and is in close proximity to the Eastern Chrome Mines. The core business of the operation is the production of charge chrome using six Submerged-Arc Furnaces, one metal recovery plant, and a Pellet and Sintering Plant.

The rising electricity tariffs in South Africa, combined with the increasingly severe load shedding patterns experienced across the country, has a negative impact on the production and revenue of Samancor Chrome business. Climate change is also a concern for Samancor Chrome referring to the emissions of greenhouse gases (GHG) in the use of fossil fuel electricity. This has motivated Samancor Chrome to consider renewable energy generation at their smelter plants. Implementing solar Photovoltaic (PV) generation will result in improved availability of supply and reduced utility bills as well as going 'green' in terms of environmental considerations.

In 2021, a Special Purpose Vehicle (SPV), TFC Solar (Pty) Ltd (hereafter referred to as TFC Solar, proposed the development of a Solar PV facility of up to 100 Megawatt (MW) generation capacity over five (5) sites: 1, 2, 3, 4 and 5. These five (5) sites were subject to an Environmental Impact Assessment (EIA) and an Environmental Authorisation (EA) was granted on 25 April 2022 from the Department of Forestry, Fisheries and the Environment (DFFE) (DFFE Ref: 14/12/16/3/3/2/2079). A General Authorisation was received from the Department of Water and Sanitation (DWS) on 28 March 2022. Site 1 is no longer considered for the Solar PV development.

A total of 60MW output can be achieved from the previously authorised Sites 2 – 5. Additionally, TFC Solar, propose the development of a 40MW Solar PV facility to be developed on Site 2B, 3B, 3C, 4B and 5B (Figure 1-1). All previously authorised Sites 2, 3, 4 and 5 as well as new Sites 2B, 3B, 3C, 4B and 5B would achieve a total of 100MW.

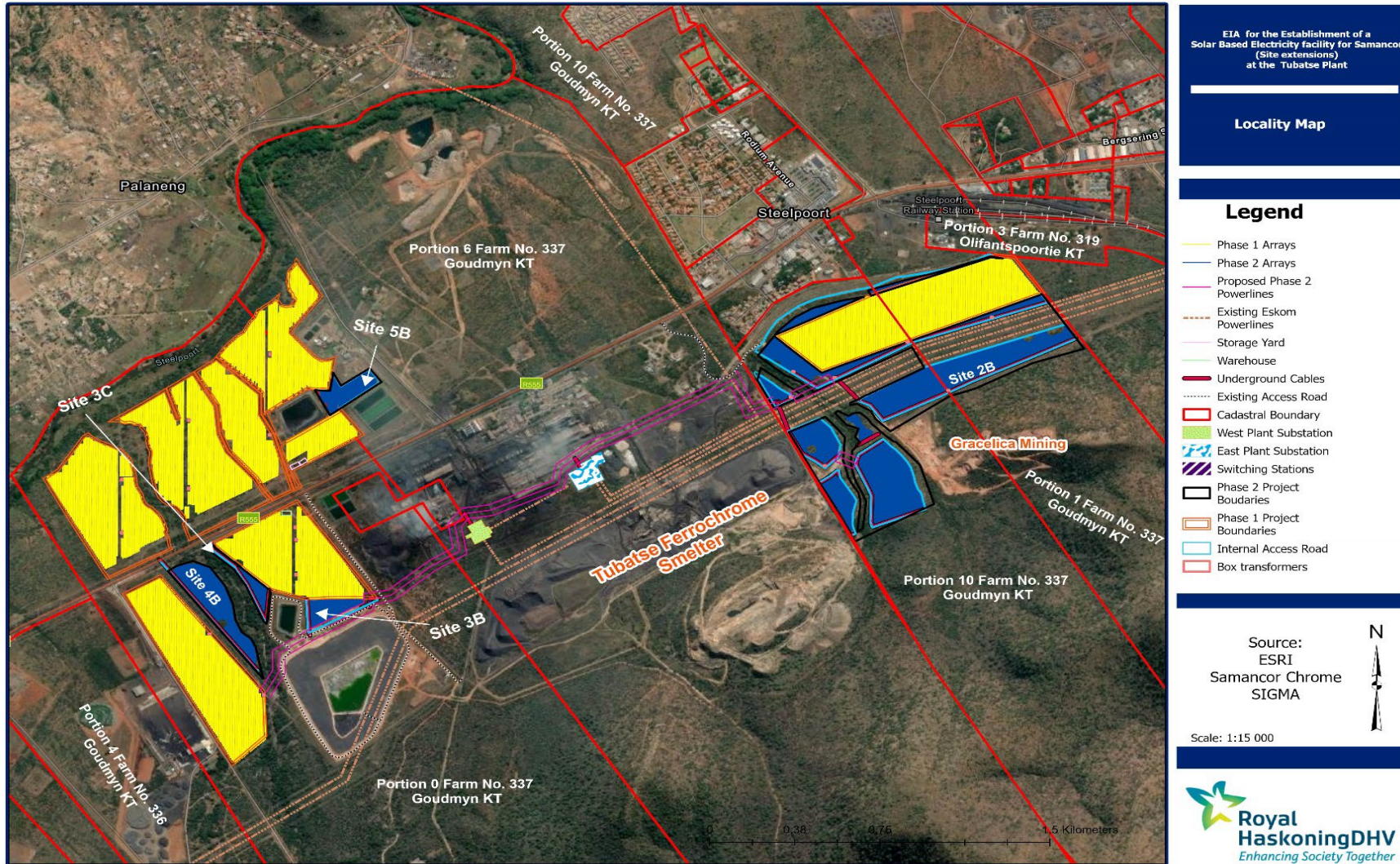


Figure 1-1: Locality map

This Environmental Management Programme (EMPr) has been prepared as part of the EIA to provide specific environmental guidance to the relevant parties for the planning, construction, rehabilitation of the proposed infrastructure with regards to their responsibilities in terms of the environmental specification.

The Competent Authority, being the Limpopo Department of Economic Development, Environment and Tourism (LEDET) requires that an EMPr be submitted in accordance with Section 19 of the EIA Regulations 2014 (as amended). Section 19 should be read in conjunction with Section 24N of the National Environmental Management Act, 1998 (NEMA) (Act No. 107 of 1998) (as amended).

In the context of this project and in most cases, the EMPr is primarily based on the principles of NEMA, which therefore bestows a 'Duty of Care' on those who cause, have caused or may in future cause pollution or degradation of the environment, as per Section 28(1) of the NEMA.

1.1 Purpose of the EMPr

The purpose of the EMPr is to prescribe mitigation and management measures to ensure social and environmental impacts, risks and liabilities identified during the EIA study are effectively managed during the construction phase and to further ensure the enhancement of the positive environmental benefits of the development are achieved.

Therefore, the EMPr specifies the mitigation and management measures to which Samancor Chrome is committed, should the EA be granted, and details how Samancor Chrome and/ or other responsible parties will mobilise organisational capacity and resources to implement these measures.

The EMPr is developed in terms of the Suite of Environmental Management Acts (SEMAs) and enforces that construction activities meet the requirements of existing environmental legislation and good environmental practice in terms of national and international norms and standards.

Core to the purpose of the EMPr is to implement the 'mitigation hierarchy' (DEA et al., 2013¹), which is illustrated in Figure 1-1.

¹ Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. *Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector*. Pretoria.

AVOID or PREVENT Refers to considering options in project location, siting, scale, layout, technology and phasing to avoid impacts on biodiversity, associated ecosystem services, and people. This is the best option, but is not always possible. Where environmental and social factors give rise to unacceptable negative impacts the development should not take place. In such cases it is unlikely to be possible or appropriate to rely on the latter steps in the mitigation.

MINIMISE Refers to considering alternatives in the project location, siting, scale, layout, technology and phasing that would minimise impacts on biodiversity and ecosystem services. In cases where there are environmental and social constraints every effort should be made to minimise impacts.

REHABILITATE Refers to rehabilitation of areas where impacts are unavoidable and measures are provided to return impacted areas to near-natural state or an agreed land use after construction activities. Although rehabilitation may fall short of replicating the diversity and complexity of a natural system.

OFFSET Refers to measures over and above rehabilitation to compensate for the residual negative effects on biodiversity, after every effort has been made to minimise and then rehabilitate impacts. Biodiversity offsets can provide a mechanism to compensate for significant residual impacts on biodiversity.

Figure 1-2: Mitigation hierarchy

1.2 Objectives of the EMPr

The EMPr has the following objectives:

- To outline mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the proposed project.
- To identify measures that could optimise beneficial impacts.
- To establish a method of monitoring and auditing environmental management practices during all phases of development.
- Specify time periods within which the measures contemplated in the EMPr must be implemented.
- To provide an environmental awareness plan.

It must be noted that the EMPr is a dynamic document that can be periodically reviewed and updated as required. The approach adopted for this EMPr is derived from the Deming Cycle (Figure 1-3), a cycle of continuous improvement that entails the reiterative actions of plan, do, check, act, and critically to then return to the planning phase. When applicable, changes to the EMPr are to be approved in accordance with legislative requirements.

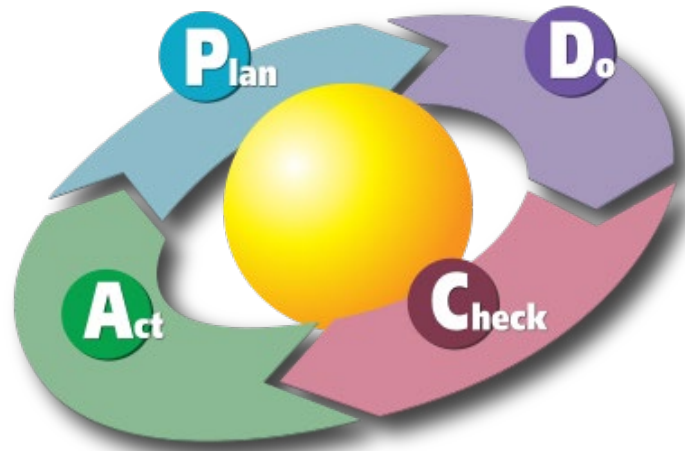


Figure 1-3: Deming cycle of continuous improvement

1.3 Scope of the EMPr

In accordance with the requirements of the NEMA, this EMPr is to be implemented by the Developer as well as any employee, contractor, agent, or sub-contractor appointed to act on behalf of the Developer in the execution of the project, in order to ensure environmental compliance on-site.

The specifications outlined in this EMPr are thus applicable to all activities undertaken by the Developer as well as their appointed contractors and all persons involved in the execution of the works, including sub-contractors, the workforce, suppliers, and volunteers, for the duration of construction, operation and future maintenance.

1.4 Structure of the EMPr

The EMPr provides proposed mitigation and management measures for the following phases of the project (Table 1-1).

Table 1-1: Different Phases of the project construction

Phase	Description
Pre-Construction (Planning & Design)	This section will provide guidelines on pre-construction activities including site establishment and clearance; environmental induction and training and awareness; site access and health and safety.
Construction	This section will provide guidelines on construction methods and considerations.
Operations	This section will provide guidelines on the operational phase.
Post-Construction / Rehabilitation	This section of the EMPr provides management principles for the rehabilitation, maintenance and operational phases of the project. This will include best practice, procedures and responsibilities as required for various associated activities.

The content of this EMPr is consistent with the requirements as set out in Section 19 (Appendix 4) of the EIA Regulations 2014 (as amended) and is cross-referenced as follows (Table 1-2)

Table 1-2: Compliance with Appendix 4 of the EIA Regulations 2014 (as amended)

EMPr Requirements according to Appendix 4 of GN R. 982 (326)	Section in the EMPr & Appendix
(1) An EMPr must comply with section 24N of the Act and include -	
a) Details of – (i) the EAP who prepared the report; and (ii) the expertise of that EAP to prepare an EMPr, including a CV.	Section 1.7 Annexure A
b) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Chapter 2
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.	Section 2.5 Annexure B
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.	Chapter 6, 7, 8, and 9
e) A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d).	Chapter 6, 7, 8, and 9
f) A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (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 (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	Chapter 6, 7, 8, and 9
g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Chapter 6, 7, 8, and 9
h) The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Chapter 6, 7, 8, and 9
i) An indication of the persons who will be responsible for the implementation of the impact management actions.	Chapter 6, 7, 8, and 9

EMPr Requirements according to Appendix 4 of GN R. 982 (326)	Section in the EMPr & Appendix
j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented.	Chapter 6, 7, 8, and 9
k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f).	Chapter 6, 7, 8, and 9
l) A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations.	Chapter 4
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.	Section 5
n) Any specific information that may be required by the competent authority.	N/A
(2) Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply. The generic EMPr is attached with applicable items noted.	Generic Environmental Management Programme for the 33kV Overhead Powerlines (Appendix I of EIAR)

1.5 Applicable Documentation


The following environmental documentation is applicable for the project, and must be read in conjunction with this EMPr:

- Environmental Authorisation – once issued;
- Final Impact Assessment Report for the Development of a 40MW Photovoltaic Plant across sites 2B, 3B, 3C, 4B and 5B associated with the Tubatse Ferrochrome Plant, Steelpoort, Fetakgomo Tubatse Local Municipality; and
- Generic Environmental Management Programme for the 33kV Overhead Powerlines - Development of a 40MW Photovoltaic Plant across sites 2B, 3B, 3C, 4B and 5B associated with the Tubatse Ferrochrome Plant, Steelpoort, Fetakgomo Tubatse Local Municipality.

1.6 Details of Applicant

The Applicant for the project is TFC Solar (Pty) Ltd, a SPV created by Samancor Chrome. The details of the responsible person are listed in Table 1-3 below.

Table 1-3: Applicant details

Applicant	TFC Solar (Pty) Ltd	
Representative	Willem den Heijer	
Physical Address	Block A, Cullinan Place Cullinan Close Morningside, Sandton, 2196	
Telephone	011 245 1000/083 256 9640	
E-mail	Willem.denheijer@samancorcr.com	

Applicant	TFC Solar (Pty) Ltd

1.7 Details of Environmental Assessment Practitioner

The team responsible for the preparation of the EMP is presented in Table 1-4.

Table 1-4: EAP details

Consultant	Royal HaskoningDHV	
Contact Persons	Seshni Govender	Prashika Reddy
Postal Address	PO Box 867, Gallo Manor, 2191	PO Box 867, Gallo Manor, 2191
Telephone	087 352 1592	087 352 1577
E-mail	Seshni.govender@rhdhv.com	prashika.reddy@rhdhv.com
Qualification	BSc (Hons) Environmental Science	BSc (Hons) Geography BSc (Hons) Botany
Expertise	<p>Seshni Govender is an Environmental Consultant with 12 years' experience working on compliance and strategic planning projects across South Africa. She has been involved in numerous Screening Studies, Basic Assessment, Water Use License projects, including complex integrated licensing that requires understanding cumulative environmental impacts.</p> <p>She is a Professional Natural Scientist (132741) with the SACNASP as well as a Registered EAP with EAPASA (2022-6018).</p>	<p>Prashika Reddy is a Senior Environmental Scientist with 23 years' experience in various environmental fields including: EIAs, EMPs, PPP and environmental monitoring and audits. She is/has been part of numerous multi-faceted large-scale projects, including the establishment of linear developments (roads and powerlines), industrial plants, electricity generation plants, mixed-use developments and mining projects.</p> <p>She is a Professional Natural Scientist (400133/10) with the South African Council for Natural Scientific Professions (SACNASP) as well as a Registered EAP with Environmental Assessment Practitioners Association of South Africa (EAPASA) (2019/917).</p>

CVs of the Environmental Team are provided in **Annexure A**.

2 Project Description

2.1 Property Details

Sites 2B, 3B, 3C, and 4B are located to the south of the R555, whilst Site 5B is located to the north of the R555 and to the south of the Steelpoort River, Limpopo Province. The project area falls within the Sekhukhune District Municipality (SDM) and the Fetakgomo Tubatse Local Municipality (FGTM). Small settlements of Pelaneng (located to the north), Stocking, Matholeng and Mohlakwana (located to the east) exist within the project area. The town of Steelpoort is located to the east of the TFC Plant.

The details regarding the proposed sites are provided in Table 2-1 and Table 2-2.

Table 2-1: Property details (PV plant)

Site	Size (ha)	Property Name	SG code	Property Owner	Zoning
2B	47,49	Goudmyn No.337 KT Portion 1	T0KT00000000033700001	Samancor Chrome Ltd	Agriculture/ Mining
		Goudmyn No.337 KT Portion 10	T0KT00000000033700010	Goldbroz Inv Pty Ltd	Possible Agriculture
3B	2,37	Goudmyn No.337 KT Portion 0	T0KT00000000033700000	Samancor Chrome Ltd	Industrial
3C	1,71	Goudmyn No.337 KT Portion 0	T0KT00000000033700000	Samancor Chrome Ltd	Industrial
4B	5,52	Goudmyn No.337 KT Portion 0	T0KT00000000033700000	Samancor Chrome Ltd	Industrial
5B	2,14	Goudmyn No.337 KT Portion 0	T0KT00000000033700000	Samancor Chrome Ltd	Agriculture
		Goudmyn 337 KT Portion 6	T0KT00000000033700006	Samancor Chrome Ltd	Agriculture

Table 2-2: Property details for the associated infrastructure

Component	Property Name	SG code	Owner	Zoning
Powerline	Goudmyn No.337 KT Portion 0	T0KT00000000033700000	Samancor Chrome Ltd	Industrial
	Goudmyn 337 KT Portion 6	T0KT00000000033700006	Samancor Chrome Ltd	Agriculture
	Goudmyn No.337 KT Portion 10	T0KT00000000033700010	Goldbroz Inv Pty Ltd	Possible Agriculture
Internal Access Roads: Site 2B	Goudmyn No.337 KT Portion 10	T0KT00000000033700010	Goldbroz Inv Pty Ltd	Possible Agriculture
	Goudmyn No.337 KT Portion 1	T0KT00000000033700001	Samancor Chrome Ltd	Agriculture/ Mining
Internal Access Roads: Site 3B	Goudmyn No.337 KT Portion 0	T0KT00000000033700000	Samancor Chrome Ltd	Industrial
Internal Access Roads: Site 3C	Goudmyn No.337 KT Portion 0	T0KT00000000033700000	Samancor Chrome Ltd	Industrial

Component	Property Name	SG code	Owner	Zoning
Internal Access Roads: Site 4B	Goudmyn No.337 KT Portion 0	T0KT000000000337000	Samancor Chrome Ltd	Industrial
Internal Access Roads: Site 5B	Goudmyn 337 KT Portion 6	T0KT000000000337006	Samancor Chrome Ltd	Agriculture
Underground Cables: Site 2B	Goudmyn No.337 KT Portion 10	T0KT0000000003370010	Goldbroz Inv Pty Ltd	Possible Agriculture
	Goudmyn No.337 KT Portion 1	T0KT000000000337001	Samancor Chrome Ltd	Agriculture/Minin g
Underground Cables: Site 3B	Goudmyn No.337 KT Portion 0	T0KT000000000337000	Samancor Chrome Ltd	Industrial
Underground Cables: Site 3C	Goudmyn No.337 KT Portion 0	T0KT000000000337000	Samancor Chrome Ltd	Industrial
Underground Cables: Site 4B	Goudmyn No.337 KT Portion 0	T0KT000000000337000	Samancor Chrome Ltd	Industrial
Underground Cables: Site 5B	Goudmyn 337 KT Portion 6	T0KT000000000337006	Samancor Chrome Ltd	Agriculture

2.2 Project Co-ordinates

The corner points of each site (Table 2-3) and internal access roads (Table 2-4) are provided below. The coordinates for the powerline corridor are presented in the Generic EMPr for the development and expansion for overhead electricity transmission and distribution infrastructure (**Appendix H**).

Table 2-3: Site co-ordinates

Site Corner points	Latitude (S)			Longitude (E)		
Site 2B						
1	24°	44'	4.66"	30°	12'	34.26"
2	24°	43'	59.68"	30°	12'	51.72"
3	24°	43'	59.97"	30°	12'	53.39"
4	24°	43'	59.80"	30°	12'	51.74"
5	24°	44'	5.44"	30°	12'	34.65"
6	24°	44'	6.14"	30°	12'	32.90"
7	24°	44'	7.74"	30°	12'	25.72"
8	24°	44'	9.17"	30°	12'	23.05"
9	24°	44'	11.16"	30°	12'	20.70"
10	24°	44'	11.70"	30°	12'	20.29"

Project related



Site Corner points	Latitude (S)			Longitude (E)		
11	24°	44'	11.91"	30°	12'	20.21"
12	24°	44'	11.91"	30°	12'	20.18"
13	24°	44'	14.73"	30°	12'	17.86"
14	24°	44'	17.53"	30°	12'	21.60"
15	24°	44'	17.94"	30°	12'	22.54"
16	24°	44'	18.54"	30°	12'	23.76"
17	24°	44'	19.29"	30°	12'	24.74"
18	24°	44'	20.10"	30°	12'	25.87"
19	24°	44'	13.56"	30°	12'	39.79"
20	24°	44'	16.57"	30°	12'	41.55"
21	24°	44'	21.77"	30°	12'	31.00"
22	24°	44'	22.07"	30°	12'	30.99"
23	24°	44'	21.91"	30°	12'	31.50"
24	24°	44'	21.82"	30°	12'	31.96"
25	24°	44'	22.47"	30°	12'	33.15"
26	24°	44'	22.93"	30°	12'	33.97"
27	24°	44'	23.25"	30°	12'	34.13"
28	24°	44'	23.98"	30°	12'	34.56"
29	24°	44'	25.87"	30°	12'	36.71"
30	24°	44'	20.82"	30°	12'	45.22"
31	24°	44'	15.84"	30°	12'	56.89"
32	24°	44'	13.78"	30°	13'	4.32"
33	24°	44'	5.78"	30°	12'	58.30"
34	24°"	44'	17.34"	30°	12'	26.98"
35	24°	44'	27.42"	30°	12'	37.51"
36	24°	44'	27.35"	30°	12'	37.17"
37	24°	44'	24.79"	30°	12'	34.08"
38	24°	44'	24.00"	30°	12'	33.45"
39	24°	44'	23.13"	30°	12'	32.39"
40	24°	44'	23.21"	30°	12'	31.53"
41	24°	44'	23.62"	30°	12'	30.73"
42	24°	44'	22.86"	30°	12'	29.27"
43	24°	44'	23.19"	30°	12'	28.83"
44	24°	44'	24.91"	30°	12'	30.45"
45	24°	44'	25.48"	30°	12'	32.23"
46	24°	44'	26.75"	30°	12'	31.68"
47	24°	44'	27.50"	30°	12'	32.42"
48	24°	44'	28.77"	30°	12'	31.34"

Project related



Site Corner points	Latitude (S)			Longitude (E)		
49	24°	44'	31.79"	30°	12'	31.30"
50	24°	44'	33.65"	30°	12'	32.01"
51	24°	44'	36.17"	30°	12'	33.29"
52	24°	44'	40.19"	30°	12'	32.81"
53	24°	44'	40.60"	30°	12'	32.04"
54	24°	44'	36.27"	30°	12'	32.51"
55	24°	44'	34.99"	30°	12'	32.26"
56	24°	44'	33.36"	30°	12'	31.12"
57	24°	44'	32.65"	30°	12'	30.77"
58	24°	44'	31.14"	30°	12'	30.33"
59	24°	44'	30.42"	30°	12'	30.03"
60	24°	44'	26.86"	30°	12'	30.27"
61	24°	44'	23.75"	30°	12'	27.43"
62	24°	44'	26.04"	30°	12'	22.32"
63	24°	44'	42.06"	30°	12'	31.68"
64	24°	44'	39.06"	30°	12'	37.75"
65	24°	44'	36.52"	30°	12'	42.94"
66	24°	44'	30.81"	30°	12'	40.97"
67	24°	44'	20.65"	30°	12'	24.25"
68	24°	44'	16.57"	30°	12'	18.29"
69	24°	44'	18.38"	30°	12'	17.78"
70	24°	44'	22.44"	30°	12'	20.19"
Site 3B						
71	24°	44'	50,65"S	30°	11'	13,24"
72	24°	44'	50,72"	30°	11'	23,61"
73	24°	44'	55,66"	30°	11'	13,5"
Site 3C						
74	24°	44'	42,3"S	30°	10'	59,68"
75	24°	44'	49,27"	30°	11'	8,34"
76	24°	44'	54,17"	30°	11'	7,75"
77	24°	44'	42,72"	30°	10'	58,77"
Site 4B						
78	24°	44'	46,32"	30°	10'	53,63"
79	24°	44'	44,86"	30°	10'	57,16"
80	24°	44'	57,56"	30°	11'	6,08"
81	24°	45'	2,19"	30°	11'	7,14"
Site 5B						
82	24°	44'	19,9"	30°	11'	14,82"

Site Corner points	Latitude (S)			Longitude (E)		
83	24°	44'	16,6"	30°	11'	22,44"
84	24°	44'	18,61"	30°	11'	24,14"
85	24°	44'	23,39"	30°	11'	17,0"

Table 2-4: Internal access roads co-ordinates

Route	Latitude (S)			Longitude (E)		
Internal Access Road 1-Site 2B						
Start point of the activity	24°	44'	0"	30°	12'	51"
Point 1 (Bend Point)	24°	44'	1"	30°	12'	47"
Point 2	24°	44'	2"	30°	12'	43"
Point 3 (Bend Point)	24°	44'	2"	30°	12'	38"
Point 4 (Bend Point)	24°	44'	3"	30°	12'	38"
Point 5 (Bend Point)	24°	44'	5"	30°	12'	34"
Point 6	24°	44'	5"	30°	12'	30"
Point 7 (Bend Point)	24°	44'	6"	30°	12'	26"
Point 8 (Bend Point)	24°	44'	7"	30°	12'	24"
Point 9 (Bend Point)	24°	44'	10"	30°	12'	21"
Point 10 (Bend Point)	24°	44'	11"	30°	12'	19"
Point 11 (Bend Point)	24°	44'	13"	30°	12'	18"
Point 12 (Bend Point)	24°	44'	14"	30°	12'	17"
Point 13	24°	44'	16"	30°	12'	21"
Point 14	24°	44'	18"	30°	12'	24"
Point 15 (Bend Point)	24°	44'	20"	30°	12'	26"
Point 16	24°	44'	16"	30°	12'	33"
Point 17 (Bend Point)	24°	44'	13"	30°	12'	40"
Point 18	24°	44'	10"	30°	12'	50"
End point of the activity	24°	44'	6"	30°	12'	58"
Internal Access Road 2-Site 2B						
Start point of the activity	24°	44'	21"	30°	12'	32"
Point 1	24°	44'	19"	30°	12'	38"
Point 2 (Bend Point)	24°	44'	16"	30°	12'	42"

Project related



Route	Latitude (S)			Longitude (E)		
Point 3	24°	44'	13"	30°	12'	52"
Point 4 (Bend Point)	24°	44'	10"	30°	13'	2"
Point 5 (Bend Point)	24°	44'	12"	30°	13'	3"
Point 6	24°	44'	16"	30°	12'	54"
Point 7	24°	44'	19"	30°	12'	48"
Point 8	24°	44'	22"	30°	12'	40"
Point 9 (Bend Point)	24°	44'	24"	30°	12'	36"
Point 10 (Bend Point)	24°	44'	22"	30°	12'	34"
End point of the activity	24°	44'	22"	30°	12'	33"
Internal Access Road 3-Site 2B						
Start point of the activity	24°	44'	29"	30°	12'	32"
Point 1 (Bend Point)	24°	44'	27"	30°	12'	36"
Point 2 (Bend Point)	24°	44'	28"	30°	12'	37"
Point 3 (Bend Point)	24°	44'	29"	30°	12'	38"
Point 4 (Bend Point)	24°	44'	31"	30°	12'	40"
Point 5	24°	44'	33"	30°	12'	40"
Point 6 (Bend Point)	24°	44'	35"	30°	12'	41"
Point 7 (Bend Point)	24°	44'	37"	30°	12'	42"
Point 8	24°	44'	39"	30°	12'	38"
Point 9 (Bend Point)	24°	44'	40"	30°	12'	34"
Point 10 (Bend Point)	24°	44'	39"	30°	12'	39"
Point 11 (Bend Point)	24°	44'	35"	30°	12'	34"
Point 12	24°	44'	33"	30°	12'	33"
Point 13 (Bend Point)	24°	44'	31"	30°	12'	32"
End point of the activity	24°	44'	29"	30°	12'	32"
Internal Access Road 4-Site 2B						
Start point of the activity	24°	44'	34"	30°	12'	26"
Point 1 (Bend Point)	24°	44'	32"	30°	12'	28"
Point 2 (Bend Point)	24°	44'	32"	30°	12'	29"
Point 3 (Bend Point)	24°	44'	33"	30°	12'	30"

Project related



Route	Latitude (S)			Longitude (E)		
Point 4	24°	44'	34"	30°	12'	31"
Point 5 (Bend Point)	24°	44'	36"	30°	12'	32"
Point 6 (Bend Point)	24°	44'	38"	30°	12'	31"
Point 7 (Bend Point)	24°	44'	31"	30°	12'	31"
Point 8 (Bend Point)	24°	44'	41"	30°	12'	32"
Point 9 (Bend Point)	24°	44'	41"	30°	12'	31"
Point 10	24°	44'	39"	30°	12'	30"
Point 11	24°	44'	36"	30°	12'	28"
End point of the activity	24°	44'	34"	30°	12'	27"
Internal Access Road 5-Site 2B						
Start point of the activity	24°	44'	26"	30°	12'	22"
Point 1 (Bend Point)	24°	44'	24"	30°	12'	27"
Point 2 (Bend Point)	24°	44'	25"	30°	12'	28"
Point 3 (Bend Point)	24°	44'	28"	30°	12'	20"
Point 4 (Bend Point)	24°	44'	30"	30°	12'	29"
Point 5 (Bend Point)	24°	44'	31"	30°	12'	27"
Point 6 (Bend Point)	24°	44'	29"	30°	12'	24"
End point of the activity	24°	44'	26"	30°	12'	22"
Internal Access Road 6-Site 2B						
Start point of the activity	24°	44'	17"	30°	12'	18"
Point 1 (Bend Point)	24°	44'	19"	30°	12'	20"
Point 2 (Bend Point)	24°	44'	20"	30°	12'	21"
Point 3 (Bend Point)	24°	44'	21"	30°	12'	23"
Point 4 (Bend Point)	24°	44'	22"	30°	12'	20"
Point 5	24°	44'	20"	30°	12'	19"
End point of the activity	24°	44'	17"	30°	12'	18"
Internal Access Road-Site 3B						
Start point of the activity	24°	44'	51"	30°	11'	13"
Point 1	24°	44'	53"	30°	11'	14"
Point 2 (Bend Point)	24°	44'	55"	30°	11'	14"

Route	Latitude (S)			Longitude (E)		
Point 3	24°	44'	53"	30°	11'	19"
Point 4 (Bend Point)	24°	44'	51"	30°	11'	24"
End point of the activity	24°	44'	50"	30°	11'	24"
Internal Access Road-Site 3C						
Start point of the activity	24°	44'	43"	30°	11'	24"
Point 1 (Bend Point)	24°	44'	43"	30°	10'	59"
Point 2 (Bend Point)	24°	44'	46"	30°	11'	3"
Point 3 (Bend Point)	24°	44'	48"	30°	11'	5"
Point 4	24°	44'	51"	30°	11'	6"
Point 5 (Bend Point)	24°	44'	54"	30°	11'	8"
Point 6	24°	44'	51"	30°	11'	8"
End point of the activity	24°	44'	49"	30°	11'	8"
Internal Access Road-Site 4B						
Start point of the activity	24°	44'	45"	30°	11'	53"
Point 1	24°	44'	51"	30°	10'	58"
Point 2	24°	44'	55"	30°	11'	2"
Point 3 (Bend Point)	24°	45'	1"	30°	11'	6"
End point of the activity	24°	45'	1"	30°	11'	7"
Internal Access Road-Site 5B						
Start point of the activity	24°	44'	18"	30°	11'	7"
Point 1 (Bend Point)	24°	44'	19"	30°	11'	18"
Point 2	24°	44'	18"	30°	11'	20"
Point 3 (Bend Point)	24°	44'	17"	30°	11'	22"
Point 4 (Bend Point)	24°	44'	19"	30°	11'	24"
Point 5	24°	44'	21"	30°	11'	21"
End point of the activity	24°	44'	23"	30°	11'	18"

2.3 Technical Description

The PV plant will consist of the following infrastructure:

- Solar PV panels that will be able to deliver the required 40MW output to the Samancor grid;
- Inverters that convert direct current (DC) generated by the PV modules into alternating current (AC) to be exported to the Samancor electrical grid;

- Transformer/s that raises the system AC low voltage to medium voltage. The transformer converts the voltage of the electricity generated by the PV panels to the correct voltage for delivery to the TFC Plant;
- Transformer substation; and
- Instrumentation and Control consisting of hardware and software for remote plant monitoring and operation of the facility.

Associated infrastructure includes:

- Mounting structures for the solar panels in a fixed tilt or rotating tracking configuration;
- Cabling between the structures, to be laid underground where practical;
- 33kV overhead powerlines between the various sites and the Tubatse East and -West substation buildings;
- Two switching stations at Site 2B and 3B as well as transformer yard at each PV site;
- Containerized switching station connection to the Tubatse East and -West MV substations;
- Water provision infrastructure (i.e. pipeline/s, storage tank/s, etc.) for PV panel cleaning; and
- Internal access roads (typically 6m) roads will be constructed, but existing roads will be used as far as possible), fencing (approximately 3m in height), gates and access control.

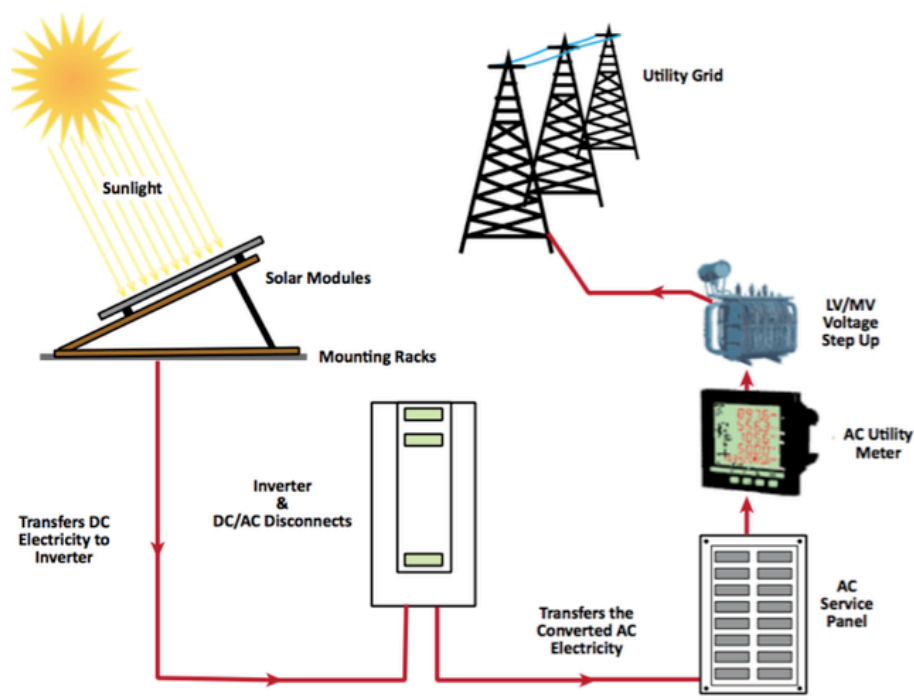


Figure 2-1: Overview of a solar PV plant²

2.3.1 Internal Access

Internal access roads (approximately 6m wide) will be constructed, but existing roads will be used as far as possible.

Internal access roads are proposed for each site, these access roads are aligned around the respective sites and no feasible alternatives can be considered as the internal access roads are restricted to the

² Source: International Finance Corporation. 2015. *Utility-scale Solar Photovoltaic Power Plants. A Project Developer's Guide*

respective site boundaries as well as the location of the arrays and associated infrastructure within the project site. Additionally, in order to maximise the area available for the placement of the PV arrays, the internal access roads have been aligned to the boundary of each project site (Figure 1-1)

2.3.2 Power Corridors

The infrastructure required to connect the solar PV generation sites to the Samancor 33kV power grid is accommodated in a power corridor. These corridors are indicated on the site layout drawing attached to this report (Figure 1-1 and **Annexure B**).

Overhead line or underground cable technology can be used for the power evacuation in these corridors. The proposed width of the power corridor is 50m to accommodate the proposed 100MW power flow.

2.3.2.1 Underground Cables

The design proposal for the underground cables is single core cables to accommodate the combined power flow of more than one solar field. The cables will be buried 1m below ground level in a trefoil configuration for each circuit. Different circuits shall be spaced at approximately 300mm away from each other.

2.3.2.2 Overhead Powerlines

Powerlines comprising of a wood pole tower construction is proposed for the 33kV powerlines. In cases where there is a double power corridor, either two wood pole lines will be used or a single steel monopole with a double circuit configuration.

The height of the single circuit wood pole construction is 11 - 13m and the steel monopoles are typically 20m tall. A 50m assessment corridor has been applied for in the EIA in order to cater for the optimal route for the powerlines.

2.3.3 Shared Infrastructure

The following infrastructure will be shared with the previously authorised PV plant (Phase 1) across the Sites 2 – 5 and these proposed additional areas across sites 2B, 3B, 3C, 4B and 5B.

2.3.3.1 On-Site Substations

The solar fields will connect to the Tubatse East- and West Substations by means of power corridors to evacuate the AC power. The power corridor will comprise of overhead lines or underground cables, or a combination thereof, at a voltage level of 33kV. The connections into the Tubatse East- and West Plant Substations will comprise of 33kV indoor switchgear blocks within the PV field. The purpose of these blocks would be to collect the feeders from the solar fields and combine them into one or two feeders to be connected onto the existing 33kV substation infrastructure. On-site substation upgrades have been approved in the previous EIA study (DFFE Ref: 14/12/16/3/3/2/2079).

2.3.3.2 Construction Camps/Laydown Areas

Only one construction camp and laydown area will be used for the project. The proposed size of laydown areas is defined as follows: 6000m² for west region (Site 3, 3B, 3C, 4, 4B, 5 & 5B) and 5000m² for the east region (Site 2 and 2B). The construction camp is approximately 2000m² and has been approved in the previous EIA study (DFFE Ref: 14/12/16/3/3/2/2079).

Chemical toilets will be provided per 15 people which will be serviced at a minimum of once every week.

2.3.3.3 Water Provision

Water will be required during the construction activities as well as during the operational phase for panel cleaning. During construction, it is estimated that 2 x 15000ℓ water tankers will be used for dust suppression and other construction activities.

During operations, it is estimated that the proposed PV plant will require approximately 1200m³ per cleaning cycle (based on best practice). The cleaning cycle depends on the type of technology, the pollution at the location as well as the seasonality.

Water will be obtained from the TFC process and no raw water sources will be required.

2.3.3.4 BESS

Lithium-ion technology will be used for the Battery Energy Storage System (BESS). The BESS will have an on-board inverter system and will connect directly to the 33kV switchboard of the connector substation. The size of the BESS combined for East and West plant locations is a minimum value of 200MWh (Megawatt per hour). No BESS will be required for this phase of the project.

2.4 Summary of Technical Specifications

A summary of the technical specification for the proposed project are provided in Table 2-5. In terms of advanced technologies and upgrading this will be determined by a more detailed design. The technology proposed is for a lifecycle of 20 years, as one normally operates a solar PV plant for this duration, due to the large capital investment, it is uneconomical to change the technology to follow latest trends and developments.

The lifespan for the solar module is 30 years. As the panels are classified a hazardous waste, the disposal of the panels will be according to waste legislation and waste disposal followed by TFC to a licenced hazardous waste facility. The waste will not be disposed of into any landfills within the Sekhukhune District Municipality and no additional burden will be placed on these landfills.

Table 2-5: Technical specifications for the PV plants and associated infrastructure

Facility Component	Description
Height of PV panels	Approximately 5m
Total site extent	59,23 ha
Length of internal roads	Varies
Width of internal roads	Approximately 6m
Number of inverters/transformers	3
Area occupied by inverter/ transformers (inverters are combined with the transformers on each site)	200m ²
Height of and type of fencing	Security fencing approximately 3m high
Overhead powerline length	<ul style="list-style-type: none"> ▪ Main Powerline (50m corridor): 3098.15m ▪ Section A Powerline within Site 2B: 192.05m ▪ Section B Powerline within Site 2B: 89.18m
Overhead powerline capacity	33kV (40MVA Site 2 to East Substation)

Facility Component	Description
Overhead powerline servitude	<ul style="list-style-type: none"> 50m corridor to be assessed in the EIA study Overhead line or underground cable technology can be used for the power evacuation in these corridors
Overhead powerline tower height	<ul style="list-style-type: none"> Powerlines comprising of a wood pole tower construction is proposed for the 33kV powerlines. In cases where there is a double power corridor, either two wood pole lines will be used or a single steel monopole with a double circuit configuration The height of the single circuit wood pole construction is 11 - 13m and the steel monopoles are typically 20m tall
Underground cables	Varies in length according to site location and connection point
Switching Station	Two switching stations are proposed: 33kV switching station 40MVA - 100m ²
Chemical Toilets	Chemical toilets will be provided per 15 people which will be serviced at a minimum of once every week
On-site substations	<ul style="list-style-type: none"> Existing substation capacity <ul style="list-style-type: none"> Tubatse East (160 000kVA) = 60MW generated from Phase 1 and 2 Tubatse West (85 000kVA) = 40MW generated from Phase 1 and 2 33kV indoor switchgear blocks will be added to the Tubatse East- and West Substations with a footprint of approximately 300m² respectively (authorised as part of Phase 1)
Laydown areas	Laydown areas authorised as part of Phase 1 to be used
Construction camp	Laydown areas authorised as part of Phase 1 to be used
Access roads	Internal Access Road 1 - Site 2B: 2850.82m Internal Access Road 2 - Site 2B: 2205.24m Internal Access Road 3 - Site 2B: 1506.47m Internal Access Road 4-Site 2B: 821.42m Internal Access Road 5-Site 2B: 704.34m Internal Access Road 6-Site 2B: 482.72m Site 3B Internal Access Road: 526.55m Site 3C Internal Access Road: 638.72m Site 4B Internal Access Road: 725.43m Site 5B Internal Access Road: 745.11m
BESS	BESS authorised as part of Phase 1

2.5 Sensitivity Maps

The environmental sensitivity maps for the development are presented below in Figure 2-2 and Figure 2-3 and attached in **Annexure B**.

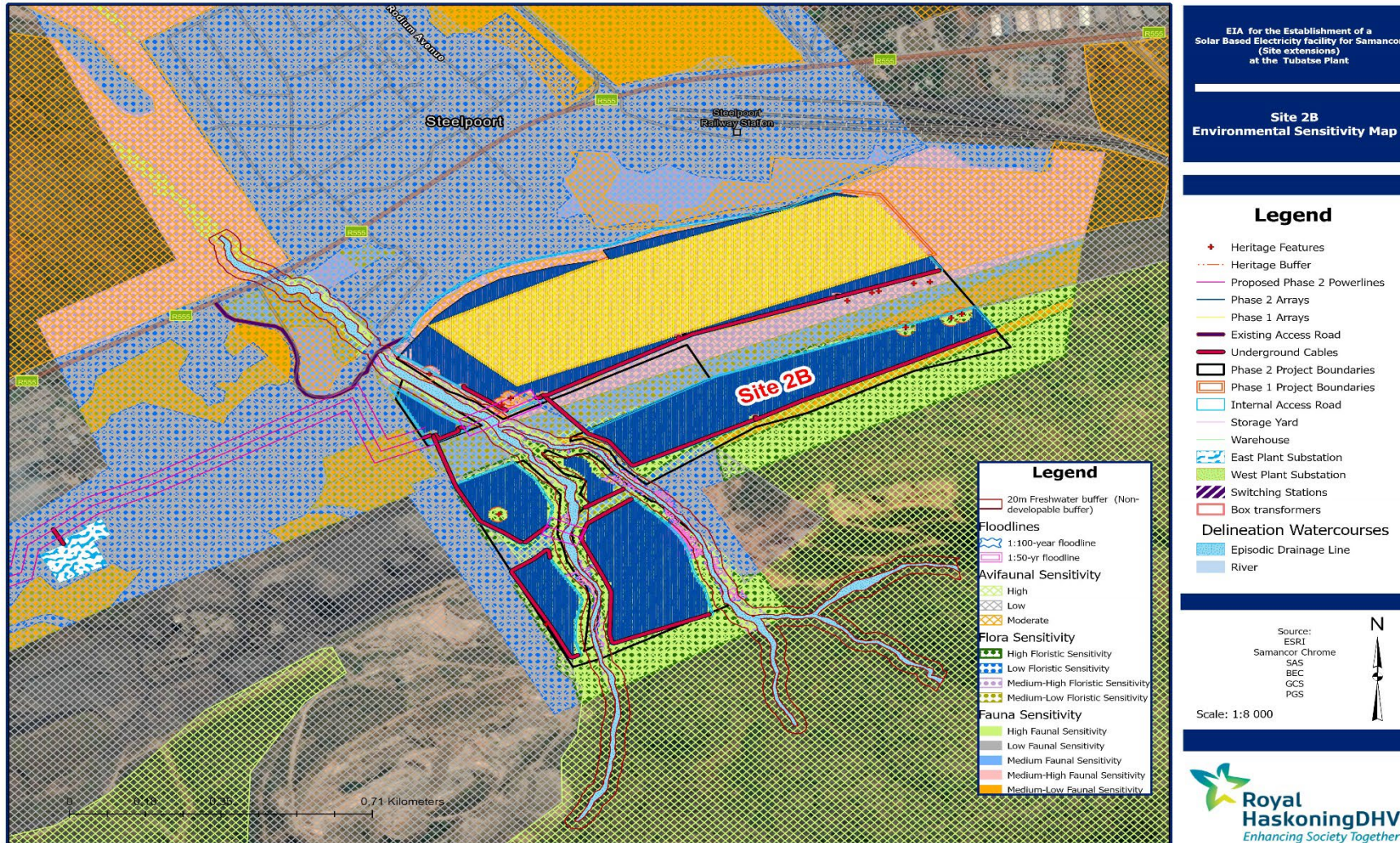


Figure 2-2: Site 2B environmental sensitivity map

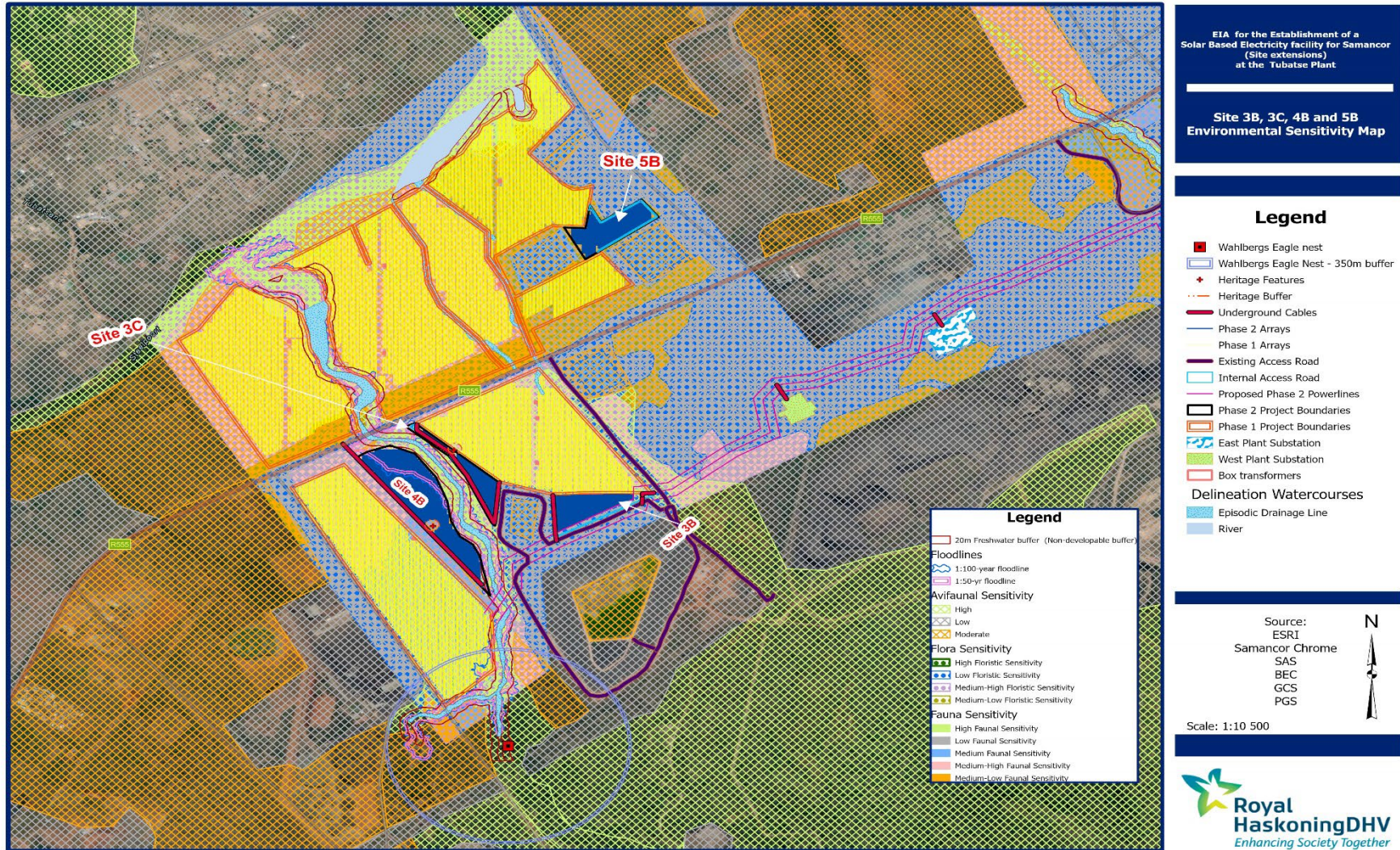


Figure 2-3: Site 3B, 3C, 4B and 5B environmental sensitivity map

3 Legal Framework

In order to protect the environment and ensure that the development is undertaken in an environmentally responsible manner, there are a number of significant environmental legislation (Table 3-1 and Table 3-2) that need to be considered during this study.

This section outlines the legislation that is applicable to the proposed project and has been considered in the preparation of this report.

Table 3-1: Key legislation considered

Acts	Objectives, important aspects, associated notices and regulations
National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) (as amended)	<p>Objectives: To provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state.</p> <p>Relevant Notices and Regulations:</p> <ul style="list-style-type: none"> ▪ Environmental Impact Assessment Regulations 2014 (GNR 326 in Government Gazette - GG 40772 as amended on 04 April 2017) ▪ Listing Notice 1 (GNR 327) as amended ▪ Listing Notice 2 (GNR 325) as amended ▪ Listing Notice 3 (GNR 324) as amended ▪ National Web-based Environmental Screening Tool (2017). ▪ Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act - NEMA, 1998, when applying for EA in GG 43110, 20 March 2020). ▪ Environmental Impact Assessment (EIA) Regulations 2014 (Government Notice Regulations - GNR 326 in Government Gazette (GG) 40772 as amended on 04 April 2017 and GN 517 in GG 44701 as amended on 11 June 2021). <p>Relevance to the proposed project:</p> <ul style="list-style-type: none"> ▪ Development must be socially, environmentally and economically sustainable. ▪ Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated; the social, economic and environmental impacts of activities including disadvantages and benefits, must be considered, assessed and evaluated and decisions must be appropriate in the light of such consideration. ▪ 'Polluter Pays' principle.

Acts	Objectives, important aspects, associated notices and regulations
	<ul style="list-style-type: none"> ▪ Any activity that is proposed and which is listed in the NEMA EIA Regulations, requires environmental authorisation. <p>Listed activities applied for: <u>Listing Notice 1:</u></p> <ul style="list-style-type: none"> ▪ Activity 11 - The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275kV; or (ii) inside urban areas or industrial complexes with a capacity of 275kV or more. <i>Applicability – any new 33kV overhead powerlines between the various sites and the existing Tubatse East and-West substation buildings.</i> ▪ Activity 12 – The development of – (ii) infrastructure or structures with a physical footprint of 100m² or more; where such development occurs – (a) within a watercourse; or (c) if no development setback exists, within 32m of a watercourse, measured from the edge of a watercourse. <i>Applicability – development within 32m of an identified watercourse as delineated in the Freshwater Assessment (Appendix F3).</i> ▪ Activity 19 - The infilling or depositing of any material of more than 10m³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m³ from a watercourse. <i>Applicability - development of the PV plant within 32m of a watercourse where material will be removed or infilled.</i> ▪ Activity 24 – The development of a road- <ul style="list-style-type: none"> i. for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or ii. with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres. <i>Applicability – the development of internal access roads associated with the PV plant.</i> ▪ Activity 28 - Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture on or after 01 April 1998 and where such development will occur outside an urban area, where the total land to be developed is bigger than 1ha. <i>Applicability - development of the PV plant will involve the transformation of approximately 59,23ha of agricultural land. The project site is located outside an urban area.</i> ▪ Activity 56 - The widening of a road by more than 6m, or the lengthening of a road by more than 1km – (i) where the existing reserve is wider than 13.5m; or (ii) where no reserve exists, where the existing road is wider than 8m;

Acts	Objectives, important aspects, associated notices and regulations
	<p>excluding where widening or lengthening occur inside urban areas. <i>Applicability – widening or the lengthening of existing access roads.</i></p> <p><u>Listing Notice 2:</u></p> <ul style="list-style-type: none"> ▪ Activity 1 - The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20MW or more. <i>Applicability - electricity generation capacity of the PV plant will be 40MW.</i> ▪ Activity 15 - The clearance of an area of 20ha or more of indigenous vegetation. <i>Applicability - The construction of the PV plant will require the clearance of approximately 59,23ha of indigenous vegetation.</i> <p><u>Listing Notice 3:</u></p> <ul style="list-style-type: none"> ▪ Activity 12(e)(i) - 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. 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. <i>Applicability - clearance of approximately 59,23ha of vegetation in an area designed as a Threatened Ecosystem (Sekhukhune Plains Bushveld).</i>
<p>National Water Act, 1998 (Act No. 36 of 1998) (as amended)</p>	<p>Objectives: The National Water Act (NWA) is a legal framework for the effective and sustainable management of water resources in South Africa. Central to the NWA is recognition that water is a scarce resource in the country which belongs to all the people of South Africa and needs to be managed in a sustainable manner to benefit all members of society. The NWA places a strong emphasis on the protection of water resources in South Africa, especially against its exploitation, and the insurance that there is water for social and economic development in the country for present and future generations.</p> <p>Relevance to the proposed project:</p> <ul style="list-style-type: none"> ▪ Sustainable protection, use, development and conservation of water resources – including aquatic ecosystems. ▪ Defines 11 water uses and provides licensing procedures. <p>Notices and Regulations:</p> <ul style="list-style-type: none"> ▪ General Authorisation in terms of Section 39 of the National Water Act (Act No. 36 of 1998, Water Uses

Acts	Objectives, important aspects, associated notices and regulations
	<p>Section 21 (a) and (b) (GN in GG 40243 of 02 September 2016).</p> <ul style="list-style-type: none"> ▪ General Authorisation in terms of Section 39 of the National Water Act (Act No. 36 of 1998, Water Uses Section 21 (c) and (i) (GN 4167 in GG 49833 of 08 December 2023). <p>General Authorisation (GA) Reference No. WU22102 issued on 28 March 2022 authorises the following:</p> <ul style="list-style-type: none"> ▪ Portions of the overhead powerline associated with Sites 3 and 5 within the 100m Zone of Regulation of a watercourse; ▪ Portions of internal access roads associated with Sites 2, 3, 4 and 5 within the 100m Zone of Regulation of a watercourse; ▪ Portion of underground cable associated with Sites 3 and 5 within the 100m Zone of Regulation of a watercourse; ▪ Channelised culvert for Site 5 within the 100m Zone of Regulation of a watercourse; ▪ Solar panels associated with Sites 3 and 5 within the 100m Zone of Regulation of a watercourse; ▪ Storage yards, Site Offices and Guard Houses associated with Sites 3 and 5 within the 100m Zone of Regulation of a watercourse. <p>This GA is valid for a period of 20 (twenty) years from date issued (28 March 2022) until the GA is repealed or the GA period is extended further by a Gazette by order of the NWA.</p> <p>Potential water uses:</p> <ul style="list-style-type: none"> ▪ Section 21 (c) - impeding or diverting the flow of water in a watercourse. <i>Applicable to any infrastructure (e.g. PV arrays, internal access roads, powerlines and underground cables) within the 1:100 year floodline of a river or within 500m to wetlands.</i> ▪ Section 21 (i) - Altering the bed, banks, course or characteristics of a watercourse. <i>Applicable to any infrastructure (PV arrays, internal access roads, powerlines and underground cables) within the 1:100 year floodline of a river or within 500m to wetlands.</i>
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	<p>Section 34 - No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.</p> <p>Section 35 - No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site.</p> <p>Section 36 - No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA) or a provincial</p>

Acts	Objectives, important aspects, associated notices and regulations
	<p>heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. "Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place.</p> <p>Section 38 (a) - the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length; (b) the construction of a bridge or similar structure exceeding 50m in length; (c) any development or other activity which will change the character of a site (d) the re-zoning of a site exceeding 10000m² in extent.</p> <p>Potential permits:</p> <ul style="list-style-type: none"> ▪ A permit issued under Section 35 of the Act that will include, surface collections, test excavations and analysis of recovered archaeological material. A further permit may be required for the destruction of the archaeological resources. ▪ Permit to relocate graves in terms of Section 36 of the Act.
National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004)	<p>Objectives: Provide for the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources.</p> <p>Notices and Regulations:</p> <ul style="list-style-type: none"> ▪ National Biodiversity Strategy and Action Plan (2005). ▪ National List of Ecosystems that are Threatened and in Need of Protection in terms of Section 52(1)(a) of the National Environmental Management Biodiversity Act (Act No. 10 of 2004), GN 1002 in GG 34809, 09 December 2011. ▪ Threatened or Protected Species (GN 388 in GG 36375, 16 April 2013). ▪ Alien and Invasive Species Regulations (GNR 506 in GG 36683, 19 July 2013). ▪ Publication of Exempted Alien Species (GNR 509 in GG 36683, 19 July 2013). ▪ Publication of National List of Invasive Species (GNR 507 in GG 36683, 19 July 2013). ▪ Publication of Prohibited Alien Species (GNR 508 in GG 33683, 19 July 2013). ▪ Limpopo Conservation Plan (2013). ▪ National Biodiversity Assessment – The Status of South Africa's Ecosystems and Biodiversity (2018). ▪ Sekhukhune Bioregional Plan (2020) – the Bioregional Plan has been gazetted in Notice 29 of 2020 (GG 3074, 27 March 2020) in terms of Section 40(1) of the National Environmental Management: Biodiversity Act, 2004.

Acts	Objectives, important aspects, associated notices and regulations
	<ul style="list-style-type: none"> ▪ The Revised National List of Ecosystems that are Threatened and in Need of Protection in terms of Section 52(1)(a) of the National Environmental Management Biodiversity Act (Act No. 10 of 2004), No 2747 in GG 47526, 18 November 2022. ▪ The National Biodiversity Offset Guideline (2023).
Limpopo Environmental Management Act, 2003 (Act No. 07 of 2003)	<p>Objectives:</p> <ol style="list-style-type: none"> a) To manage and protect the environment in the Province; b) To secure ecologically sustainable development and responsible use of natural resources in the Province; c) Generally to contribute to the progressive realisation of the fundamental rights contained in section 24 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996); and d) To give effect to international agreements effecting environmental management which are binding on the Province. <p>Relevance to the proposed project:</p> <ul style="list-style-type: none"> ▪ Part 2 – Sites of Ecological Importance, Section 18 – 20. ▪ Part 3 – Protected Environmental and Private Nature Reserves, Section 21. ▪ Section 64(c)(iv) – Protection of indigenous plants – no person may without a permit pick any indigenous plant in a Provincial Nature Reserve, a Site of Ecological Importance, a Protected Environment or a Private Nature Reserve. ▪ Chapter 13 – Environmental Pollution. <p>Potential permits:</p> <ul style="list-style-type: none"> ▪ Permits issued in terms of Schedules 2 (Specially protected wild animals), 3 (Protected wild animals), 7 (Undesirable animals), 9 (Prohibited aquatics growths), 10 (Invertebrates), 11 (Specially protected plants) and 12 (Protected plants) of the Act to remove, relocate or destroy species listed in the above Schedules.
National Forests Act, 1998 (Act No. 84 of 1998)	<p>Provides for the protection of certain tree species, groups of trees, woodland or forests as declared by the Minister and prohibits the destruction of protected trees without an approval in place. Protected tree species have been confirmed within the study area.</p> <p>Regulations: List of Protected Tree Species under the National Forests Act, 1998 (GNR 690, 08 September 2017).</p> <p>Potential licence:</p> <ul style="list-style-type: none"> ▪ Licence to cut, disturb, damage or destroy any protected tree.

3.1 Other Relevant Acts, Guidelines, Department Policies and Environmental Management Instruments

Table 3-2: Other relevant acts, guidelines, policies and environmental management instruments

Acts/Guideline/Policies/Environmental Management Instruments	Considerations
The Constitution (No. 108 of 1996)	Chapter 2 – Bill of Right Section 24 – Environmental Rights
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) as amended	Section 17 - Every attempt must be made to reduce, recycle or re-use all waste before it is disposed. Section 25 - All waste (general and hazardous) generated during construction may only be disposed of at appropriately licensed waste disposal sites. All waste management activities (e.g. recycling, treatment) meeting the relevant thresholds should be authorised under the National Environmental Management: Waste Act (Act No. 59 of 2008) [NEM:WA] (as amended) and Government Notice (GN) 921 of 29 November 2013 (as amended in 2015 and 2017). No person may commence, undertake or conduct a waste management activity listed GN 921 (as amended) unless a licence is issued in respect of that activity.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	Section 32 - Control of dust. Section 34 - Control of noise. Section 35 - Control of offensive odours. National Dust Control Regulations published in GNR 827 in GG 36974, 01 November 2013.
Electricity Regulation Act No. 4 of 2006 as amended by the Electricity Regulation Amendment Act No. 28 of 2007	These regulations regulate the use and generation of electricity.
Occupational Health and Safety Act (Act No. 85 of 1993)	Section 8 - General duties of employers to their employees. Section 9 - General duties of employers and self-employed persons to persons other than their employees.
Construction Regulations (2014)	Contractors must comply with the Construction Regulations which lay out the framework for construction related activities.
Other:	
<ul style="list-style-type: none"> ▪ Hazardous Substance Act (Act No. 15 of 1973) and Regulations ▪ Conservation of Agricultural Resources Act (Act No. 43 of 1983) ▪ Electricity Act (Act No. 41 of 1987) ▪ National Road Traffic Act (Act No. 93 of 1996) ▪ Civil Aviation Regulations of 1997 ▪ Mineral and Petroleum Resources Development Act (Act No. 28 of 2002 – Section 53(1)) ▪ Disaster Management Act (Act No. 57 of 2002, as amended) 	

Acts/Guideline/Policies/Environmental Management Instruments	Considerations
<ul style="list-style-type: none"> ▪ White Paper on Renewable Energy (2003) ▪ Electronic Communications (Act No. 36 of 2005) ▪ South African National Standard (SANS) 10103: 2008 – The Measurement and Rating of Environmental Noise with Respect to Annoyance and to Speech Communication ▪ Civil Aviation Act (Act No. 13 of 2009) ▪ National Climate Change Response White Paper (2011) ▪ Limpopo Green Economy Plan (2013) ▪ Spatial Planning and Land Use Management Act (Act No. 16 of 2013) ▪ Environmental Impact Assessment Guidelines for Renewable Energy Projects, GNR 989 of 2015 ▪ Greater Tubatse Municipality Final Integrated Development Plan (IDP) 2016/ 17 – 2020/ 21 ▪ Limpopo Climate Change Response Strategy 2016 - 2020 ▪ Sekhukhune District Municipality Final IDP 2016/ 17 – 2020/ 21 ▪ BirdLife South Africa: Guidelines for Assessing and Monitoring the Impact of Solar Power Generating Facilities on Birds in Southern Africa (2017) ▪ Sekhukhune District Municipality Draft Spatial Development Framework (2018) ▪ National Climate Change Bill (2018) ▪ Relevant Municipal By-laws 	

3.2 International Conventions and Agreements

Other relevant environmental and social international conventions and agreements to which South Africa is a party that is applicable to this project are presented in Table 3-3.

Table 3-3: Relevant international conventions to which South Africa is a party to

Convention	Summary of Objectives or Relevant Conditions	South African Status
Convention concerning the Protection of the World Cultural and Natural Heritage 1972 (Paris)	Ensuring the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage.	Ratification
Montreal Protocol on Substances That Deplete the Ozone Layer (1 January 1989)	Calculated levels of consumption and production of chlorofluorocarbons must not exceed the stipulated thresholds.	Party to

Project related

Convention	Summary of Objectives or Relevant Conditions	South African Status
Convention on Biological Diversity (29 December 1993)	The Convention has a bearing on the management of biodiversity at the study area. Countries such as South Africa that ascribe to the Convention must rehabilitate or restore degraded ecosystems through the formulation of appropriate strategies and plans.	Party to
United Nations Framework Convention on Climate Change (21 March 1994)	Protection of the climate system: Operations must protect the climate system by controlling greenhouse gases not controlled by the Montreal Protocol, which cause climate change through anthropogenic interference with the climate system.	Party to
United Nations Convention to Combat Desertification (26 December 1996)	To combat desertification and mitigate the effects of drought through national action programs.	Party to
United Nations Framework Convention on Climate Change - Kyoto Protocol (23 February 2005)	To further reduce greenhouse gas emissions by enhancing the national programs of developed countries aimed at this goal and by establishing percentage reduction targets for the developed countries and through the clean development mechanism (where developed countries can invest in developing country clean technology to offset emissions).	Party to
Paris Agreement adopted on 12 December 2015 at the 21st session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC CoP21)	<p>The Agreement is a comprehensive framework which will guide international efforts to limit greenhouse gas emissions and to meet all the associated challenges posed by climate change.</p> <p>The main objective of the Agreement is to limit the global temperature increase to well below 2 degrees Celsius, while pursuing efforts to limit the increase to 1.5 degrees.</p>	Ratified
Sendai Framework for Disaster Risk Reduction (2015)	The Sendai Framework for Disaster Risk Reduction 2015 - 2030 was adopted at the Third United Nations World Conference in Sendai, Japan, on March 18, 2015. The Sendai Framework is the successor instrument to the Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters. One of the lessons learned from the HFA is that more dedicated action needs to be focused on tackling underlying disaster risk drivers, such as the	Party to

Convention	Summary of Objectives or Relevant Conditions	South African Status
	consequences of climate change and variability. As such, the Sendai Framework considers the incorporation of disaster risk reduction measures into programmes within and across all sectors, as appropriate, related to, among other things, the adaptation to climate change.	
Sustainable Development Goals (2015)	<p>The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all UN Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs recognise that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability.</p> <p>SDG 7 requires Affordable and Clean Energy for all. Investing in solar, wind and thermal power, improving energy productivity, and ensuring energy for all is vital if we are to achieve SDG 7 by 2030. Expanding infrastructure and upgrading technology to provide clean and more efficient energy in all countries will encourage growth and help the environment.</p>	Party to

4 Management and Monitoring Procedures

4.1 Organisational Structure and Responsibilities

TFC Solar is the Primary Developer for the project. Each of the team roles are elaborated on in terms of their specific duties in Table 4-1.

Table 4-1: Roles and responsibilities

Role	Responsibility
Developer (TFC Solar or End User)	<p>Role: The Developer is ultimately responsible for ensuring compliance with the environmental specification and all relevant legislation and is accountable for any non-</p>

Role	Responsibility
	<p>compliances with this EMPr and any other conditions of approval or non-compliances with legislation.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> ▪ Appoint a Project Manager (PM) to assume ultimate project responsibility; ▪ Appoint an Environmental Control Officer (ECO) to monitor environmental compliance according to the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and permits; ▪ Be fully conversant with the conditions of the EA, EMPrs and all other licences and permits; ▪ Ensure the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and permits are in the tender documentation issued to prospective Contractors; ▪ Request for, review and approve the method statements prepared by the Contractor; ▪ Review and comment on environmental assessments and/ or reports produced by the Contractor and ECO; ▪ Discuss with the ECO the application of penalties for the infringement of the Environmental Specifications, another possible enforcement measures necessary; ▪ Issue instructions as and when necessary based on the recommendation of the ECO; ▪ Arrange information meetings for or consult with the public about the impending construction activities as required. ▪ May on the recommendation of the PM and/ or ECO order the Contractor to suspend any or all works on-site if the Contractor or his sub-contractor/ supplier fails to comply with the said environmental specifications for the project; and ▪ Ensure the EMPr is implemented as well as revised and updated as and when required.
<p>Project Manager (Developer’s Engineering Representative on Site)</p>	<p>Role: The PM reports directly to the Developer, oversees site works and liaises with the Contractor(s) and the ECO.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> ▪ Implement the environmental specification on-site; ▪ Be fully conversant with the conditions of the EA, EMPrs and all other licences and permits; ▪ Ensure the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and permits are in the tender documentation issued to prospective Contractors; ▪ Request for, review and approve the method statements prepared by the Contractor; ▪ Review and comment on environmental assessments and/ or reports produced by the Contractor and ECO; ▪ Undertake regular site visits and ensure environmental specifications are implemented; ▪ Monitor compliance with the requirements of the specification; ▪ Assess the Contractor’s environmental performance in consultation with the ECO from which a brief monthly statement of environmental performance is drawn up for record purposes and to be reported on within project meetings; and

Project related

Role	Responsibility
	<ul style="list-style-type: none"> ▪ A Pre-construction survey of the site must be undertaken of the entire works area and all support infrastructure (such as site construction camps) etc. This must include a complete photographic record.
<p>Principal Contractor including Sub-Contractors, Service Providers, Suppliers and Maintenance Contractor</p>	<p>The Contractor must:</p> <ul style="list-style-type: none"> ▪ Be fully conversant and comply with the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and permits; ▪ Implement the EMPrs for the duration of the contract; ▪ Manage and maintain the Site Environmental File for the duration of the contract; ▪ Appoint a suitably qualified Site Environmental Officer whose responsibility includes on-going monitoring and control of all construction activities concerning minimisation of environmental impact and adherence to all relevant environmental documentation for the duration of the project; ▪ Supply method statements timeously for all activities requiring special attention as specified and/ or requested by the Developer, ECO and/ or PM during the duration of the Contract; ▪ Ensure any sub-contractors/ suppliers who are utilised within the context of the contract comply with the environmental requirements of the project, in terms of the specifications. The Contractor will be held responsible for non-compliance on their behalf; ▪ Provide trained and qualified resources - budgets, equipment, personnel and training - for the effective control and management of the environmental risks associated with the construction of the development; ▪ Bear the cost of any delays, with no extension of time granted, should his or her sub-contractors/ suppliers contravene the said specifications such that the Engineer orders a suspension of work. The suspension will be enforced until such time as the offending party(ies), procedure, or equipment is corrected; ▪ Bear the costs of any damages/ compensation resulting from non-adherence to the said specifications or written site instructions; ▪ Read and act on ECO reports and take cognisance of the information/ recommendations contained therein; ▪ Comply with all applicable legislation; ▪ Ensure that he/ she informs the PM timeously of any foreseeable activities which will require input from the ECO; ▪ Notify the ECO and PM, verbally and in writing at least ten (10) working days in advance of any activity he/ she has reason to believe may have significant adverse environmental impacts, so that mitigatory measures may be implemented timeously; ▪ Ensure environmental awareness among his/ her employees, sub-contractors and workforce so that they are fully aware of, and understand the Environmental Specifications and the need for them; ▪ Maintain a register of environmental training for site staff and sub-contractor's staff for the duration of the contract; ▪ Communicate and liaise frequently and promptly with the ECO and the PM to ensure effective, proactive environmental management with the overall objective of preventing or reducing negative environmental impacts while enhancing positive environmental impacts; ▪ The Contractor will conduct all activities in a manner that minimises disturbance to the natural environment as well as directly affected residents and the public in general; and ▪ The Principal Contractor assumes responsibility and accountability of all appointed sub-contractors and must ensure their compliance with this EMPr.

Role	Responsibility
<p>Designated Environmental Officer (dEO) (Contractor's Representative)</p>	<p>Role: Principal Contractor must have a dedicated Environmental Officer (EO) to ensure the day-to-day implementation of the environmental specification on-site and to report to the PM and ECO.</p> <p>Responsibilities: The EO must:</p> <ul style="list-style-type: none"> ▪ Be fully conversant and assist the Contractor in complying with the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and permits; ▪ Be fully conversant with all relevant environmental legislation applicable to the project, and ensure compliance with them; ▪ Compile environmental method statements on behalf of the Contractor that will specify how potential environmental impacts will be managed in line with the requirements of the EA, Final Approved EMPr, Generic EMPr and other relevant licences and permits and where relevant environmental best practice, and how they will practically ensure that the objectives of the EMPr are achieved; ▪ Convey the contents of the EA, Final Approved EMPr, Generic EMPr and other relevant licences and permits to the Principal Contractor, sub-contractors and suppliers. Ensure all relevant information is relayed to construction site-staff in a manner that is easily understandable; ▪ Undertake daily and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EA, Final Approved EMPr, Generic EMPr and other relevant licences and permits; ▪ Take appropriate action if the specifications contained in the EA, Final Approved EMPr, Generic EMPr and other relevant licences and permits are not followed. This must include reporting transgressions to the Project Manager, Engineer and Principal Contractor, and may include the recommendation for penalties to be imposed on the Principal Contractor; ▪ Monitor and verify that environmental impacts are kept to a minimum, as far as possible; ▪ Order the removal from the construction site of any person(s) and/ or equipment in contravention of the specifications of the Final Approved EMPr and Generic EMPr; ▪ Submitting a report at each site meeting which will document all incidents that have occurred during the period before the site meeting; ▪ Ensuring that the Written Warning Notification and Incidents Register is available on request; and ▪ Maintain an environmental register which keeps a record of all incidents which occur on the site during construction.

Role	Responsibility
<p>Developer's Environmental Coordinator (dEC)</p>	<p>Role: The dEC employed within the Developers Organisation (Samancor Chrome).</p> <p>Responsibilities: The dEC must:</p> <ul style="list-style-type: none"> ▪ Be fully conversant with the conditions attached to the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and permits; ▪ Be familiar with the recommendations and mitigation measures of the associated Final Approved EMPr as well as Generic EMPr for the project; ▪ Monitor the implementation of the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and permits during the pre-construction, maintenance and rehabilitation phases; ▪ Monitor that the Developer and Principal Contractor are in compliance with the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and permits at all times during the pre-construction, maintenance and rehabilitation phases of the project; ▪ Monitor all site activities monthly for compliance; ▪ Conduct monthly audits of the site (one contract at a time) according to the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and permits, and report findings to the project team; ▪ Monitor the EPC Contractor's compliance and review their documentation on behalf of the Developer. This documentation will include all Contractor documents related to environmental such as plans, procedures and method statements. Also risk assessments for activities that may have an environmental impact; ▪ Reporting can be done directly to the Developer on the environmental performance of the project, summary of current activities, interventions necessitated/ recommendations proposed, and a look ahead of upcoming activities and risks; ▪ The dEC will maintain records of Contractor performance in the form of project environmental Key Performance Indicator's (KPI's); and ▪ Attend monthly site meetings and provide feedback on compliance, updates on outstanding reviews or approvals and highlight areas of potential environmental risk based on current and upcoming construction activities.
<p>Independent ECO</p>	<p>Role: The ECO must be employed by the Developer for the duration of the contract. The ECO must report to the relevant authorities as required by the conditions of approval. The ECO must monitor compliance against the environmental specification and report on such.</p> <p>Responsibilities: The ECO must:</p> <ul style="list-style-type: none"> ▪ Be fully conversant with the conditions attached to the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and permits; ▪ Be familiar with the recommendations and mitigation measures of the associated Final Approved EMPr as well as Generic EMPr for the project; ▪ Monitor the implementation of the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and permits during the pre-construction, maintenance and rehabilitation phases; ▪ Monitor that the Developer and Principal Contractor are in compliance with the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and

Role	Responsibility
	<p>permits at all times during the pre-construction, maintenance and rehabilitation phases of the project;</p> <ul style="list-style-type: none"> ▪ Monitor all site activities monthly for compliance; ▪ Conduct bi-monthly audits of the site (one contract at a time) according to the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and permits, and report findings to the project team; ▪ Attend monthly site meetings and provide feedback on compliance, updates on outstanding reviews or approvals and highlight areas of potential environmental risk based on current and upcoming construction activities; ▪ Recommend corrective action for any environmental non-compliance at the site; ▪ Compile a monthly ECO report in line with the requirements of Appendix 7 of the EIA Regulations 2014 (as amended); and ▪ Conduct once-off training (induction) with the Contractor on the requirements of the EA, EMPr, and other relevant licences and permits; and may include general environmental awareness based on best practice. <p>Required Qualifications</p> <ul style="list-style-type: none"> ▪ Environmental Management Diploma or Degree. ▪ 5 years+ experience in environmental field. ▪ Traceable and verifiable ECO experience specifically in renewable energy developments. <p><i>It must be noted that the responsibility of the ECO is to monitor compliance and give advice on the implementation of the EMPr and not to enforce compliance. Ensuring compliance is the responsibility of the Developer, Project Manager, Contractor and the Site Environmental Officer.</i></p>
<p>Environmental Manager (EM)</p>	<ul style="list-style-type: none"> ▪ Be fully conversant and assist the Operations Manager in complying with the EAs, Final Approved EMPr, Generic EMPr and all other relevant licences and permits applicable to the plant. ▪ Be fully conversant with all relevant environmental legislation applicable to the plant and ensure compliance with them. ▪ Assist in the compilation of environmental specifications, operating instructions and company standards that will specify how potential environmental impacts will be managed in line with the requirements of the EA, Final Approved EMPr, Generic EMPr and other relevant licences and permits and where relevant environmental best practice, and how they will practically ensure that the objectives of the EMPrs are achieved; ▪ Convey the contents of the EA, Final Approved EMPr, Generic EMPr and other relevant licences and permits to new contractors and service providers, if required; ▪ Conduct annual internal audits and internal reporting of the plant and surrounding areas in compliance with the EMPrs and other relevant licences and permits. ▪ Take appropriate action if the specifications contained in the EA, Final Approved EMPr, Generic EMPr and other relevant licences and permits are not followed. ▪ Monitor and verify that environmental impacts are kept to a minimum, as far as possible. ▪ Order the removal from the plant, any person(s) and/ or equipment in contravention of the specifications of the EMPrs ▪ Appoint an independent Environmental Auditor to annually monitor environmental compliance according to the EA, Final Approved EMPr, Generic EMPr and all other relevant licences and permits.

4.2 Monitoring

A monitoring programme will be in place not only to ensure compliance with this EMPr through the contract/work instruction specifications, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are or could result in significant environmental impacts for which corrective action is required.

A monitoring programme will be implemented for the duration of the construction phase of the project. This programme will include:

- Monthly audits will be conducted by the ECO for the duration of the construction activities including rehabilitation – the ECO shall undertake this environmental monitoring with the audits considering compliance with the EMPr.
- On-going monitoring is to be undertaken by the Contractor's dEO – this will include notification to the ECO in the event an incident takes place.
- The Contractor's dEO must undertake daily site inspections to ensure all legislative requirements are adhered to.
- The dEC will monitor the EPC Contractor's compliance and review their documentation on behalf of the Developer.

4.3 Reporting Procedures

4.3.1 Documentation

The following documentation must be kept on-site in order to record compliance with the EMPr:

- An Environmental File which includes:
 - Copy of the EMPr and all appendices;
 - Copy of the EA;
 - Copy of Generic EMPr;
 - Copy of all other licences/ permits;
 - Environmental Policy of the Main Contractor;
 - Environmental Method Statements compiled by the Contractor;
 - Written Warning Notifications;
 - Environmental Register, which must include:
 - Complaints Register - including records of complaints, and, minutes and attendance registers of all environmental meetings;
 - Incident Register - including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record;
 - Waste Documentation such as, but not necessarily limited to:
 - Waste Manifest Documents;
 - Weighbridge Receipts (for general waste);
 - Safe Disposal Certificates (SDCs) (for hazardous waste);
 - Waste Management Contractors Permits (to operate); and
 - Waste Management Licences (for recycling and disposal facilities) - if applicable.
 - Material Safety Data Sheets (MSDSs) for all hazardous substances;
 - Dust Suppression Register;
 - Notification of Emergencies and Incidents in terms of Section 30 of NEMA (Act No. 107 of 1998) and Section 20 of the National Water Act (Act No. 36 of 1998).

4.3.2 Environmental Register

The Contractor must establish an Environmental Register that includes:

- ECO Audit Reports and findings.
- Complaints Register.
- Incidents Register.

The Contractor must enforce that the following information is recorded for all complaints/ incidents:

- Nature of complaint/ incident.
- Causes of complaint/ incident.
- Party(ies) responsible for causing complaint/ incident.
- Immediate actions undertaken to stop/ reduce/ contain the causes of the complaint/ incident.
- Additional corrective or remedial action taken and/ or to be taken to address and to prevent reoccurrence of the complaint/ incident.
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions.
- Procedures to be undertaken and/ or penalties to be applied if corrective or remedial actions are not implemented.
- Copies of all correspondence received regarding complaints/ incidents.

The above records will form an integral part of the Contractors' records. These records must be kept in the Site Environmental File on-site, and must be made available for scrutiny; if so requested by the Developer, ECO or relevant authorities.

4.3.3 Method Statements

To allow the mitigation measures in this document to be implemented, task-specific method statements must be developed for each set of tasks. A Method Statement details how and when a process must be carried out, detailing possible dangers/ risks, and the methods of control required. Method statements can include:

- Type of construction activity;
- Timing and location of the activity;
- Construction procedures;
- Materials and equipment to be used;
- Transportation of the equipment to/ from site;
- How equipment/ material must be moved while on-site;
- Location and extent of construction site office and storage areas;
- Identification of impacts that might result from the construction activity;
- Methodology and/ or specifications for impact prevention/ containment;
- Methodology for environmental monitoring;
- Emergency/ disaster incident and reaction procedures (required to be demonstrated); and
- Rehabilitation procedures and continued maintenance of the impacted environment.

The Contractor must be accountable for all actions taken in non-compliance of the approved Method Statements. The Contractor must keep all the Method Statements and subsequent revisions on file, copies of which must be distributed to all relevant personnel for implementation.

As a minimum, the following Method Statements must be generated:

- Site establishment;
- Formalisation of any access or emergency vehicular routes;
- Biodiversity - protected species and alien plant management;
- Cement mixing/ concrete batching;
- Contaminated water;
- Dust;
- Environmental awareness course(s);

- Environmental monitoring;
- Erosion control;
- Fire, hazardous and/ or poisonous substances;
- Fuels and fuel spills (must form part of the item above);
- Storage, handling and decanting of diesel (must form part of the item above);
- Personnel, public and animal safety;
- Rehabilitation of modified environment(s);
- Solid and liquid waste management;
- Sources of materials (including MSDSs which are not more than 5 years old);
- Soil management (including topsoil and stockpiles);
- Stormwater Management; and
- Wash areas.

Method Statement topics may be grouped together in certain instances reducing the need to produce stand-alone statements covering each topic.

The Contractor may propose changes to an approach to the management of an activity (including control measures) through a method statement. This method statement must in turn be submitted to the ECO and dEC for approval. Under no circumstance may the change in the management of an activity result in new or additional environmental impacts. At the discretion of the ECO, the Developer may be required to consult with relevant Environmental Specialists to determine if control measures dictated in said method statements are sufficient.

4.3.4 Environmental Emergency Response

According to NEMA (Act No. 107 of 1998) - “incident” means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

According to Section 20 of the National Water Act (Act No. 36 of 1998), “incident” includes 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.

The Contractor’s environmental emergency procedures must enforce responses to unexpected/ accidental actions/ incidents that could cause environmental impacts. Such incidents must include:

- Accidental discharges to water (i.e. into the watercourse) and land;
- Accidental spillage of hazardous substances (typically: oil, petrol, and diesel);
- Accidental damage to existing utilities e.g. sewer and water pipelines;
- Accidental toxic emissions into the air; and
- Specific environmental and ecosystem effects from accidental releases or incidents.

An *Environmental Emergency Response Procedure* combined with the Health and Safety as it is aimed at responding specifically to environmental incidents and must enforce and include the following:

- Construction employees shall be trained in terms of incidents and emergency situations;
- Details of the organisation (i.e. manpower) and responsibilities, accountability and liability of personnel;
- A list of key personnel and contact numbers;
- Details of emergency services (e.g. the fire department/ on-site fire detail, spill clean-up services) shall be listed;
- Internal and external communication procedure;
- Actions to be taken in the event of different types of emergencies;
- Incident recording, progress reporting and remediation measures to be implemented; and

- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.

The Contractor and their sub-contractor(s), service providers and suppliers must comply with the environmental emergency preparedness and incident and accident-reporting requirements as per the relevant legal requirements.

4.3.5 Written Warning Notification (s)

A Written Warning Notification must be issued to the Contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This must be issued by the ECO to the Contractor in writing. Preceding the issuing of a Written Warning Notification, the Contractor must be given an opportunity to rectify the issue within an agreed timeframe.

The ECO and the dEC must verify that the agreed actions have taken place by the agreed completion date, when completed satisfactorily; the ECO and Contractor must close out the non-compliance.

4.3.6 Public Communication and Liaison with I&APs

The Developer must ensure that the adjacent landowners are informed and updated throughout the construction phase.

A SHEQ Complaint Register must be kept at the access gates for each area.

Sufficient signage must be erected around the site (including at the entrance), informing the public of the construction activities taking place. The signboards must include the following information:

- The name of the Contractor; and
- The name and contact details of the site representative to be contacted in the event of emergencies or complaint registration.

5 Training and Environmental Awareness

The Developer is committed to promoting and implementing sustainability throughout their operations. As It is important to ensure that the Contractor has the level of environmental awareness and competence to enforce continued environmental due diligence and on-going minimisation of environmental harm. Training needs must be identified based on the available and existing capacity of site personnel (including the Contractors, sub-contractors, service providers and suppliers) to undertake the required EMPr management actions and monitoring activities. It is vital that all personnel are trained to perform their designated tasks to an acceptable standard.

The environmental training is aimed at:

- Promoting environmental awareness;
- Informing the Contractor of all environmental procedures, policies and programmes applicable;
- Providing generic training on the implementation of environmental management specifications;
- Providing job-specific environmental training in order to understand the key environmental features of the construction site and the surrounding environment. Job-specific training may include: Spill response training; Snake handling, Training by an avifaunal specialist to identify potential Red Data species as well as the signs that indicate possible breeding by these species.
- Incidents and non-compliances will be assessed through the Internal Incident Investigation and Reporting System, to determine the root cause, including the possible lack of awareness/ training;

- Should it be evident that re-training is required, the SHEQ Manager will inform the Developer/ End user of the need and take the appropriate actions;
- General awareness training of all personnel shall be repeated annually; and
- The re-induction should take into consideration changes made in the EMPr, changes in legislation, current levels of environmental performance and areas of improvement.

Environmental awareness to the employees of the project must be provided by the Principal Contractor and/ or the responsible party in the following forms:

- Toolbox Talks (Weekly) – These are mandatory. The topics discussed during training sessions must be recorded, with all employees present signing an attendance register. These records must be maintained in the Site Environmental File.
- EMPr Awareness (as and when required).

As potential environmental impacts differ in each execution/ implementation, the suggested environmental topics selected for discussion can be:

- General topics that are applicable to the entire activity;
- Area specific topics as identified in the impacts on the receiving environment or based on findings from the most recent ECO report; and
- Topics that can be “taken home” and implemented off-site.

The above-mentioned awareness activities must be used to share information and to ensure that all personnel are aware of the environment in which they operate and what environmental aspects require attention during their daily operations/ activities/ tasks. Additionally, personnel awareness training will be undertaken if and when required to strengthen the personnel’s understanding of environmental issues.

5.1 Activity Specific Topics

Some activities may have environmental impacts that are unique to each area as determined by the outcomes of the risk assessment and findings of the ECO reports. These should be addressed in the Weekly Toolbox Talks.

Area-specific topics may include:

- Stormwater management;
- Potential for water pollution and related impacts;
- Identification and management of erosion;
- Vehicle emissions and related impacts;
- Practical training regarding the clean-up of major and minor hydrocarbon spills;
- The importance of the waste management system and implementing good housekeeping;
- Dust generation and why and how to reduce dust; and
- Biodiversity interaction awareness.

5.2 Take-home Topics

Environmental awareness should not stop at the workplace. Many of the concepts learned at work can be applied to employees’ lifestyle at home. Topics that can be covered under “take home topics” include, but are not limited to:

- Water consumption and conservation; and
- Domestic waste minimisation and recycling - “Reduce, Reuse and Recycle”.

6 Environmental Management Programme: Pre-Construction

6.1 Authorisation, Licences and Permits

Management Objective: The development must have the relevant authorisation, licences and permits in place prior to construction according to applicable legislation					
Management Outcome: All construction work must comply with the conditions of the relevant authorisations, licences and permits					
Impact Management Actions					
	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. All required authorisations, permits and licences must be obtained by the Developer prior to the commencement of construction. 2. All applications for licences in respect of protected trees must be obtained from the DFFE. 3. Permits for the removal of protected plant species must be obtained from the Limpopo Department of Economic Development, Environment and Tourism (LEDET). 4. If any of the identified archaeological sites on sites 2B, 3B, 3C, 4B and 5B are to be impacted a Phase 2 archaeological mitigation process must be implemented. This will include, surface collections, test excavations and analysis of recovered material. A permit issued under Section 35 of the National Heritage Resources Act (NHRA) will be required to conduct such work. On completion of the mitigation work the developer can apply for a destruction permit with the backing of the mitigation report. 5. Consultation with the Department of Water and Sanitation (DWS) with regards to a Water Use Authorisation for activities triggering a water use as defined in Section 21 of the National Water Act. 	Developer	Obtaining authorisations, permit and licences prior to construction	ECO	Once-off	All authorisations, licences and permits must be filed in the Site Environmental File

6.2 Appointment of Contractor

Management Objective: Appointment of Contractor who will undertake construction works in compliance with approved environmental authorisation, licences and permits						
Management Outcome: The appointed Contractor (including all sub-contractors and suppliers) complies with the relevant provisions of the environmental authorisation, approved EMPr, Generic EMPr and all other relevant licences and permits, as well as applicable environmental legislation and associated regulations						
Impact Management Actions		Implementation		Monitoring		
		Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. The Developer must ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project. 2. The Contractor must make adequate financial provision in their budgets for the implementation of the environmental authorisation, approved EMPr and all other relevant licences and permits. 3. The Contractor (including all sub-contractors and suppliers) must comply with the relevant provisions of the environmental authorisation, this EMPr, Generic EMPr, applicable environmental legislation and associated regulations promulgated in terms of these laws. 4. Tender documents must include statements which include the use of local communities or local community organisation(s) in supplying services and labour for the construction activities. 		Developer Contractor	Environmental Authorisation, EMPr, licences and permits must be included in the tender documents and the Contractor needs to price appropriately	ECO dEC	Once-off	Contractor Agreements and Appointment

6.3 Environmental Awareness Training

Management Objective: Environmental impacts during construction are minimised due to general awareness of environmental requirements					
Management Outcome: Environmental impacts are minimised through effective awareness and training for all construction staff including sub-contractors, service providers and suppliers					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> The ECO must ensure that the initial environmental induction with the project management team prior to the commencement of construction is performed. The Contractor's Environmental Induction presentation must be provided to the ECO for review (comment and approval) prior to the commencement of construction. All contractors, sub-contractors, service providers and suppliers must acknowledge their understanding of the EMPr and environmental responsibilities by signing an induction attendance record. 	ECO	On-site environmental induction	-	Once-off	Record of attendance to the induction must be filed in the Site Environmental File
<ol style="list-style-type: none"> All construction staff including sub-contractors, service providers and suppliers working on-site must receive environmental awareness training. Training must be done and records of the training (attendance registers and content notes) must be kept within the Site Environmental File. Information posters must be erected and maintained at key location site. The Contractor's environmental awareness training must be site specific and address all findings raised by the ECO. 	Contractor	Weekly toolbox talks and awareness training	ECO	Monthly	Record of attendance to the toolbox talks must be filed in the Site Environmental File

6.4 Preparation of Area for Construction

Management Objective: Impacts on fauna and vegetation in and adjacent to the construction area are avoided					
Management Outcome: Construction activities are restricted to the demarcated construction area					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> A pre-construction photographic record of the entire construction area and servitudes must be undertaken prior to commencement. Under no circumstances must any natural area on neighbouring properties (outside the approved development footprint) be impacted, degraded, cleared, or affected in any manner. The construction of a semi-permanent fence (which will prevent vehicle and personnel access to adjacent areas) must be constructed. The demarcation and fencing must be signed off by the ECO before any work commences. All sites should be fenced with a permeable 	Contractor Ecologist Avifauna Specialist	Demarcation of construction servitude prior to site clearing Walkthrough by Ecologist and	ECO dEC	Once-off	All DFFE and LEDET permits must be filed in the Site Environmental File

Management Objective: Impacts on fauna and vegetation in and adjacent to the construction area are avoided					
Management Outcome: Construction activities are restricted to the demarcated construction area					
<p>fence structure to allow the free movement of smaller-bodied animal species.</p> <p>4. Prior to the stripping and clearing of the terrestrial habitat within the development footprint/ corridor, a search and rescue of indigenous vegetation must be undertaken and relocated to suitable habitat out of the development footprint/ corridor. A Plant Rescue and Protection Report must be compiled and must be made available to the DFFE or applicable competent authority on request.</p> <p>5. Prior to site clearance, a detailed 'walkthrough' must be conducted to ascertain the number, abundance and physical conditions of all protected tree species (<i>Balanites maughamii</i>, <i>Boscia albitrunca</i>, and <i>Sclerocarya birrea subsp. Caffra</i>) were observed in the project area) to assist with permit application (DFFE).</p> <p>6. Prior to site clearance, conduct a detailed 'walkthrough' of the proposed site to ascertain the number, abundance and physical conditions of all protected plant species (<i>Adenia 46ruticose</i> subsp. <i>Fruticose</i>, <i>Elephantorrhiza praetermissa</i>, <i>Eulophia petersii</i>, <i>Stapelia gettliffei</i> and <i>Stapelia gigantea</i>) to assist with permit application (LEDET).</p> <p>7. No protected plant species may be affected, removed, excavated, relocated, or impacted in any manner, except under a valid permit granted by the relevant authority and under the supervision of the appointed EO.</p> <p>8. Prior to site clearance, conduct targeted searches for less mobile animal species of conservation concern with high probability of occurring within the project footprint (i.e. small mammals, medium mammals that may have dens/resting places/ roosts, burrows, etc. within the footprint) to allow relocation to take place where necessary, and avoid mortalities of these species.</p> <p>9. The project footprint sites should be "screened" prior to, and during the construction phase for reptile species of conservation concern (especially for <i>Kinixys lobatsiana</i>) by a qualified herpetologist/zoologist. This person should also be capable of handling venomous snakes. All species found should be relocated to suitable habitat not more than 50km from the study sites.</p> <p>10. Develop and execute a Search and Rescue operation for certain plants/ trees as per recommendations from the Final Walkdown Report. These plants should be relocated to a secure, suitable, and appropriate location, taking care to duplicate existing habitat conditions as far as possible. It should be noted that the transportation and relocation process of protected plant species is also subject to permitting requirements.</p>		<p>Avifauna Specialists</p> <p>DFFE & LEDET permits</p>			<p>Walkthrough reports by Ecologist & Avifaunal Specialists</p> <p>Pre-construction photographic records</p> <p>Clearly marked construction servitude</p>

Management Objective: Impacts on fauna and vegetation in and adjacent to the construction area are avoided					
Management Outcome: Construction activities are restricted to the demarcated construction area					
<p>11. Prior to construction, an avifaunal specialist must conduct a site walkthrough, covering the final access roads and powerline routes as well as the substation area, to identify any nests/ breeding/ roosting activity of sensitive species, as well as any additional sensitive habitats. The results of which may inform the final construction schedule in close proximity to that specific area, including abbreviating construction time, scheduling activities around avian breeding and/ or movement schedules, and lowering levels of associated noise.</p> <p>12. Erosion control must be prioritized, notably during the planning phase where slopes, runoff from paved and tarmac areas and stormwater control measures need to be highlighted and planned to prevent erosion of surrounding natural areas.</p>					
Visual Design Criteria					
<p>1. The structures supporting the panels could create cumulative glint and glare if these are metallic and reflective, the consideration of non-reflective material for such supports is recommended.</p> <p>2. It is recommended that the monopole powerline tower be used (as opposed to the steel lattice tower) in order to reduce the visibility of powerline towers.</p>					
	Developer	Designs	Contractor	Once-Off	Design Drawings

7 Environmental Management Programme: Construction

7.1 Site Establishment

Management Objective: Incorporation of environmental issues and constraints in the planning and establishment of the site					
Management Outcome: Impacts relating to site establishment are minimised					
Impact Management Actions		Implementation		Monitoring	
		Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring
<p>1. Stockpile areas, hazardous materials storage areas (including fuels), equipment cleaning areas, cooking and ablution facilities, workshops, parking must be restricted to the construction camp/ laydown area.</p> <p>2. The location of any additional temporary laydown, stockpile, waste or spoil areas must be approved by the ECO prior to implementation.</p> <p>3. Signage must be placed in the area where construction will take place informing the public of the activities taking place.</p> <p>4. The construction areas must be kept in an orderly state at all times.</p> <p>5. No painting or marking of rocks or vegetation (trees) to identify locality or other information shall be allowed, as it will disfigure the</p>		Contractor and dEO	Layout Plan	ECO	Once-off
					Mechanism for Monitoring Compliance
					Approved Layout Plan

Management Objective: Incorporation of environmental issues and constraints in the planning and establishment of the site					
Management Outcome: Impacts relating to site establishment are minimised					
natural setting. Marking shall be done by steel stakes with tags, if required. All temporary markings will be removed upon completion of the construction.					

7.2 No-Go Areas

Management Objective: Construction-related activities in No-Go areas are prevented					
Management Outcome: Impact on No-Go areas are avoided through effective demarcation and management of these areas					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. The extent of disturbance must be limited to the extent of the construction footprint. No areas outside the construction footprint must be cleared unless authorised. 2. Under no circumstances shall any natural area on neighbouring properties (outside the development site footprints) be impacted, degraded, cleared, or affected in any manner. 3. Any contractors found working inside the No-Go areas (areas outside the working servitude) must be issued with a final warning as per agreements for the project. 4. Unauthorised stockpiling, dumping or storage of equipment, material or waste must be strictly prohibited in identified No-Go areas. 5. Areas outside of the construction footprint that are disturbed during the construction phase must be rehabilitated immediately to the satisfaction of the ECO as per the relevant re-vegetation/ re-planting plan. 6. Existing roads or authorised access roads must be used to gain access to site. 7. The watercourses must be considered as No-Go areas. No construction vehicles, or construction personnel or vehicles may traverse through these watercourses. 8. A 20m development exclusion area buffer around all freshwater ecosystems where no development should occur is recommended. 9. Maintenance of the integrity of the 350m Wahlberg's Eagle nest buffer throughout the lifespan of the proposed development and must be seen as a no-go area for development. 10. Development on habitat with high faunal sensitivity at the riparian thickets and drainage lines must be avoided. 11. Burial grounds TFC001, TFC004, TFC005, Site 2-1 and Site 2-2 are to be avoided. All burial grounds and graves should be retained and avoided with a buffer zone of 30m as per SAHRA guidelines. 	Contractor and dEO	Demarcation of sensitive areas and staying within approved areas for construction	ECO	Daily Monthly	Site inspection of sensitive No-Go areas

Management Objective: Construction-related activities in No-Go areas are prevented					
Management Outcome: Impact on No-Go areas are avoided through effective demarcation and management of these areas					
11. Monitoring during site clearing in a 20m radius from the identified archaeological sites TFC003 and Site 2-4 through the implementing of an archaeological watching brief.					

7.3 Soil Management

Management Objective: Additional construction-related activities impact on soils are prevented					
Management Outcome: Impact on soils are minimised or avoided through implementation of mitigation measures					
Impact Management Actions					
	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. A <i>Soil Management Method Statement</i> must be compiled by the Contractor and approved by the ECO. 2. Erosion/ sediment control measures such as use of silt curtains, erosion berms, sandbags etc. must be placed around the stockpiles to limit sediment runoff from stockpiles. 3. Subsoil and topsoil must be stockpiled separately. Stockpiled soil must be replaced in the reverse order to which it was removed (subsoil first followed by topsoil). 4. Stockpiles of construction materials must be clearly separated from soil stockpiles in order to limit any contamination of soils. 5. The maximum depth of topsoil stripping should be 30cm or as agreed with the ECO. 6. If additional unconsolidated material exists below 30cm and needs to be removed for construction purposes, it must be stripped and stockpiled separately from the upper 30cm topsoil. 7. The stockpiles must only be placed within demarcated stockpile areas. 8. Stockpiled soils must be kept free of weeds and must not be compacted. 9. Limiting the stockpile height to 3m and the slope to 1 in 5 and rounding the top edges. 10. Excavated materials must not be contaminated, and it must be ensured that the minimum surface area is taken up. The mixture of the lower and upper layers of the excavated soil must be kept to a minimum, so as for later use as backfill material after construction has commenced. 11. Soil must be lightly recompacted to a depth of 450mm, and all construction material must be removed from the site upon the completion of construction or used in the rehabilitation process.	Contractor and dEO	Method Statement to be compiled for soil stockpile management	dEO ECO	Daily Monthly	Site inspection and compliance with Method Statement

Management Objective: Additional construction-related activities impact on soils are prevented					
Management Outcome: Impact on soils are minimised or avoided through implementation of mitigation measures					
<p>12. Topsoil must be stockpiled separately from other material outside the delineated extent of the freshwater ecosystems and their associated 20m development exclusion buffer.</p> <p>13. For the construction of the powerlines material used as bedding material (at the bottom of the excavated pit) should be stockpiled as close as possible to the support structures footprint area. Once the pit has been excavated, the bedding material must be placed directly within the pit, rather than stockpiling it alongside the pit:</p> <ol style="list-style-type: none"> Soil removed for excavating the pit should be used as backfill material. All excavated pits must be compacted to natural soil compaction levels to prevent the formation of preferential surface flow paths and subsequent erosion. Conversely, areas compacted as a result of construction activities must be loosened to natural soil compaction levels. Any remaining soil following the completion of backfilling of the pits is to be spread out thinly surrounding the installed support structures (outside of the delineated freshwater ecosystems) to aid in the natural reclamation process. 					
<p>14. If an activity will mechanically disturb the soil below surface in any way, then any available topsoil must first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.</p>	Contractor	<p>Record GPS positions if it is an area of greater than 25m²</p> <p>Record the date of topsoil stripping and replacement</p>	dEO ECO	As required, whenever areas are disturbed	Site inspection and review of records
<ol style="list-style-type: none"> A <i>Soil Erosion and Sedimentation Control Method Statement</i> must be compiled by the Contractor and approved by the ECO prior to construction. Vegetation/ soil clearing, and stripping activities must only be undertaken during agreed working times and permitted weather conditions. Construction activities must be scheduled to minimise the duration of exposure to bare soils on-site. All erosion control measures must be maintained and monitored monthly and sediment accumulating behind the structures must be removed and redistributed to ensure that structures do not fail. Conduct inspections after each rainfall event to identify areas of erosion. 	Contractor and dEO	Method Statement to be compiled for erosion control and sedimentation	dEO ECO	Daily Monthly	Site inspection and compliance with Method Statement

Management Objective: Additional construction-related activities impact on soils are prevented					
Management Outcome: Impact on soils are minimised or avoided through implementation of mitigation measures					
6. Implement an effective system of stormwater runoff control at all points of disturbance where water accumulation might occur. The system must effectively collect and safely disseminate any runoff water from all hardened surfaces, and it must prevent any potential down slope erosion. Any occurrences of erosion must be attended as per agreement with the ECO and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring.					
7. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.					

7.4 Vegetation Clearing

Management Objective: Construction-related activities are undertaken in a manner which prevents additional impacts to vegetation					
Management Outcome: Vegetation clearance and associated impacts are minimised through adherence of EMPr vegetation clearance requirements					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Areas proposed for vegetation clearance must be clearly marked and no heavy vehicles should travel beyond the marked area.	Contractor & dEO Ecologist	Working within demarcated areas Alien and Invasive Plant Management Plan	dEO ECO	Weekly (dEO) Monthly (ECO) Annually (Ecologist)	Site inspections
2. The retention of a vegetated buffer zone between the edge of the proposed infrastructure footprint and the outer boundary of the facility, within which the existing vegetation should be retained, where the design allows for this.					
3. Cleared vegetation and debris that has not been utilised must be collected and can be mulched and composted. Under no circumstances may it be burned on-site.					
4. All bare surfaces across construction site must be checked for Alien Invasive Plants (AIPs) monthly as prescribed and disposed of as permitted.					
5. Herbicides must be utilised where hand pulling/ uprooting is not possible.					
6. No painting or marking of rocks or vegetation to identify locality or other information must be allowed, as it will disfigure the natural setting. Marking must be done by steel stakes with tags, if required. All temporary markings must be removed upon completion of the construction.					
7. Collection of branches, wood (dead or alive), shrubs or any vegetation for fire making purposes is strictly prohibited.					

Management Objective: Construction-related activities are undertaken in a manner which prevents additional impacts to vegetation					
Management Outcome: Vegetation clearance and associated impacts are minimised through adherence of EMPr vegetation clearance requirements					
<p>8. An <i>Alien and Invasive Plant Management Plan</i> must be compiled with the assistance of a qualified specialist and must be made available to the DFFE or applicable competent authority on request.</p> <p>9. The methods employed to control and eradicate a listed invasive species must also be directed at the offspring, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating or re-establishing itself in any manner.</p> <p>10. The removed vegetation must be stockpiled outside of the delineated boundary of the watercourse. The footprint areas of these stockpiles should be kept to a minimum, and may not exceed a height of 2m.</p> <p>11. During excavation activities, the topsoil and vegetation should be stockpiled separately from other material outside of the 20m development exclusion buffer.</p> <p>12. Revegetation must consider drought and heat resistant species.</p> <p>13. Where clearing of vegetation at a large scale (i.e. in the solar panel array footprints) is to be undertaken, no large-scale indiscriminate clearing of vegetation from the entire footprint must be undertaken. Rather blocks of vegetation must be systematically cleared of vegetation to avoid the creation of large volumes of dust and to control stormwater runoff during construction.</p>					

7.5 Protection of Fauna

Management Objective: Construction-related activities are undertaken in a manner which prevents additional impacts to fauna and wildlife						
Management Outcome: Impacts on fauna are minimised through adherence of EMPr requirements						
Impact Management Actions		Implementation		Monitoring		
General		Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<p>1. Personnel and staff should be advised by means of induction and environmental awareness training on the biodiversity importance of the area. The intentional killing of any faunal species (in particular invertebrates, reptiles and snakes) must be avoided by means of awareness programmes presented to the labour force. The labour force must be made aware of conservation issues pertaining to the taxa occurring on the study site.</p> <p>2. Establish operational procedures for eventualities in dealing with snakebites.</p> <p>3. No wild animal may under any circumstance be hunted, snared, captured, injured, killed, harmed in any way or removed from the</p>		Contractor	<p>Awareness Training</p> <p>Injuring, capturing, killing of animals identified on-site must be reported as an</p>	dEO ECO	Weekly Monthly	Training material relating to wildlife management

Management Objective: Construction-related activities are undertaken in a manner which prevents additional impacts to fauna and wildlife					
Management Outcome: Impacts on fauna are minimised through adherence of EMP requirements					
<p>site. This includes animals perceived to be vermin (such as snakes, rats, mice, etc.). Nests must be protected and no eggs must be collected.</p> <p>4. All sites should be fenced with a permeable fence structure to allow the free movement of smaller-bodied animal species.</p> <p>5. Due to the type of development, the type and nature of demarcation should not attempt to facilitate free movement of smaller animals as this could lead to unwanted presence (and accidental killing) of animals within the development site.</p> <p>6. Any fauna that are found within the construction zone must be moved to the closest point of natural or semi-natural habitat outside the construction corridor. The handling and relocation of any animal perceived to be dangerous/ venomous/ poisonous must be undertaken by a suitably trained individual. A permit from the relevant conservation authority may be required.</p> <p>7. All vehicles accessing the site should adhere to a low-speed limit (40km/hr is recommended) to avoid collisions with susceptible species such as reptiles (snakes and lizards).</p> <p>8. Natural corridors (e.g. riparian thicket and drainage lines) must be retained between the sites to promote and allow for the movement of mobile fauna.</p>		environmental incident and investigated			
<p>Avifauna:</p> <p>1. The appointed dEO and ECO must be trained by an avifaunal specialist to identify the potential Red Data species as well as the signs that indicate possible breeding by these species.</p> <p>2. The dEO and ECO must then, during audits/ site visits, make a concerted effort to look out for such breeding activities of Red Data species, and such efforts may include the training of construction staff (e.g. in Toolbox talks) to identify Red Data species, followed by regular questioning of staff as to the regular whereabouts on-site of these species.</p> <p>3. Anti roosting spikes/ diverters should be fitted to the solar panels, if required.</p> <p>4. Placing of bird flight diverters along the spans of the power line crossing the drainage lines, or located within 100m each side of the drainage line riparian zones.</p> <p>5. During the establishment (construction) of the powerline servitudes in areas of residual natural vegetation, especially within riparian corridors, clearing of vegetation must be limited to what is technically required and woody vegetation within drainage lines that is below the minimum clearance distance to the lines must not be indiscriminately felled.</p>	dEO	<p>Training on Red Data avifauna species</p> <p>Implement a Bird Monitoring Programme</p>	dEO ECO	Monthly	<p>Site inspection</p> <p>Bird Monitoring Reports</p>

Management Objective: Construction-related activities are undertaken in a manner which prevents additional impacts to fauna and wildlife					
Management Outcome: Impacts on fauna are minimised through adherence of EMP requirements					
6. With the exception of Site 4B (and Phase 1 Site 4) – see point 7 below in which a narrower construction window in the winter is specified - the bulk of construction should as far as possible be timed to occur in the drier winter months when most bird species are not breeding, and when many granivores tend to become nomadic in nature and less territorial.					
7. No commencement of construction (especially vegetation clearing and bulk earthworks) for the solar power site on Phase 1 Site 4 and Phase 2 Site 4B and its surrounds must occur within the designated 350m buffer around the Wahlberg's Eagle nest until such time as the Wahlberg's Eagles have left the area on their northward migration in April and before their arrival in August, as stipulated in the EA Amendment for the Phase 1 Solar Development.					
8. Monitoring of the Wahlberg's Eagle nest site must continue (as part of the general recommended pre-, during- and post-construction (operational) avifaunal monitoring on the development sites and wider study area) on a yearly basis in the period prior to the start of construction, through the construction phase, and for five (5) subsequent years after the end of construction.					

7.6 Protection of Ground- and Surface Water Resources

Management Objective: Construction-related activities is undertaken in a manner which prevent additional impacts to ground- and surface water resources					
Management Outcome: Impacts on ground- and surface water resources are minimised					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Mitigation for spillage or leakages include bunded areas to store chemical and/ or fuel.	Contractor	Prevention of any spillage into ground- and surface water resources	dEO ECO	Daily Monthly	Site inspection
2. Spillages must be cleaned up immediately and contaminated soil must either be remediated in situ or disposed of at an appropriately licenced landfill site.					
3. Potentially contaminating wastes (empty containers for paint, solvents, chemicals, etc.) and cement must be stored in bunded areas until removed by a reputable contractor for disposal at an appropriately licenced facility.					
4. Drip trays with plugs must be utilised at all dispensing areas.					
5. Vehicles must be service in the dedicated workshop area.					
6. It is preferred that all construction works be undertaken during the dry winter months.					
7. Limit water use to sustainable levels.					

Management Objective: Construction-related activities is undertaken in a manner which prevent additional impacts to ground- and surface water resources					
Management Outcome: Impacts on ground- and surface water resources are minimised					
8. During and after clearing regular spraying of non-potable water or the use of chemical suppressants, that are approved for use near freshwater ecosystems must be implemented to reduce dust and to ensure no smothering of vegetation within the adjacent freshwater ecosystems occurs from excessive dust settling. It is recommended that a suitably qualified specialist be consulted for approval of the product and conditions for use.					

7.7 Spills, Incident and Pollution Control

Management Objective: To avoid, manage and mitigate potential impact on the environment due to spillages					
Management Outcome: Impacts to the environment soils, surface and groundwater is avoided (where possible) or managed					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> <i>A Spill Contingency Plan</i> must be compiled by the Contractor. In the event that a pollution incident occurs on-site, the Contractor must: <ul style="list-style-type: none"> Implement reasonable measures immediately to contain and minimise the impacts of the incident; Refer to the MSDS if applicable to determine clean up requirements; Investigate and determine the root cause. The causes must be addressed in an Action Plan; Notify all persons whose health is affected by the incident; Undertake clean up procedures immediately as appropriate; Notify the dEO and ECO of the incident immediately who will advise the employee as to the measures that must be implemented; Record the incident in the <i>Environmental Incident Register</i>; and Implement measures to prevent similar incidents from occurring in the future. In the event of a significant spillage that cannot be contained and which poses a serious threat to the environment, the following Departments must be informed within forty-eight (48) hours of the incident and in accordance with Section 30 of the NEMA: <ul style="list-style-type: none"> The relevant Municipality; Department of Forestry, Fisheries and the Environment; Department of Water and Sanitation; and The Local Fire Department. 	dEO & Contractor	Construction staff to be trained in spill management Spill Contingency Plan Updated Environmental Incident Register	dEO ECO	Daily Monthly	Site inspection Inspection of Environmental Incident Register Compliance with Spill Contingency Plan Provision of spill kits

Management Objective: To avoid, manage and mitigate potential impact on the environment due to spillages					
Management Outcome: Impacts to the environment soils, surface and groundwater is avoided (where possible) or managed					
4. Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly disposed of using appropriate spill kits. Any contaminated soil from the construction site must be removed and rehabilitated or disposed appropriately at the nearest landfill site. The ECO must be notified immediately when a spill occurs.					
Wastewater 1. In the event that wastewater needs to be treated and released into the environment, an Environmental Risk Assessment must be conducted, and an approval process (in terms of applicable environmental legislation) must be undertaken prior to implementation.	Contractor	Collection, storage, treatment and/ or disposal of wastewater	ECO	Monthly	Site inspection Proof of SDCs

7.8 Hazardous Substances

Management Objective: To minimise the risk of impact to the environment through the safe storage, handling, use and disposal of hazardous substances					
Management Outcome: The management of hazardous substances is undertaken in accordance with the Hazardous Substances Act (Act No. 15 of 1973)					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> Hazardous storage and refuelling areas must be bunded prior to their use on-site during the construction period following the appropriate SANS codes. MSDSs for all hazardous substances must be filed in the Site Environmental File. Fire-fighting equipment must be present at all hazardous storage facilities. Fuel storage containers must be regularly inspected to prevent leaks. Drums (220ℓ) or another appropriate storage container must be kept on-site to collect contaminated soil. These containers must be labelled and sealed to prevent the ingress of water. Contaminated soil must be disposed of at a licenced hazardous waste site. If a water pump is required, the water pump must operate within to prevent any spillage and limit the risk of soil/ water contamination. The drip tray will need to be lined with absorbent pads and checked daily while in use. Water leaks into the drip tray must be prevented and attended to as appropriate. 	Contractor	Bunding of hazardous storage sites	dEO ECO	Daily Monthly	Site inspection of hazardous storage areas and inspection of drip trays and impervious surfaces

7.9 Water Supply

Management Objective: Undertake responsible water usage during construction					
Management Outcome: Water for construction is compliant with the requirements of the National Water Act (Act No. 36 of 1998)					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> Only approved/ licenced sources of water must be used for construction on the construction site and in the construction camp. Water for human consumption must be available at the site offices and at other convenient locations on-site where work occurs. 	Contractor	Approved/ licenced sources of water	ECO	Monthly	Site inspection

7.10 Stormwater Management

Management Objective: Stormwater is managed across the construction area					
Management Outcome: Avoid, prevent and manage impacts related to stormwater					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> An updated <i>Stormwater Management Plan (SWMP)</i> must address stormwater management during construction and the final developed infrastructure and approved by the ECO. Stormwater interventions as described in Section 6 - Conceptual Stormwater Management Plan of the Hydrology Report³ must be incorporated. Runoff generated from cleared and disturbed areas/ slopes that drains into watercourses must be controlled using erosion control and sediment trapping measures like berms, silt fences, sandbags and synthetic logs, particularly where slopes are exposed. These control measures must be established at regular intervals perpendicular to the slope to break surface flow energy and reduce erosion as well as trap sediment. Divert stormwater away from construction activities by the use of berms. The topography of the site is favourable in that it is situated on a slope so runoff will naturally drain away from site. Install a temporary cut off trench to contain poor quality runoff (if observed). Construct temporary silt traps at drainage points to allow sediment settlement from runoff. Return the drainage line to the previous geometry after construction and ensure sufficient measures are taken to divert water around the working area. 	Project Manager	SWMP	ECO	Monthly	Approval of SWMP

³ GCS, 2024, *Hydrological Assessment for the Samancor Tubatse Ferrochrome PV Plant Development Extension Sites Report*, Reference: 22-0865, Dated:04 March 2024

Management Objective: Stormwater is managed across the construction area					
Management Outcome: Avoid, prevent and manage impacts related to stormwater					
7. Rip rap must be placed on all outlet structures and indigenous vegetation established to bind the soil of the bed, to prevent erosion and assist with energy dissipation. This will also promote diffuse flow and decrease the velocity of water released downgradient towards the drainage lines. At no point must erosion or gully formation be allowed as this will have an impact on the water dispersal which could potentially reduce the extent and functionality of the riparian systems in the long-term.					
8. After installation of stormwater outlets, the area surrounding the outlets should be re-seeded with indigenous riparian vegetation.					
9. Berms, sandbags and/ or silt fences employed must be maintained and monitored for the duration of the construction phase and repaired immediately when damaged. The berms, sandbags and silt fences must only be removed once vegetation cover has successfully re-colonised the disturbed areas post-rehabilitation.					

7.11 Ablution/Sanitation

Management Objective: Adequate number of clean ablution/ sanitation facilities are available to all staff to minimise impacts on the environment					
Management Outcome: No pollution or disease arises in terms of poorly maintained ablution / sanitation facilities or lack thereof					
Impact Management Actions		Implementation		Monitoring	
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. A minimum ratio of one chemical toilet must be provided per 15 persons. Chemical toilets must be serviced a minimum of once every week. A SDC and/ or waste manifest must be obtained and kept on-site. The construction of "long drop" toilets, including French drains or soakaway systems is prohibited. Under no circumstances must open areas or the surrounding bush be used as toilet facilities.	Contractor	Provision of ablution facilities during construction	dEO	Daily	Proof of servicing and safe disposal
2. The chemical toilets must be strategically placed (easily accessible to workers, preferably no more than a 300 m from the work-face).		Approval for the treatment and release of wastewater (if applicable)	ECO	Monthly	Water use authorisation for the release of wastewater into the environment
3. All ablution activities must take place in these facilities, and the waste material must be removed from site on a regular (weekly) basis by a permitted Waste Contractor for safe disposal at a licenced waste disposal facility or a municipal wastewater treatment works.					
4. All temporary/ portable toilets must be secured to the ground to prevent them from toppling due to wind or any other cause.					
5. If toilet facilities are to be constructed, these must be linked to conservancy tanks. All wastewater within conservancy tanks must be removed on a frequent basis (weekly).					

Management Objective: Adequate number of clean ablution/ sanitation facilities are available to all staff to minimise impacts on the environment					
Management Outcome: No pollution or disease arises in terms of poorly maintained ablution / sanitation facilities or lack thereof					
6. Unauthorised dumping/ spilling of waste from toilets into the environment and/ or burying of waste are strictly prohibited.					

7.12 Access Roads

Management Objective: Minimise impacts to the environment through the use of existing and established access routes					
Management Outcome: Construction vehicle movement are restricted to approved routes					
Impact Management Actions					
	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. Existing roads must be used as far as practical to gain access to the site and crossing the streams in areas where no existing crossing is apparent must be discouraged, but if this is essential crossings must be made at right angles. 2. Access of all construction and material delivery vehicles must be strictly controlled and vehicles (type e.g. private, heavy, number plates, owner etc.) recorded. 3. Security gates must be provided at the entrance of site. 4. Strategic positioning of entry and exit points to ensure as little impact/ effect as possible on the traffic flow. 5. The main routes to the site must be clearly defined and signposted. 6. During the construction of internal roads and associate cable installation that may potentially traverse watercourses, a buffer of no more than 5m on either side of the proposed road reserve through the watercourses may be impacted. This area must be cordoned off, and no vehicles or personnel are permitted outside of the authorised construction area. 7. Any remaining soils following the completion of backfilling of the trenches are to be spread out thinly in an area within the watercourses to aid in the natural reclamation process. 8. Runoff/ stormwater control measures on either side of roads and at the solar facilities must be constructed so that small terrestrial animals can cross them. Ditches/ trenches should have slopes of less than 45° rather than vertical sides. 9. For the proposed internal access roads the construction footprint must be limited to a 10m wide construction Right of Way (RoW) that includes the road footprint. 10. Any removed vegetation must be stockpiled outside of the delineated boundary of the drainage lines and their associated 20m development exclusion buffer area. 11. The disturbed part of the construction RoW outside of the road footprint must be revegetated with suitable indigenous vegetation to 	Contractor	Access roads must be identified, and agreements formalized/ approvals obtained before commencing construction	dEO ECO	Weekly Monthly	Site inspection

Management Objective: Minimise impacts to the environment through the use of existing and established access routes					
Management Outcome: Construction vehicle movement are restricted to approved routes					
prevent the establishment of alien vegetation species and to prevent erosion from occurring.					

7.13 Fires

Management Objective: Minimise the risk of fire during construction					
Management Outcome: Fire prevention measures are carried out in accordance with the National Veld and Forest Fire Act (Act No. 101 of 1998)					
Impact Management Actions					
	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. Prevent all open fires on-site. 2. The irresponsible use of welding equipment, oxy-acetylene torches, and other naked flames, which could result in veld fires, or constitute a hazard should be guided by safe practice guidelines. 3. Provide demarcated fire-safe zones, facilities, and suitable fire control measures. 4. Emergency Procedures should be developed and implemented on-site during construction. 5. The workers must be educated on the dangers of open/ unattended fires. 6. Fire-fighting measures such as fire extinguishers must be located on-site. 7. The workforce must be trained in fire prevention and fire-fighting measures. 8. The burning of general waste material is prohibited. 9. Provide demarcated fire-safe zones, facilities and suitable fire control measures. 10. Contact numbers for the local Fire Fighting Unit must be communicated in the environmental awareness training and displayed at the camps. 	Contractor	Awareness training	dEO ECO	Daily Monthly	Site inspection

7.14 Vehicle and Equipment Maintenance

Management Objective: Vehicle and equipment maintenance are carried out in designated areas preventing pollution to soil, surface water and groundwater resources					
Management Outcome: Impacts to soil, surface water and groundwater resources are avoided or minimised through the implementation of management actions					
Impact Management Actions					
	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Heavy machinery and construction vehicles must be parked in the designated area at the construction camp/ laydown area.					

Management Objective: Vehicle and equipment maintenance are carried out in designated areas preventing pollution to soil, surface water and groundwater resources					
Management Outcome: Impacts to soil, surface water and groundwater resources are avoided or minimised through the implementation of management actions					
<ol style="list-style-type: none"> 2. A dedicated maintenance area must be demarcated with an impermeable surface leading to an oil-water separator. 3. All machinery and equipment to be used within the sensitive working areas must be checked daily for oil and diesel leaks before gaining access to these working areas. 4. No vehicle must be repaired in any place other than in the dedicated maintenance yard – if such repairs are required the vehicle must be made safe (i.e. no leakage while being removed to the repair facility) and removed at the earliest opportunity to the repair facility. 5. Washing of vehicles on-site or at the construction camp is prohibited. The only exception is if a designated bund facility with an oil-water separator is constructed at the laydown /construction camp area. 6. The positioning of such a facility must be approved prior to construction by the ECO in consultation with the Engineer. 7. All vehicle re-fuelling is to take place outside of the development exclusion buffer. 	Contractor dEO	Dedicated maintenance area/ yard	dEO ECO	Monthly	Site inspection

7.15 Waste Management

Management Objective: To avoid, manage and mitigate potential waste impacts during the construction phase					
Management Outcome: Potential impacts to the environment caused by waste (general and hazardous) are avoided or managed					
Impact Management Actions	Implementation		Monitoring		
Solid Waste	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. Adequate rubbish bins and waste disposal facilities (general and hazardous waste) must be provided on-site and at the shared infrastructure area. 2. The construction site must be kept clean and tidy and free from rubbish. 3. Recycling/ re-use of waste must be encouraged. 4. No solid waste must be burned on-site. 5. Bins and/ or skips must be supplied at convenient intervals on-site for disposal of waste within the construction camp(s). The bins must have liner bags for easy control and safe disposal of waste. 6. Bins must be provided to all areas that generate waste e.g. worker eating and resting areas and the camp site. General refuse and construction material refuse as well as hazardous waste must not be mixed. 	Contractor	General camp house-keeping Provision of bins Waste Register/Matrix Waste documents Awareness training on	dEO ECO	Daily Monthly	Approved Waste Register/Matrix Provision of waste disposal facilities (bins & skips) Proof of waste documents (SDCs, weighbridge

Management Objective: To avoid, manage and mitigate potential waste impacts during the construction phase					
Management Outcome: Potential impacts to the environment caused by waste (general and hazardous) are avoided or managed					
<p>7. Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be covered with a lid).</p> <p>8. Hazardous waste must be disposed of at a licenced hazardous waste landfill site.</p> <p>9. Waste bins must be cleaned out weekly or when capacity has been reached to prevent any windblown waste and/ or visual disturbance.</p> <p>10. Skips must be covered by tarpaulin or sail and bins must have lids.</p> <p>11. Once loaded onto a truck, the rubble (inert waste i.e. concrete, sand, rock etc.) must be taken to a recognised local municipal landfill site as approved by the ECO. Waybills or a signed waste manifest (with all relevant signatures) or as a last resort photographic record of the waste disposal at the local municipal landfill site must be provided as proof of safe disposal. The truck must be covered with tarpaulin or a sail.</p> <p>12. Should rubble be required as a raw material for the construction, it must be taken to a designated stockpile area - which must be approved by the ECO.</p> <p>13. Spoil material must be hauled to a designated spoil site approved by the ECO. No spoil material must be discarded on-site.</p> <p>14. A Waste Register/Matrix must be compiled and completed monthly.</p> <p>15. A full paper trail for waste disposal must be kept that includes: permits to operate (handle, transport waste); Waste Management Licences (for both storage and waste disposal facilities - where applicable) for Waste Handling Contractor/ s; Waste Registrations (for storage of waste, and recycling facilities - where applicable] for Waste Handling Contractor/ s; Waste Manifests; Weighbridge Certificates; Safe Disposal Certificates and Certificates of Recycling.</p> <p>16. The provisions of the NEM: Waste Act and Norms and Standards for the Storage of Hazardous Waste and Recycling or Recovery of Waste must be complied with.</p> <p>17. The burning of general waste material is not allowed.</p> <p>18. A periodic (at least annual) clean-up of the surrounding natural environment should be undertaken to remove litter and prevent unwanted deterioration of the surrounding natural environment.</p> <p>19. The Municipality has one licensed landfill site situated at Apel. The site is a general waste facility, no hazardous waste is allowed, therefore all the general waste generated during construction and operational phase must be disposed at the Malogeng Landfill site in Apel.</p>		<p>waste minimisation and re-use</p>			<p>receipts, recycling certificates)</p>

Management Objective: To avoid, manage and mitigate potential waste impacts during the construction phase					
Management Outcome: Potential impacts to the environment caused by waste (general and hazardous) are avoided or managed					
20. The life span for the solar module is 30 years. As the panels are classified a hazardous waste, the disposal of the panels will be according to waste legislation and waste disposal followed by TFC to a licenced hazardous waste facility. The waste will not be disposed of into any landfills within the Sekhukhune District Municipality and no additional burden will be placed on these landfills.					

7.16 Batching Plants

Management Objective: To avoid, manage and mitigate potential impact on the environment due to spillages and contamination					
Management Outcome: Minimise spillages and contamination of soil, surface water and groundwater					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. A Method Statement must be compiled for Batching Plants (if required). 2. No mixed concrete may be deposited outside of the designated construction footprint. 3. Batching plant areas (if any) must be fitted with a containment facility for the collection of cement-laden water. 4. Mixing of concrete (if not provided via ready mix trucks) must take place on trays, shutter boards or on impermeable surfaces. 5. Runoff from cement/ concrete batching areas must be directed to an excavation lined with DPM plastic and allowed to dry out before being broken up and re-used elsewhere or safely disposed of at a licenced disposal facility. 6. Concrete spilt outside of the demarcated area must be promptly removed and taken to a suitably licensed waste disposal site. 7. No tracking of wet concrete is allowed. 8. Wet concrete must be cleared from site daily. 9. Only dry concrete may be stockpiled directly on the ground. 10. Empty cement bags (if ready mix is not provided on-site) must be secured with adequate binding material if these will be temporarily stored on-site. 11. Fresh concrete and cement mortar must not be mixed near the freshwater ecosystems. Mixing of cement may be done within the construction camp, however, may not be mixed on bare soil, and must be within a lined, bound or banded portable mixer. Consideration must be given to the use of ready mix concrete. 	Contractor	Method Statement for Batching Plants	dEO ECO	Monthly	Approved Method Statement for Batching Plants Site inspection

Management Objective: To avoid, manage and mitigate potential impact on the environment due to spillages and contamination					
Management Outcome: Minimise spillages and contamination of soil, surface water and groundwater					
12. A washout area must be designated outside of the freshwater ecosystems, and wash water must be treated on-site or discharged to a suitable sanitation system.					
13. Cement bags must be disposed of in the demarcated hazardous waste receptacles and the used bags must be disposed of through the hazardous substance waste stream.					
14. Spilled or excess concrete must be disposed of at a suitable landfill site. Chain of custody documentation must be provided.					

7.17 Noise Management

Management Objective: To avoid or prevent unnecessary noise to the environment by ensuring noisy construction activities are mitigated					
Management Outcome: Noise management is undertaken in accordance with SANS 10103 and the Occupational Health and Safety Act (Act No. 85 of 1993)					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> Surrounding communities and adjacent landowners are to be notified upfront (within 48 hours) of noisy construction activities (blasting, excavations and piling activities). All construction vehicles and equipment must be kept in good repair. Construction activities must be limited to the period 06h00 to 18h00. With regard to unavoidable noisy construction activities in the vicinity of noise sensitive areas, the Developer should liaise with adjacent landowners/ occupants on how best to minimise the impact. Machines in intermittent use must be shut down or throttled down to a minimum whenever practicable. Noise levels must be kept within prescribed limits. All noise and sounds generated must adhere to SANS 10103 specifications for maximum allowable noise levels for rural areas. No pure tone sirens or hooters must be utilised except where required in terms of Safety and SANS standards or in emergencies or during emergency drills. Construction staff working in an area where the 8-hour ambient noise levels exceed 85dBA must have the appropriate Personal Protective Equipment (PPE) (earmuffs). All operations must meet the noise standard requirements of the Occupational Health and Safety Act (Act No. 85 of 1993). A <i>SHEQ Complaints Register</i> must be kept at the Site Office at all times. 	Contractor	Compliance with SANS 10103 and OHS Act Use of appropriate PPE	dEO ECO	Daily Monthly	Inspection of SHEQ Complaints Register Site inspection

7.18 Air Quality

Management Objective: To reduce air quality (dust, emission and odour) during construction activities					
Management Outcome: Minimal dust, emissions and odour due to adherence of management actions					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Dust must be suppressed on the construction site as well as access roads and active working areas during dry periods by the regular application of water. 2. The use of water for dust suppression must be considered in context of reduced water availability. 3. Water used for this purpose must be used in quantities that will not result in the generation of runoff. 4. A speed limit of 40 km/hr must be set for all vehicles travelling over exposed areas or near stockpiles. 5. Dust suppression measures must be implemented, especially on road stretches located within 500m of households/ farmsteads located close to the access route. 6. The retention of a natural buffer (with a minimum width of 15 – 20m) comprising of natural vegetation (i.e. the natural trees and shrubs that are present on the development sites) along the boundary of each site would assist with dust mitigation. 7. A <i>Dust Suppression Register</i> must be kept on-site. 8. Dust fallout from the construction and batching areas must be monitored by dust collection buckets located downwind of construction area. Monitoring in accordance with SANS 2004. 9. Construction activities must avoid the use of old or improperly functioning equipment that use fossil fuels in an inefficient manner or that release fugitive emissions. 10. Vegetation along the borders of the site must as far as reasonably possible, not be removed, in order to act as a form of wind buffer for dust mitigation. It is further recommended that ground cover must be (re-) established to prevent erosion and dust.	Contractor	Regular dust suppression Maintaining a dust suppression register Dust fallout monitoring Plant and equipment must be in good working order	dEO ECO	Daily Monthly	Site inspection Dust suppression register Records from dust fallout monitoring Inspection of Dust Suppression Register Servicing Receipts

7.19 Protection of Heritage and Palaeontological Resources

Management Objective: Prevent damage and destruction to fossils, archaeological site and material of heritage significance					
Management Outcome: Impact to heritage and palaeontological resources are managed in terms of the National Heritage Act					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Implement a chance to find procedure in case where possible heritage finds are uncovered.					

Management Objective: Prevent damage and destruction to fossils, archaeological site and material of heritage significance					
Management Outcome: Impact to heritage and palaeontological resources are managed in terms of the National Heritage Act					
<p>2. An appropriately qualified heritage practitioner/archaeologist must be identified to be called upon if any possible heritage resources or artefacts are identified.</p> <p>3. All burial ground and graves should be retained and avoided with a buffer zone of 30m as per SAHRA guidelines.</p> <p>4. TFC001, TFC004, TFC005, Site 2-1 and Site 2-2 to be avoided. If this is not possible, the structures at TFC001, TFC004, TFC005 and Site 2-2 will be investigated through test excavation to determine if there are graves. If it is found to be graves these graves including the graves at Site 2-2 must be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of Section 36 of the NHRA and its regulations as well as the National Health Act and its regulations.</p> <p>5. Site locality TFC002-1 - TFC002-8's structures are of low significance, but to be avoided given the potential for infant burial and unmarked graves.</p> <p>6. It is recommended that the possibility of stillborn burials are investigated through a stakeholder engagement process. If it is found that there are still born burials present the remains must be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of Section 36 of the NHRA and its regulations as well as the National Health Act and its regulations.</p> <p>7. Monitoring during site clearing in a 20m radius from the identified archaeological Sites TFC003 and Site 2-4 through the implementing of an archaeological watching brief.</p> <p>8. The ECO for this project must be informed that the Magaliesberg Formation has a high palaeontological sensitivity.</p> <p>9. If palaeontological heritage is uncovered during surface clearing and excavations the Chance Find Protocol attached should be implemented immediately. Fossil discoveries ought to be protected and the ECO/Project Manager must report to South African Heritage Resources Agency (SAHRA) (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carried out.</p> <p>10. Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum</p>	<p>Palaeontologist</p> <p>Contractor</p>	<p>Construction works to be halted until the relevant provincial heritage agency is contacted</p> <p>Implement Chance Find Protocol</p>	<p>dEO</p> <p>ECO</p>	<p>Once-off</p>	<p>Construction works to be halted until the relevant provincial heritage agency is contacted</p>

Management Objective: Prevent damage and destruction to fossils, archaeological site and material of heritage significance					
Management Outcome: Impact to heritage and palaeontological resources are managed in terms of the National Heritage Act standards for palaeontological impact studies suggested by SAHRA.					

7.20 Visual

Management Objective: Reasonable measures are taken to ensure intrusive visual impacts are minimised					
Management Outcome: No complaints about visual impact					
Impact Management Actions					
	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Clearing of vegetation must be undertaken in a phased manner, so as to prevent the large-scale exposure of soils and substrate that could result in a large visual contrast compared to the surrounding vegetation.					
2. The retention of a natural buffer (of a minimum width of 15-20m) of natural vegetation - i.e. the natural trees and shrubs that are present on the development sites would assist in the screening of the arrays from receptor locations located in closest proximity to these sites particularly for Site 5, where the design allows for this.	Contractor	Vegetation Clearance Method Statement	ECO	Monthly	Site Inspection

7.21 Traffic Management

Management Objective: Reasonable measures are taken to ensure the safety of public, pedestrians and construction workers at all times during construction					
Management Outcome: All precautions are taken where possible to minimise the risk of injury, harm, death or complaints. Compliance with the Occupational Health and Safety Act (Act No. 85 of 1993) and Regulations					
Impact Management Actions					
	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Adequate road warning signs and road markings must be introduced.					
2. The road signage must be carried out in accordance with the latest edition of the South African Road Traffic Signs Manual (SARTSM) and comply with the latest editions of the Southern African Development Community (SADC) Road Traffic Signs Manual.					
3. The delivery of materials by trucks must be phased through the day to the reduce the impact that trucks may have on traffic congestion and dust generation.					
4. On-site speed restrictions to be imposed for 15km/hr once through the security gate and 40 km/hr on the access roads to the site.					
5. Clear and early warning of construction vehicles Roads must be provided.	Contractor	Traffic Management Method Statement	dEO ECO	Monthly Daily	Approval of Traffic Management Method Statement

Management Objective: Reasonable measures are taken to ensure the safety of public, pedestrians and construction workers at all times during construction					
Management Outcome: All precautions are taken where possible to minimise the risk of injury, harm, death or complaints. Compliance with the Occupational Health and Safety Act (Act No. 85 of 1993) and Regulations					
6. Throughout the period of construction, the Province, District and Local Municipalities to be made aware of the name and contact details of the Engineer (PM) that they can communicate with should any matters arise in connection with any aspects of the construction that are affecting the road.					

7.22 Social Considerations

Management Objective: Negative social impacts are avoided or minimised and benefits are maximised					
Management Outcome: Social benefits and impacts associated with construction activities are enhanced (in the form of employment opportunities) or avoided/minimised (social ills associated with construction activities)					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> A Community Liaison Officer (CLO) must be appointed for the project to deal with the employment of local labour and to interface between the Contractor and the local community. The principles of equality, Broad-Based Black Economic Empowerment (BBBEE), gender equality and non-discrimination must be implemented. Due to the concentration of a workforce in the area over the construction period, the Contractor must implement an HIV/ AIDS Awareness Programme, annually on-site during construction. No informal settlements must be allowed. Project information must be communicated to Interested and Affected Parties (I&APs) to avoid misunderstandings and the creation of unrealistic expectations. A formal grievance/ complaint mechanism must be set up. All complaints must be recorded, followed up and resolved expeditiously. Local contractors and providers of goods and services must be used where practicable. The Contractor, in line with the relevant socio-economic focus of FGTM and Samancor Chrome's personnel policies, must develop an appropriate exit strategy for temporary employees. 	Contractor Community Liaison Officer	Labour recruitment policy Awareness training material relating to HIV/ AIDS	Developer ECO	Once-off	Recruitment of local labour to be included in contract documentation HR and Labour Policy

8 Environmental Management Programme: Operations

8.1 Alien Invasive Management

Management Objective: Operational activities are undertaken in a manner which prevents additional impacts to vegetation					
Management Outcome: Alien and invasive vegetation infestation is managed as per the requirements of NEM: BA and Regulations					
Impact Management Actions	Implementation			Monitoring	
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> Continue with the <i>Alien Invasive Plant Management Plan</i> established during the construction phase. The EM must compile relevant action plans to deal with the presence of alien and invasive species. The plan must include for control and eradication for a period of at least 5 years after the end of construction. Alien species monitoring be conducted on an annual basis during the wet/ growing season. Monitoring must focus on identified priority sites, as well as other disturbed sites throughout the site to identify potential new sites of colonisation. 	Operational Manager	IAP eradication and control	EM	Monthly	Site inspection

8.2 Protection of Fauna

Management Objective: Operations-related activities are undertaken in a manner which prevents additional impacts to fauna and wildlife					
Management Outcome: Impacts on fauna are minimised through adherence of EMP requirements					
Impact Management Actions	Implementation			Monitoring	
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<p>General</p> <ol style="list-style-type: none"> Site induction for contractors and personnel must include a familiarization with all aspects relating to environmental components of the project, as well as potentially occurring dangerous animals of the area and the correct actions to take when encountering dangerous species, notably snakes and scorpions. A competent person must be appointed to safely handle and remove any dangerous animal from the operational site. Establish operational procedures for eventualities in dealing with snakebites. Information signs regarding animals that may crossroads, notably during nocturnal periods, should be erected at selected localities. Monitoring of road conditions will inform sites where burrows are observed. Conduct regular screens to determine the occurrence/ density of invader taxa (e.g. invader/ alien rats and mice, domestic cats). If detected, a specialist in the field of pest control should be appointed to rectify the problem. 	Operational Manager Avifaunal Specialist Biodiversity Specialist	<p>Awareness Training</p> <p>Injuring, capturing, killing of animals identified on-site must be reported as an environmental incident and investigated</p> <p>Bird monitoring data</p>	EM	Monthly	<p>Training material relating to wildlife management</p> <p>Operational phase bird monitoring data report</p>

Management Objective: Operations-related activities are undertaken in a manner which prevents additional impacts to fauna and wildlife					
Management Outcome: Impacts on fauna are minimised through adherence of EMP requirements					
<p>7. No pets should be allowed on the premises.</p> <p>8. Develop and implement a biodiversity monitoring programme to establish long-term trends of floristic and faunal diversity patterns and the latent and immediate effects of the project on these receiving environments.</p> <p>Avifauna:</p> <p>1. Maintenance of the integrity of the 350m Wahlberg's Eagle nest buffer throughout the lifespan of the proposed development and the restriction of access (other than security personnel access) into this buffer area.</p> <p>2. The on-site operational facilities manager, ECO (or a suitably appointed Environmental Manager) must be trained by an avifaunal specialist to identify the potential Red Data species as well as the signs that indicate possibly breeding by these species.</p> <p>3. Monitoring at the Wahlberg's Eagle nest site must be undertaken during the species' breeding period in order to determine how the presence of the development affects breeding.</p> <p>4. Regular searches for carcasses of any bird fatalities associated with the operational solar facility must be undertaken, by an avifaunal specialist or a suitably trained ECO. Search focus must be directed at the areas/ components of the development highlighted as high risk for collisions, including all new powerline alignments, the arrays in the vicinity of the existing water bodies on the site, and the arrays located closest to the Steelpoort riparian corridor. The methods detailed in the BirdLife South Africa Guidelines must be applied.</p> <p>5. Operational lighting at the solar facility must be limited to low level security lighting and no floodlighting must be utilised.</p> <p>6. Active protection of sensitive habitats through fencing off from public access – in the context of Phase 2 this would include the riparian zones of the drainage lines located between sites 3B and 3C drainage lines located between the Site 2B development compartments and the fringing non-development buffer areas.</p> <p>7. Powerline servitudes must not be cleared of all woody vegetation and only woody vegetation infringing on the required clearance area around the lines must be felled.</p>					

8.3 Protection of Ground-and Surface Water Resources

Management Objective: Operational-related activities is undertaken in a manner which prevent additional impacts to ground- and surface water resources					
Management Outcome: Impacts on ground- and surface water are minimised during operations					
Impact Management Actions					
	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. The maintenance of a 20m development exclusion area buffer around all freshwater ecosystems is critical to buffering the drainage lines from the effects of the loss of vegetation cover and long-term alteration of infiltration and resultant runoff capacity of parts of the catchments of the drainage lines within the solar array footprint. 2. The buffer zones and drainage lines to be fenced into the solar development to protect the integrity of the drainage lines and associated buffer areas. 3. All water-related infrastructure (e.g. pipes, pumps, reservoirs, toilets, taps etc.) must be regularly inspected for leaks and repaired as soon as practically possible. Inspections must be recorded and filed. 4. Settled silt must be removed from runoff control berms regularly (every 6 months) and examined for contamination with oil and/ or hydraulic fluids. Contaminated material must be subjected to remediation or appropriate disposal in accordance with prevailing legislation. Clean silt can be used during re-vegetation of bare areas. 5. Potentially contaminating wastes produced during operations and maintenance activities must be stored in bunded areas until removed by a reputable contractor for disposal at an appropriately licenced disposal facility. 6. All cleaning products used on the site must be environmentally friendly and bio-degradable. 7. No indiscriminate driving through the watercourses may be permitted during standard operational activities or maintenance activities. Use must be made of the existing watercourse crossings only. 8. Routine maintenance of the roads must be undertaken to ensure that no concentration of flow and subsequent erosion occurs due to the road crossings. Such maintenance activities must especially be undertaken after high rainfall events. 9. Maintenance vehicles must make use of dedicated access roads and no indiscriminate movement in the watercourses may be permitted. 10. Ensure that routine inspections and monitoring of any instream infrastructure are undertaken to monitor the establishment of indigenous vegetation and the presence of any alien or invasive plant species. 	Operational Manager	Prevention of any spillage and/ or pollution of water resources	EM	Monthly	SDCs Site inspections

Management Objective: Operational-related activities is undertaken in a manner which prevent additional impacts to ground- and surface water resources					
Management Outcome: Impacts on ground- and surface water are minimised during operations					
11. Should erosion be noted that was caused by the road crossings the area must be rehabilitated by infilling the erosion gully and revegetation thereof with suitable indigenous vegetation. Use can also be made of rocks obtained from the surrounding area to infill any area prone to erosion, as a natural dispersal mechanism.					

8.4 Stormwater Management

Management Objective: Stormwater is managed across the operational area					
Management Outcome: Avoid, prevent and manage impacts related to stormwater					
Impact Management Actions					
	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. An updated SWMP must address stormwater management during operations and approved by the EM: <ul style="list-style-type: none"> ▪ Design the SWMP to ensure that the velocities of the stormwater runoff flow are kept to a minimum. ▪ Design release structures to dissipate stream power and disperse flow to ensure minimal impact on the receiving environment. ▪ Include erosion protection measures such as rip rap in release structures. ▪ Keep clean water away from dirty areas. ▪ Demarcated dirty areas to be limited to roads, parking areas and chemical storage areas. 2. Release structures must incorporate silt traps to allow for settlement of sediments. Silt traps to be regularly cleaned. 3. The surface infrastructure areas must be inspected to ensure that no concentrated runoff from these areas forms erosion gullies and eventually flow into the watercourses. Should this be noted, these gullies/preferential flow paths must be infilled with in situ material and appropriately revegetated. 4. Stormwater runoff from the road crossings must be monitored, so it does not result in erosion of the watercourses. Stormwater must be allowed to diffusely spread across the landscape, by ensuring adequate surface roughness in the watercourse (through vegetation and rocky areas). 5. Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water runoff control system and to specifically record the occurrence of any erosion on-site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring. 	Operational Manager	SWMP	EM	Monthly	Approval of SWMP

Management Objective: Stormwater is managed across the operational area					
Management Outcome: Avoid, prevent and manage impacts related to stormwater					
6. Revegetation of areas underneath and around the panel arrays will greatly reduce the velocities of run-off prevent erosion and reduce sedimentation. It is also recommended that a gravel erosion control strip be placed underneath the panel arrays.					

8.5 Spills, Incidents and Pollution Control

Management Objective: To avoid, manage and mitigate potential impact on the environment due to spillages					
Management Outcome: Impacts to the environment soils, surface and groundwater is avoided (where possible) or managed					
Impact Management Actions		Implementation		Monitoring	
		Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring
<p>1. In the event that a pollution incident occurs on-site, the Operational Manager must:</p> <ul style="list-style-type: none"> ▪ Implement reasonable measures immediately to contain and minimise the impacts of the incident; ▪ Investigate and determine the root cause. These causes must be addressed in an Action Plan to prevent a recurrence; ▪ Notify all persons whose health is affected by the incident; ▪ Undertake clean up procedures immediately; ▪ Notify the EO and ECO of the incident immediately who will advise the employee as to the measures that must be implemented; ▪ Record the incident in the <i>Environmental Incident Register</i>; and ▪ Implement measures to prevent similar incidents from occurring in the future. <p>2. In the event of a significant spillage that cannot be contained and which poses a serious threat to the environment, the following Departments must be informed within forty-eight (48) hours of the incident and in accordance with Section 30 of the NEMA:</p> <ul style="list-style-type: none"> ▪ The relevant Municipality; ▪ The Department of Forestry, Fisheries and the Environment; ▪ Department of Water and Sanitation; ▪ The Local Fire Department. <p>3. Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly disposed of using appropriate spill kits. MSDS must be referred to for clean-up requirements. Any contaminated soil from the construction site must be removed and rehabilitated or disposed appropriately at the nearest landfill site. The EO must be notified immediately when a spill occurs.</p>		Operational Manager	<p>Provision of sanitation facilities and bunding/ impervious surfaces for activities that may lead to soil and groundwater pollution</p> <p>Operational staff to be trained in spill management</p>	EM	Monthly
					<p>Site inspection</p> <p>Inspection of Environmental Incident Register</p> <p>Compliance with Spill Contingency Plan</p> <p>Provision of spill kits</p>

8.6 Hazardous Substances

Management Objective: To minimise the risk of impact to the environment through the safe storage, handling, use and disposal of hazardous substances					
Management Outcome: The management of hazardous substances is undertaken in accordance with the Hazardous Substances Act (Act No. 15 of 1973)					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
General 1. Hazardous storage and refuelling areas must be bunded prior to their use on-site during operations following the appropriate SANS codes. 2. MSDSs for all hazardous substances must be filed in the Site Environmental File. 3. Mixing of concrete during operation (if required) must take place on trays, shutter boards or on impermeable surfaces. 4. Drip trays with plugs must be utilised at all dispensing areas. 5. Drums (220l) or other suitable containers must be kept on-site to collect contaminated soil. These containers must be labelled and sealed to prevent the ingress of water. Contaminated soil must be disposed of at a licenced hazardous waste disposal facility.	Operational Manager	Bunding of hazardous storage sites MSDSs Inspections, communications, training, and drills	EM	Monthly	Site inspection of hazardous storage areas and inspection of drip trays and impervious surfaces

8.7 Waste Management

Management Objective: To avoid, manage and mitigate potential waste impacts during the operational phase					
Management Outcome: Potential impacts to the environment caused by waste (general and hazardous) are avoided or managed					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Adequate rubbish bins and waste disposal facilities (general and hazardous waste) must be provided on-site and at the shared infrastructure area. 2. Recycling/ re-use of waste must be encouraged. 3. Bins and/ or skips must be supplied at convenient intervals at the operational site for disposal of waste. 4. Bins must be provided to all areas that generate waste. Waste streams must not be mixed. 5. Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be covered with a lid). 6. Hazardous waste must be disposed of at a licenced hazardous waste landfill site. 7. Waste bins must be cleaned out weekly or when capacity has been reached to prevent any windblown waste and/ or visual disturbance. 8. Skips must be covered and bins must have lids. 9. A Waste Register/ Matrix must be compiled and completed monthly.	Operational Manager	General camp house-keeping Provision of bins Waste Register/Matrix Waste documents Awareness training on waste	EM	Monthly	Updated Waste Register/Matrix Provision of waste disposal facilities (bins & skips) Proof of waste documents (SDCs, weighbridge receipts,

Management Objective: To avoid, manage and mitigate potential waste impacts during the operational phase					
Management Outcome: Potential impacts to the environment caused by waste (general and hazardous) are avoided or managed					
10. A full paper trail for waste disposal must be kept that includes: permits to operate (handle, transport waste); Waste Management Licences (for both storage and waste disposal facilities - where applicable) for Waste Handling Contractor/ s; Waste Registrations (for storage of waste, and recycling facilities - where applicable) for Waste Handling Contractor/ s; Waste Manifests; Weighbridge Certificates; Safe Disposal Certificates and Certificates of Recycling.		minimisation and re-use			recycling certificates)
11. The provisions of the National Environmental Management: Waste Act and Norms and Standards for the Storage of Hazardous Waste and Recycling or Recovery of Waste must be complied with.					

8.8 Lighting

Management Objective: Reasonable measures are taken to ensure intrusive visual impacts are minimised					
Management Outcome: No complaints about visual impact					
Impact Management Actions					
	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Where not prescribed by technical or local and international requirements, external lighting must be of an intermittent and coloured nature rather than constant white light to reduce the potential impact on the movement patterns of nocturnal species.	Operational Manager	Complaints Register	EM	Monthly	Site inspection
2. Day night switches should be used where applicable.					
3. Lighting of the site during operation must be directional and limited to only the necessary areas to prevent light spillage.					
4. Lighting of the plant at night must be limited to security lighting (where this is necessary), and emergency operational lighting must only be lit when required.					
5. As the structures supporting the panels could create cumulative glint and glare if these are metallic and reflective, the consideration of non-reflective material for such supports is recommended.					
6. Minimize exterior lighting and implement operational strategies to reduce "spill light" although with the balance to achieve safety and security of the solar facilities. Outside features should be illuminated by using "down-lighting" rather than "up-lighting" as far as possible. Where possible, outside lighting should apply UV filters to high pressure mercury vapour lamps or fluorescent lights to minimise the attraction of nocturnal invertebrates to the lights.					

8.9 Fire

Management Objective: Minimise the risk of fire during operational activities					
Management Outcome: Fire prevention measures are carried out in accordance with the National Veld and Forest Fire Act (Act No. 101 of 1998)					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. Prevent all open fires on-site. 2. The irresponsible use of welding equipment, oxy-acetylene torches, and other naked flames, which could result in veld fires, or constitute a hazard should be guided by safe practice guidelines. 3. Provide demarcated fire-safe zones, facilities, and suitable fire control measures. 4. Emergency Procedures should be developed and implemented on-site during operations. 5. The workers must be educated on the dangers of open/ unattended fires. 6. Fire-fighting measures such as fire extinguishers must be located on-site. 7. The workforce must be trained in fire prevention and fire-fighting measures. 8. The burning of general waste material is prohibited. 9. Provide demarcated fire-safe zones, facilities and suitable fire control measures 10. Contact numbers for the local Fire Fighting Unit must be communicated in the environmental awareness training and displayed at the camps. 11. Fire breaks to be created annually prior to fire season. 	Operational Manager	Awareness training	EM	Monthly	Site inspection

9 Environmental Management Programme: Post-Construction and Rehabilitation

Management Objective: Post-construction and rehabilitation activities are undertaken in a manner which prevents additional impacts to the EMPr					
Management Outcome: The site is rehabilitated according to EMPr specifications					
Impact Management Actions	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. The Developer is responsible for compliance with the provisions for Duty of Care and Remediation of Damage in accordance with section 28 of National Environmental Management Act (NEMA), Act No. 107 of 1998. An overall Rehabilitation Plan to be compiled (which includes watercourse rehab) must be submitted to DFFE and DWS for approval prior to the commencement of rehabilitation activities. 2. Areas where surface infrastructure have been decommissioned and removed must be suitably compacted and revegetated to ensure 	Contractor	<p>Method Statement to be compiled</p> <p>Rehabilitation of Modified Environments</p> <p>Watercourse Rehabilitation,</p>	EM ECO	Monthly	<p>Approved Watercourse Rehabilitation, Management and Maintenance Plan</p> <p>Approved Method Statement for</p>

Management Objective: Post-construction and rehabilitation activities are undertaken in a manner which prevents additional impacts to the EMPr					
Management Outcome: The site is rehabilitated according to EMPr specifications					
<p>that no erosion occurs which may contribute to the sediment load of the watercourses.</p> <ol style="list-style-type: none"> 3. Should erosion gullies be noted, these areas must be rehabilitated by infilling them with suitable soil and ensuring the area is vegetated. The increased surface roughness will discourage concentrated flow paths to develop and ensure diffuse flow patterns. 4. Follow up revegetation should take place in areas where initial revegetation is not successful. 5. It is recommended that a <i>Watercourse Rehabilitation, Management and Maintenance Plan</i> must be compiled before construction and implemented during construction. Implementation must be overseen by a suitably qualified EM and the EM must sign off the rehabilitation before the relevant contractors leave site. 6. Post-construction monitoring of the watercourses (for a period of 3 years), with specific mention of the erosion and invasion of alien vegetation species) is recommended to be undertaken. 7. The use of locally indigenous plant species for landscaping and rehabilitation purposes is strongly recommended. Under no circumstances must exotic and invasive plants be used for landscaping purposes. 8. All remaining construction materials, building rubble and waste must be removed from the site. 9. All disturbed surfaces compacted by project must be ripped to a minimum depth of 30cm to allow organic contaminants to breakdown and promote vegetation establishment. 10. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion. 11. High flood peaks from the decommissioning footprint areas can be mitigated by ensuring that no concentrated runoff from the surface infrastructure area and subsequent cleared area enters the freshwater ecosystems. The velocity of surface water flow from these areas must be reduced by ensuring that the vegetation in the buffer area surrounding the freshwater ecosystems is intact or by the strategic placement of silt traps of hay bales as a means to obstruct flow but still allow flow to percolate at a reduced velocity and encourages a diffuse flow pattern. In this regard it is recommended an alien and invasive plant species management plan be implemented during the decommissioning phase to specifically prevent the spread of any such species into the sensitive ecological areas. 		<p>Management and Maintenance Plan</p> <p>SDC</p>			<p>the Rehabilitation of Modified Environments</p> <p>SDC</p>

Management Objective: Post-construction and rehabilitation activities are undertaken in a manner which prevents additional impacts to the EMPr					
Management Outcome: The site is rehabilitated according to EMPr specifications					
12. Channel banks associated with the freshwater ecosystems must be suitably rehabilitated (shaped end revegetated) to prevent any erosion from occurring.					
13. Should road crossings be decommissioned, road footprint areas within a freshwater feature must be levelled to the same level and shape as that of the upstream and downstream reaches. This will ensure a continuous bed level and prevent any concentration of surface flow from occurring;					

10 Compliance with Environmental Specification

The EMPr must form part of the Tender and Contract Documentation and is thus a legally binding document. It is also required for the Contractor to make provisions as part of their budgets for the implementation of the EMPr. In terms of *Polluter Pays Principle*. Section 28 of the NEMA, an individual responsible for environmental damage must pay the costs for both environmental and human health damage. As far as possible reasonable, feasible and implementable measures must be in place to reduce or prevent additional pollution and/ or environmental damage from occurring.

The EMPr must be considered to be an extension of the Conditions of Approval as set forth by the LEDET as well as the Generic EMPr and any other regulatory authority for relevant permits and/ or licences. As such, non-compliance with the EMPr will constitute non-compliance with said Conditions.

The Contractor (as well as sub-contractors, service providers and suppliers) is deemed not to have complied with the Environmental Specification/ EMPr if:

- There is evidence of contravention of clauses within the boundaries of the site, site extensions, construction camps and/ or haul/ access roads;
- Environmental damage ensues due to negligence;
- The Contractor ignores or fails to comply with corrective or other instructions issued by the Developer, ECO or Engineer, within a specified time; or
- The Contractor (as well as sub-contractors, service providers and suppliers) fails to respond to complaints from the public.

Non-Compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance. Non-compliance with the conditions of the EMPr constitutes a breach of contract.

10.1 Penalties

Application of a penalty clause will apply for incidents of non-compliance. The Contractor (as well as sub-contractors, service providers and suppliers) must be allowed one non-compliance and a Written Warning Notification must be issued to the Contractor's Environmental Officer. Failure to rectify the non-compliance within an agreed upon time of the issue of the warning or a repeat non-compliance will result in a penalty.

The penalty must be issued by a representative of the Developer. The penalty imposed must be per incident at the discretion of the Developer's Project Manager or any other duly authorised representative. The value of the penalty imposed shall be as defined in the contract and enforcement shall be at the discretion of the Developer. Such fines must be issued in addition to any remedial costs incurred as a result of non-compliance with the EMPr. The Developer will inform the Contractor of the contravention and the amount of the penalty and will deduct the amount from monies due under the Contract. The penalty monies must become the property of the Developer to be used for rehabilitation and maintenance of the site.

Unless stated otherwise in the project specification the penalties imposed per incident or violation must be:

Table 10-1: Penalties applicable

OFFENCE	AMOUNT
Failure to respond to complaints within specified timeframe	R10,000
Failure to close findings raised by the ECO within specified timeframes	R10,000
Failure to demarcate working areas	R10,000
Working outside of demarcated areas	R30,000
Failure to strip topsoil with intact vegetation	R50,000
Failure to stockpile topsoil correctly	R30,000
Failure to stockpile materials in designated areas	R10,000
Failure to take measures to prevent soil contamination	R10,000
Failure to take measures to control dust dispersion on-site and on access roads leading to site	R10,000
Pollution of water bodies and/ or groundwater	R20,000
Failure to implement stormwater management provisions during construction	R20,000
Failure to implement/ maintain erosion controls	R30,000
Failure to provide adequate sanitation	R10,000
Failure to provide adequate waste disposal facilities and services	R50,000
Failure to reinstate disturbed areas within the specified time-frame	R30,000
Any other contravention of the project specific specification	R10,000

10.2 Removal from Site and Suspension of Works

Failure to remediate after the issue of a financial penalty, depending on the severity and significance of the impact related to non-compliance, the ECO may undertake to report directly to the LEDET (Compliance) recommending that for:

- High impact: to issue a notice to cease construction;
- Medium impact: to issue a notice instructing the Developer to implement recommended remedial action; or
- Low impact: ECO to notify, but up to discretion of LEDET to apply sanction.

The Developer, at the direction of the ECO, or of his own conviction, has the power to remove from site any person who is in contravention of the EMP, and if necessary, the Developer can suspend part or the whole of the works, as required.

**Annexure A –
EAP CV**



Curriculum Vitae

Prashika Reddy

Smart Mobility

Senior Environmental Scientist

Prashika is a Senior Environmental Scientist with 22 years' experience in various environmental fields. She has a successful track record in environmental licencing processes, managing specialists, project budgets, project management, project administration, interfacing with other disciplines and stakeholder and public participation processes.

She is/ has been part of numerous multi-faceted large-scale projects, including the establishment of linear developments (roads and powerlines), industrial plants, electricity generation plants and mixed-use developments.

She has led and contributed to EIAs for large multi-disciplinary projects and accomplished in producing sound scientific reports. Reports include: Scoping Reports; Environmental Impact Assessment Reports; Environmental Management Programmes; Status Quo reports and Environmental Screening Reports.

She is a Professional Natural Scientist (400133/10) with the South African Council for Natural Scientific Professions as well as a Registered EAP with EAPASA (2019/917).

Years of experience

22

Years with Royal HaskoningDHV

16

Professional memberships

SA Council for Natural Scientific Professions, Pr Sci Nat,

EAPASA, Registered EAP, 2

Qualifications

1999: Bachelor of Science Honours: Botany, University of KwaZulu-Natal

2006: Bachelor of Science Honours: Geography (with distinction), University of Pretoria

Professional experience

Environmental Impact Assessment (EIA), Waste Management Licence and Integrated Water Use Licence for the Underground Coal Gasification (UCG) Project and associated infrastructure in support of co-firing of gas at the Majuba Power Station, Mpumalanga, South Africa, South Africa

Start Date: 2008 - 2015

Client Name: Eskom Holdings SOC Ltd

Project Value: R 5,900,000

Eskom Holdings (SOC) Ltd appointed Royal HaskoningDHV to undertake the integrated environmental authorisation process, as well as the integrated Water Use Licence, for the UCG pilot project and associated infrastructure in support of co-firing of gas at the Majuba Power Station. UCG is a process whereby coal is converted in situ into combustible gas that can be used for power generation and is one of the new clean coal technologies being developed for implementation by Eskom that intends to diversify Eskom's fuel supply.

Position: Project Manager

Assigned Tasks: Project management, client liaison, compilation of environmental reports, management of the specialist team, authority consultation and co-management of the public participation process

Integrated Environmental Authorisations for the proposed Concentrated Solar Power (CSP) Plants on the farm Sand Draai, Northern Cape Province

Start Date: 2014 - 2016

Client Name: Solafrika Energy (Pty) Ltd

Project Value: R 1,500,000

Solafrika appointed Royal HaskoningDHV to undertake the integrated environmental authorisation and waste licence processes for two CSP plants (central receiver and parabolic trough) with an electricity generation capacity of between 100 - 150MW to be constructed on the farm Sand Draai, Upington.

Position: Environmental Scientist

Assigned Tasks: Compilation of environmental reports

Environmental Impact Assessment for the Pumped Storage Power Generation Facility in the Steelpoort area, Mpumalanga and Limpopo Provinces

> Start Date: 2005 - 2007

> Client Name: Eskom Holdings SOC Ltd

> Project Value: R 1,300,000

As part of the increased electricity supply plan, Eskom will be constructing a Pumped Storage Scheme (PSS) in the Steelpoort area, Limpopo and Mpumalanga Provinces. It is planned that the scheme will have an installed capacity of approximately 1520MW. The proposed scheme consists of the following components: upper and lower reservoirs; underground power house complex and associated waterways that link the reservoirs; and ancillary works.

Position: Project Manager

Assigned Tasks: Completion of the EIA study and reports (EIA Report and EMP), project management, client liaison, management of the specialist team, authority consultation and co-management of the public participation process

Basic Assessment Study for Eight New PV Developments on the Farm Bokpoort, Groblershoop

Start Date: 2019

Client Name: ACWA Power Africa Holdings (Pty) Ltd

Project Value: R 966,123

Due to the changes in the Integrated Resource Plan published in October 2019, ACWA Power intend replacing the authorised CSP site with 8 new PV plants. The updated layout has been revised to incorporate the 8 new PV plants of 200MW each, covering a total of 1200ha (i.e. 150ha for each plant) on Remaining Extent of the Farm Bokpoort 390.

Position: Environmental Scientist and Project Manager

Assigned Tasks: Compilation of environmental reports and project management

Basic Assessment Study for Seven 9.9MW Internal Combustion Engines (ICE) at the Previously Authorised PV Developments on the Farm Bokpoort, Groblershoop

Start Date: 2020

Client Name: ACWA Power Africa Holdings (Pty) Ltd

Project Value: R 153 000

Recently, the Department of Mineral Resources and Energy issued a Request For Proposal (RFP) to which ACWA Power will be participating. A condition in the RFP requires Bidders to not tap into the national grid for power and requires that a reliability test be undertaken at specified generation rate and time. In meeting the RFP requirements, ACWA Power has decided to supplement their already authorised project infrastructure by the addition of ICE infrastructure in the projects to be bid.

Position: Environmental Scientist and Project Manager
Assigned Tasks: Compilation of environmental reports and project management

Environmental Screening Investigation for the Establishment of a Solar Based Electricity Generation System on a Build, Own, Operate and Maintain Basis – 118MW Photovoltaic Plant at the Tubatse Chrome Plant, Steelpoort, Limpopo

Start Date: 2020

Client Name: Samancor Chrome

Project Value: R 146 000

As part of the Transaction Advisory Services, Royal HaskoningDHV's Environmental Management and Planning (EM&P) Knowledge Group have been appointed to conduct a high-level desktop Environmental Screening Investigation (ESI) of twelve (12) sites to investigate the environmental sensitivities, opportunities and constraints associated with the proposed project for the proposed 118MW PV plant at the Tubatse Chrome Plant in the Steelpoort area, Limpopo Province.

Position: Environmental Scientist

Assigned Tasks: Compilation of environmental reports and project management

Environmental Impact Assessment for the Development of a 60MW Photovoltaic (PV) Plant associated with the Tubatse Ferrochrome (TFC) Smelter, Fetakgomo Tubatse Local Municipality

Start Date: 2021

The rising electricity tariffs in South Africa, combined with the increasingly severe load shedding patterns experienced across the country, has a negative impact on the production and revenue of Samancor Chrome business. This has motivated Samancor Chrome to consider renewable energy generation at their smelter plants. Samancor Chrome is therefore proposing the development of a PV plant with 60MW generation capacity over five potential sites adjacent to the TFC Smelter in Steelpoort.

Client Name: Samancor Chrome

Project Value: R 2,140,000

Position: Environmental Technical Leader

Assigned Tasks: Compilation of environmental reports, management of the specialist team and project management

Environmental Impact Assessment for the Development of a 40MW Photovoltaic (PV) Plant associated with the Tubatse Ferrochrome (TFC) Smelter, Fetakgomo Tubatse Local Municipality

Start Date: 2023

In 2021, a Special Purpose Vehicle, TFC Solar (Pty) Ltd proposed the development of a Solar PV facility of up to 100 Megawatt (MW) generation capacity over five (5) sites: 1, 2, 3, 4 and 5. These five sites were subject to an Environmental Impact Assessment (EIA) and an Environmental Authorisation (EA) was granted on 25 April 2022 from the Department of Forestry, Fisheries and the Environment.

A total of 60MW output can be achieved from the previously authorised Sites 2 – 5. Additionally, TFC Solar, propose the development of a 40MW Solar PV facility to be developed on Site 2B, 3B, 3C, 4B and 5B

Client Name: Samancor Chrome

Project Value: R 1,820,000

Position: Environmental Technical Leader

Assigned Tasks: Compilation of environmental reports, management of the specialist team and project management

Fatal Flaw Assessment and Environmental Impact Assessment for the Biesiesvlei Cluster of Wind Energy Facilities

Start Date: 2024

Royal HaskoningDHV has been appointed by South Africa Mainstream Renewable Power Developments (Pty) Ltd to provide a Phase A: Fatal Flaw Assessment and Phase B: Environmental Impact Assessment (EIA) proposal for the development of the Biesiesvlei Wind Energy Facilities (WEFs) and associated Grid Connection Infrastructure (Basic Assessments) and one EIA proposal associated with the 2 x 400kV 1-2km looping in and out of the existing line to a shared 132/400kV main transmission station. The proposed development is in the Free State Province and is called the Biesiesvlei Cluster of Projects.

Client Name:

Project Value: R 6,824,000

Position: Environmental Technical Leader

Assigned Tasks: Client and authority consultation, Compilation of environmental reports, management of the specialist team and project management

Environmental Scoping Study for the uMdloti and uMkhomazi Wastewater Treatment Plants PPP Project

Start Date: 2020 - 2021

Scoping assessment for the proposed 35Ml/day uMdloti Wastewater Treatment Works including Sludge handling and beneficiation plant, Biogas facility and Raw sewage transmission network

Client Name: International Finance Corporation

Project Value: R 2,000,000

Position: Environmental Scientist

Assigned Tasks: Assist with the compilation of the Scoping Report, risk identification, compliance with IFC Performance Standards, identify gaps between SA legislation and IFC Performance Standards and compilation of Terms of Reference for the Environmental and Social Impact Assessment

Environmental Screening Investigation as part of the Feasibility Study and Best Fit Specifications of an Inland Coal Terminal/s for Eskom, Mpumalanga

Start Date: 2022

Assessment of three sites for the development of an Inland Coal Terminal

Client Name: Eskom Holdings SOC Ltd

Project Value: R 3,000,000 (total appointment)

Position: Environmental Scientist

Assigned Tasks: Conduct Environmental Screening Investigation, compile ESI Report, provide input into the Feasibility Study

Basic Assessment for the Development of a 400kV Loop-In-Loop-Out (LILO) Powerline to the Existing Eskom Garona Substation and Expansion/Upgrade of the Eskom Garona Substation

Start Date: 2022

Assessment of a loop-in 400kV powerline to the existing Ferrum-Garona Substation and loop-out into the existing Garona-Nieuwehoop 400kV powerline from the Eskom Garona Substation as well as upgrade and expansion of the Garona substation

Client Name: Eskom Holdings SOC Ltd

Project Value: R 205,662

Position: Environmental Assessment Practitioner

Assigned Tasks: Compile BA Report, review specialist assessments, client liaison and project management

Environmental Screening Investigation for the Stormwater Harvesting and Water Re-Use PPP in the eThekweni Metropolitan Area

Start Date: 2020

Environmental screening investigation of various re-use options including indirect effluent re-use, indirect re-use ex-impoundment, indirect re-use from aquifers and direct re-use.

Client Name: eThekweni Municipality

Project Value: R 200,000

Position: Environmental Scientist

Assigned Tasks: Conduct Environmental Screening Investigation, compile ESI Report, provide input into the Feasibility Study

Proposed Glen Valley Wastewater Treatment and Re-use Project, Greater Gaborone Area, Botswana

Start Date: 2019

Scoping study of re-use options: direct potable water re-use and indirect water-use

Client Name: World Bank Group

Project Value: R 500,000

Position: Environmental Scientist

Assigned Tasks: Assist with the compilation of the Scoping Report

Environmental Impact Assessment (EIA), Waste Management Licence and Integrated Water Use Licence for the Matimba Power Station Ash Disposal Facility, South Africa

Start Date: 2012 - 2016

Client Name: Eskom Holdings SOC Ltd

Project Value: R 5,800,000

Approximately 4.8 million tons of ash is produced annually from the Matimba Power Station. This ash is currently being disposed by means of 'dry ashing' ~3km south of the power station. The proposed ash disposal facility will ensure that the power station is able to accommodate the 'ashing' requirements for the remaining life (approximately 44 years) of the Power Station.

Position: Environmental Scientist, Project Manager

Assigned Tasks: Compilation of environmental reports (EIA Report and EMPr), project management, management of the public participation process and specialist team

Charlie 1 Landfill Stormwater Management & Optimisation Project, Sasol Secunda, South Africa

Start Date: 2015 - 2016

Client Name: Sasol Chemical Industries (Pty) Ltd

Project Value: R 735,000

The Sasol Synfuels, Secunda, Charlie 1 landfill site was authorised in 1993 as a Class II Site, in terms of the Environmental Conservation Act (ECA) (Act No. 73 of 1989). Recent legislation changes such as the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) and the new Waste Classification and Management Regulations, August 2013 (GN 634) have implications for the management of waste disposal sites.

The latest audits conducted at Charlie 1 landfill site highlighted that the water management is not in accordance with the permit requirements. Therefore, the Pollution Control Dam (PCD) of approximately 16000m³ will be constructed to ensure compliance with the existing permit requirements. It will be constructed to ensure effective management of leachate and stormwater.

Position: Project Manager

Assigned Tasks: Project management

Waste Management Licence for the BMW Waste Facility, South Africa

Start Date: 2010

Client Name: BMW SA (Pty) Ltd

Project Value: R 168,797

Position: Project Manager

Assigned Tasks: Project management, client management, authority consultation, report compilations and internal review of work

EIA and Water Use Authorisation for the Removal, Re-Instatement and Re-Positioning of Two High-Voltage Powerlines routed through the Devon Valley Landfill, Stellenbosch

Start Date: 2019

Client Name: Stellenbosch Municipality

Project Value: R 820,000

The Stellenbosch Municipality owns and operates the Stellenbosch Landfill situated off Devon Valley Road. The landfill comprises completed cells (cell 1 and 2) as well as an operating cell (cell 3). Cell 3 is separated from cells 1 and 2 by an area on the landfill property footprint that is used for access roads, entrance area and weighbridge, green waste chipping and rubble crushing and stockpiling

activities. This area is also traversed by two high voltage Eskom powerlines. The presence of these powerlines prevents the Municipality from engineering and operating the area between completed cells 1 and 2 and operating cell 3 as waste disposal cells.

Position: Project Manager and Environmental Scientist

Assigned Tasks: Project management, compilation of environmental reports, management of specialist team

Site Clearance: Planning and Design for Maintenance and/or Upgrade of the Patrol Roads and Fencing on the Borders between RSA, Swaziland and Mozambique

Start Date: 2016

Client Name: Department of Public Works

Project Value: R 2,598,000

Undertake the Basic Assessment study, mining permitting as well as Water Use Licencing application processes associated with the border patrol road and fence.

Position: Project Manager

Assigned Tasks: Project management

Basic Assessment and Water Use Licence for the rehabilitation of the existing P236 gravel road from km6.235 to km14.0 in Ubombo, KwaZulu-Natal

Start Date: 2016

Client Name: KwaZulu-Natal Department of Transport

Project Value: R 546,186

This project is a rehabilitation of a portion of the existing P236 road from km6.235 to km14.0, where the surfaced width will be increased by 2.5m and where there are climbing lanes; the surfaced width will increase by 5.6m. In areas where there will be horizontal curve widening, the width will be increased by 4.5m. Furthermore, existing culverts will be lengthened where required to accommodate the increase in the road bed width. A culvert at a stream crossing, is also planned to be replaced at km6.240 of the P236.

Position: Strategic Environmental Advisor

Assigned Tasks: Quality review of environmental reports and public participation documentation

Basic Assessment and Water Use Licence for the proposed bridge crossing over the uMfolozi River linking the Esiyembeni and Novunula areas within the Mtubatuba Local Municipality, KwaZulu-Natal

Start Date: 2016

Client Name: KwaZulu-Natal Department of Transport
Project Value: R 522,225

The KwaZulu-Natal Department of Transport (KZN DoT) is planning to construct a bridge over the uMfolozi River and associated link road that will serve to link the Esiyembeni and Novunula local communities situated on either side of the uMfolozi River which is currently impassable save for the existing N2 bridge crossing to the east near Mtubatuba.

Position: Strategic Environmental Advisor

Assigned Tasks: Quality review of environmental reports and public participation documentation

Basic Assessment for the construction of two 7km long 88kV Power Lines Grootpan / Brakfontein, South Africa

Start Date: 2015

Client Name: Eskom Holdings SOC Ltd

Project Value: R 458,021

The proposed project involves the construction of two (2) 7km 88kV power lines and dismantling of two (2) 88kV power lines from Grootpan to Brakfontein, south of Ogies in Mpumalanga.

Position: Project Principal

Assigned Tasks: Quality review and overall project management

Proposed Tinley Southbanks Beach Enhancement Project in the KwaDukuza Municipality, KwaZulu-Natal

Start Date: 2016

Client Name: Tongaat Hulett Developments (Pty) Ltd

Project Value: R 925,270

The Tinley Manor Southbanks development provides for the coastal resort, however, it does not provide for what is critical for the success of the resort and that is a safe swimming beach in close proximity to the resort. The lack of a safe swimming beach with public amenities adjacent the development was identified as a major constraint. This EIA is therefore targeted at dealing with this constraint and to enable the provision of a new beach resort that has all the requirements to be able to attract international investment, including specifically a safe, swimming beach.

Position: Strategic Environmental Advisor

Assigned Tasks: Provide strategic advice on project, review of environmental reports

Environmental Impact Assessment for the Cornubia Phase 2 Development, KwaZulu-Natal, South Africa

Start Date: 2012

Client Name: Tongaat Hulett Developments (Pty) Ltd

Project Value: R 989,660

Conduct a full Environmental Impact Assessment (EIA) for the proposed Cornubia Mixed Use Phased development - Phase 2 in Mount Edgecombe, KwaZulu-Natal.

Position: Strategic Environmental Advisor

Assigned Tasks: Provide strategic advice on project, review of environmental reports

Cornubia Retail Park - EIA, South Africa

Start Date: 2012

Client Name: Tongaat Hulett Developments (Pty) Ltd

Project Value: R 370,120

Undertaking the EIA, Public Participation Process (PPP), attending client progress meetings and providing environmental input into the planning of the proposed Phase 2 Retail Development.

Position: Strategic Environmental Advisor

Assigned Tasks: Environmental Scientist. Strategic project advice, quality review and approval of reports

Centurion Metropolitan Core Masterplan: Stormwater and Flooding, South Africa

Start Date: 2012

Client Name: City of Tshwane Metropolitan Municipality

Project Value: R 4,300,000

The City of Tshwane requires a multi-disciplinary project team to assist the Client with the Preparation of a Master Plan of the Centurion Metropolitan Core Study Area.

Position: Environmental Scientist

Assigned Tasks: Environmental Screening Investigation

Environmental Screening for the Commercial 125MW CSP, South Africa

Start Date: 2012

Client Name: Sasol Technology (Pty) Ltd

Project Value: R 185,000

Environmental Screening Investigation for the proposed 125MW commercial concentrated Solar Power Plant located in Upington.

Position: Project Principal

Assigned Tasks: Project Management, financial management, review of Environmental Screening Report

Route Determination and Environmental Screening Investigation of 14 K-routes, South Africa

Start Date: 2016-2019

Client Name: Gauteng Department of Roads and Transport

Project Value: R 5.6 Million

Route determination and ESI for routes K

Position: Environmental Scientist

Assigned Tasks: Environmental Screening Investigation and compilation of the ESI Report

City of Tshwane: Waste Transfer Facilities, South Africa

Start Date: 2014

Client Name: City of Tshwane Metropolitan Municipality

Project Value: R 150,000

Report on environmental and sustainability considerations in Waste to Energy (WtE) Plants when they are co-fired with Municipal Solid Waste. Concept designs and environmental screening of various waste transfer stations. Situational assessment of other closed landfill facilities.

Position: Environmental Scientist

Assigned Tasks: Advise the client on Environmental authorisation requirements

Basic Assessment for the Sasol C3 Expansion Project, Sasol Industrial Complex, South Africa

Start Date: 2013

Client Name: Sasol Polymers

Project Value: R 267,614

The C3 expansion project was initiated to address an estimated 105ktpa additional propylene that will be available in 2014 as a result of various optimisation projects on the upstream Sasol Synfuels facilities. An opportunity was identified for the additional propylene to be utilised as feed for the polypropylene (PP) plants, namely PP1 and PP2. The C3 expansion project involves upgrading and implementing changes to the existing PP1 and PP2 process equipment to accommodate the increase in throughput.

Position: Project Principal

Assigned Tasks: Strategic project advice, quality review and approval of reports

BA for the Sasol Iso-Octanol Long Term Phase II Project, Sasol Industrial Complex, South Africa

Start Date: 2012

Client Name: Sasol Technology (Pty) Ltd

Project Value: R 261,184

The Iso-octanol long-term phase 2 project involves a process whereby aldehydes are converted in the existing Iso-alcohol stream (in Octene Train III) by hydrogenation to its corresponding alcohols to achieve the desired product specification for the Iso-octanol product. A new reactor and a new distillation column with its associated equipment will be installed for this purpose. The expected Iso-octanol production will range between 7 and 9kt/annum. In addition, a storage tank with a capacity of approximately 400m³ and a loading pump will be installed to enable storage and loading of the final Iso-octanol product.

Position: Project Principal

Assigned Tasks: Strategic project advice, quality review and approval of reports

Environmental Impact Assessment for the C3 Stabilisation Project situated on the Sasol Secunda Site, South Africa

Start Date: 2010

Client Name: Sasol Technology (Pty) Ltd

Project Value: R 447,172.00

Environmental Impact Assessment for the C3 Stabilisation Project situated on the Sasol Secunda Site

Position: Project Manager

Assigned Tasks: Project Management, review and compilation of EIA documentation, management of public process, liaise with client and authorities

Environmental Impact Assessment for the proposed Biogas to Power Plant Project at Sasol Synfuels, South Africa

Start Date: 2009

Client Name: Sasol Technology (Pty) Ltd

Project Value: R 167,865

Basic assessment study for the Biogas to power plant project.

Position: Project Manager

Assigned Tasks: Project management, compilation of environmental reports

Environmental Impact Assessment for the proposed Sasol Bioworks upgrade, South Africa

Start Date: 2008

Client Name: Sasol Technology (Pty) Ltd

Project Value: R306,101 Sasol One Bioworks Expansion

Position: Project Manager

Assigned Tasks: Overall Project Management and quality control

EIA or the Amendment of Mining Right for the UCG Pilot Plant, South Africa

Start Date: 2008

Client Name: Sasol Technology (Pty) Ltd

Project Value: R 404,000

Environmental Impact Assessment and Mining Authorisation for the Underground Coal Gasification Pilot Project located in Secunda Mpumalanga Province.

Position: Project Manager

Assigned Tasks: Overall Project Management and quality control

Department of Public Works: ECO Work in Pretoria, South Africa

Start Date: 2010 - 2017

Client Name: Department of Public Works

Project Value: R 2,100,000

Environmental Control Officer and Occupational Health and Safety for the demolition activities associated with the HG de Witt Building in Pretoria.

Position: Project Manager

Assigned Tasks: Project Management and Environmental Control Officer (ECO) work

AEL OEMPr Compilation

Start Date: 2019

Client Name: AEL Africa

Project Value: R 100,000

Position: Senior Environmental Scientist

Assigned Tasks: Compilation of OEMPr for the ISAP and Nitrate Plant

Environmental Status Quo for the Scottsville Local Area Plan

Start Date: 2018

Client Name: Msunduzi Municipality

Project Value: R 2.5 million

Position: Environmental Scientist

Assigned Compilation of Environmental Status Quo chapter

White Mfolozi Bridge & Link Road, South Africa

Start Date: 2016

Client Name: Kwa-Zulu Natal Department of Transport

Project Value: R 0.8 million

Position: EAP

Assigned Tasks: Compilation of the Basic Assessment Report and EMPr in support of the necessary Environmental Authorisations and permits

Sundumbili Wastewater Treatment Works, South Africa

Start Date: 2015

Client Name: Ilembe Municipality

Project Value: R2 000 000

Position: EAP

Assigned Tasks: Environmental Screening and Environmental Impact Assessment

Rustenburg Integrated Rapid Public Transport Network (IRPTN), South Africa

Start Date: 2009

Client Name: Rustenburg Local Municipality

Project Value: R 3,000,000,000

Planning, design and implementation of the Rustenburg Rapid Transport project in Rustenburg.

The final system, which will consist of several phases, will comprise of approximately 900 busses, 600 kilometres (km), 50 bus routes, 35 km segregated bus lanes, 30 stations, 3 depots, 1 transport management centre, and zero compromise in public transport service quality. Royal HaskoningDHV are the project managers in charge of the Design and Construction, as well as the designers for the Intelligent Transportation Systems and Urban Traffic Control.

Position: Environmental Scientist

Assigned Tasks: Environmental Screening Investigation and Ad Hoc environmental advice

Previous Experience

2010 - 2012

SSI Engineers and Environmental Consultants (Pty) Ltd Associate

Prashika Reddy

2008 – 2010

SSI Engineers and Environmental Consultants (Pty) Ltd
formerly known as Bohlweki Environmental (Pty) Ltd
Senior Environmental Consultant

2006 – 2008

Bohlweki Environmental (Pty) Ltd
Junior Environmental Consultant

2001 – 2006

Department of Agriculture
Senior Plant and Quality Control Officer



Curriculum Vitae

Seshni Govender

Smart Mobility

Environmental Consultant

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Seshni Govender is an Environmental Consultant working on environmental and water related projects. Seshni has drafted applications for complex integrated licences that include components of National Environmental Management Act and National Water Act. She has been involved in the development of the Environmental Authorisation Processes for the N11-13X Mokpane Ring Road and the development of Photovoltaic Plants in the Northern Cape and Limpopo Provinces, Environment Outlook and Environmental Management Frameworks. This has exposed her to the intricate mechanisms of trying to integrate environmental impacts with mitigations measures that will be in line with the sustainable development principles.

As an Environmental Scientist Seshni contributes to projects through; report writing, data management and analysis, environmental impact analysis, policy review and public engagement/consultation.

Nationality

South African

Years of experience

12

Years with Royal HaskoningDHV

12

Professional Membership

South African Council for Natural Scientific Professions,
Professional Natural Scientist, [REDACTED]

Environmental Assessment Practitioners Association of South
Africa, Environmental Assessment, Practitioner [REDACTED]

Qualifications

2010 BSc (Hons) Environmental Science, University of
KwaZulu Natal, South Africa

2009 BSc Environmental Science, University of KwaZulu
Natal, South Africa

Professional experience

Environmental Impact Assessment and Water Use Authorisation for the Development of a Photovoltaic (PV) Plant up to 100MWp generation capacity associated with the Tubatse Ferrochrome (TFC) Smelter, Fetakgomo Tubatse Local Municipality

- > Samancor Chrome Pty Ltd
- > Sekhukhune District Municipality, Limpopo Province, 2021
- > Position: Environmental and Public Participation Consultant
- > Assigned Tasks: Compilation of scoping, Environmental Impact Assessment Reports, Environmental Management Programme, Water Use Licence Application and Facilitation of Public Participation Process
- > Project Duration: March 2021-May 2022
- > Project Value: R 2,140,000

The rising electricity tariffs in South Africa, combined with the increasingly severe load shedding patterns experienced across the country, has a negative impact on the production and revenue of Samancor Chrome business. Climate change is also a concern for Samancor Chrome referring to the emissions of greenhouse gases (GHG) in the use of fossil fuel electricity. This has motivated Samancor Chrome to consider renewable energy generation at their smelter plants. Implementing solar Photovoltaic (PV) generation will result in improved availability of supply and reduced utility bills as well as going 'green' in terms of environmental considerations.

Samancor Chrome proposed the development of a PV plant with up to 100 Megawatt peak (MWp) generation capacity over five potential sites adjacent to the TFC Smelter in Steelpoort, Fetakgomo Tubatse Local Municipality.

Part 2 Amendment of the Environmental Authorisation Issued for the Bokpoort 75MW Concentrating Solar Thermal Power Plant and Associated Infrastructure near Groblershoop, Northern Cape Province

- > ACWA Power Solafrica Bokpoort CSP Power Plant Pty Ltd (RF)
- > ZF Mgcawu District Municipality, Northern Cape Province, 2021
- > Position: Environmental and Public Participation Consultant
- > Assigned Tasks: Compilation of Environmental Assessment Report, Operations Environmental

Management Programme. Specialist co-ordination and Facilitation of Public Participation Process

- > Project Duration: March 2021-April 2022
- > Project Value: Unknown

ACWA Power Solafrica Bokpoort CSP Power Plant Pty Ltd (RF) (hereafter referred to as Bokpoort CSP) was issued with an Environmental Authorisation on the 14th of June 2011 for the development of a 75 MW Bokpoort Concentrating Solar Thermal Power Plant (CSP) near Groblershoop, Northern Cape Province.

Therefore, Bokpoort CSP proposed the following amendments described below:

- As part of the project infrastructure, Bokpoort CSP had proposed the use of a temporary labour accommodation camp which was to house workers during the construction phase of the project after which this accommodation was to be demolished. Since the start of the operational phase, Bokpoort CSP has had to reconsider the initial decision to demolish the camp, due to the proximity of the site to the nearest town and are now in the process of making an application to utilise this already built temporary infrastructure to house staff onsite on a 4 week rotational basis (4 weeks on, 2 weeks off) for the duration of the operational phase of the Bokpoort CSP. The project infrastructure components description as included in the EA is therefore proposed to be amended as follows:
 - Permanent Staff Accommodation;
 - Access control building;
 - Visitors centre;
 - Shades ports of approximately 12m high; and
 - Covid-19 isolation room.
- A second amendment is also proposed for the change of the technical description relating to the now authorised 9MW PV augmentation power plant (which was an amendment of the 14 June 2011 EA) from a fixed system to a tracking system.

Basic Assessment for the Proposed Development of Seven 9.9MW Internal Combustion Engines (ICE) on the Remaining Extent of Farm Bokpoort 390, Groblershoop, Northern Cape

- > ACWA Power Energy Africa (Pty) Ltd
- > ZF Mgcawu District Municipality, Northern Cape Province, 2021
- > Position: Environmental and Public Participation Consultant
- > Assigned Tasks: Compilation of Basic Assessment Report, Environmental Management Programme, and Facilitation of Public Participation Process
- > Project Duration: March 2020-September 2021
- > Project Value: R 153 000

ACWA Power Energy Africa (Pty) Ltd (hereafter referred to as ACWA Power) is proposing to develop seven individual 9.9MW Internal Combustion Engines (ICE) on the authorised 200MW Pedi, Venda, Zulu, Afrikaans, Ndebele, Swati and Sotho PV Plants on the Remaining Extent (RE) of the Farm Bokpoort 390, located 20km north-west of the town of Groblershoop within the !Kheis Local Municipality in the ZF Mgcawu District Municipality, Northern Cape Province.

ACWA Power participated in the Department of Mineral Resource and Energy's (DMRE) Risk Mitigation Independent Power Producer Procurement (PPP) programme and/ or Captive Power Projects through their authorised PV projects. The country is in dire need of electricity especially during peaking hours but like any other solar technology, PV can only generate electricity when the weather is favourable. In order to address this need, ACWA Power is proposing additional infrastructure (ICE) within their authorised plants to create the flexibility and efficiency within the plants which will enable electricity generation during unfavourable weather conditions.

Basic Assessment for the Proposed Developments of Ten (10) Photovoltaic (PV) plants at the Bokpoort farm near Groblershoop, Northern Cape

- > ACWA Power Energy Africa (Pty) Ltd
- > Northern Cape Province, 2019
- > Position: Environmental and Public Participation Consultant
- > Assigned Tasks: Compilation of Basic Assessment Report, Environmental Management Programme, and Facilitation of Public Participation Process
- > Project Duration: 2019-2021
- > Project Value: R 966,123

ACWA Power Energy Africa (Pty) Ltd (hereafter referred to as ACWA Power) is proposing to construct a solar energy facility (Bokpoort II) consisting of ten (10) photovoltaic (PV) plants on the north-eastern portion of the Remaining Extent (RE) of the Farm Bokpoort 390, located 20 km north-west of the town of Groblershoop within the !Kheis Local Municipality in the ZF Mgcawu District Municipality, Northern Cape Province.

On 21 October 2016, a 900 ha, 150 MW Concentrating Solar Power (CSP) plant was authorised by the Department of Environmental Affairs (DEA). Due to the changes in the Integrated Resource Plan (IRP) published in October 2019, ACWA Power intend replacing the authorised CSP site with eight (8) new PV plants. The updated layout has been revised to incorporate the 8 new PV plants of 250 MW each, covering a total of 1200 ha (i.e. 150 ha for each plant).

Two 250 ha 75 MW PV plants including ancillary infrastructure, were also authorised by the DEA on 24 October 2016. As the PV 1 and PV 2 plants are also approved on the Farm Bokpoort 390 RE, the footprints of these approved PV plants will undergo an amendment to accommodate the 8 new PV plants and ancillary infrastructure.

Basic Assessment and Water Use Authorisation for the removal, re-instatement and repositioning of two high voltage powerlines routed through the Stellenbosch Landfill off Devon Valley Road, Stellenbosch, Western Cape

- > Eskom Holdings SOC Ltd and Stellenbosch Municipality
- > Western Cape Province, 2020
- > Position: Environmental and Public Participation Consultant
- > Assigned Tasks: Facilitation and compilation of Water Use Licence Application and Public Participation Processes
- > Project Duration: 2019
- > Project Value: R 820,000

The Stellenbosch Municipality owns and operates the Stellenbosch Landfill situated off Devon Valley Road. The landfill comprises completed cells (cell 1 and 2) as well as an operating cell (cell 3). Cell 3 is separated from cells 1 and 2 by an area on the landfill property footprint that is used for access roads, entrance area and weighbridge, green waste chipping and rubble crushing and stockpiling activities. This area is also transversed by two high

voltage Eskom powerlines. The presence of these powerlines prevents the Municipality from engineering and operating the area between completed cells 1 and 2 and operating cell 3 as waste disposal cells.

Eskom Distribution (Western Cape Operating Unit) therefore proposes removing, re-instating and repositioning the two powerlines (132kV and 66kV) routed through the landfill. The 132kV powerline will be relocated to the northern and eastern boundary of the landfill, whilst the 66kV powerline will be relocated to the eastern and southern boundary. The proposed length of each of the deviated lines are approximately 1km. Two alternative pylon structures are currently being considered i.e. monopoles and lattice towers.

Basic Assessment and Environmental Management Programme for the Borrow Pit 5.5L associated with the N11 Section 13X (N11-13X), Mokopane Ring Road, Mogalakwena Local Municipality, Limpopo province

- > South African National Roads Agency Ltd
- > Limpopo Province, 2019
- > Position: Environmental and Public Participation Consultant
- > Assigned Tasks: Compilation of Basic Assessment Report, Environmental Management Programme, and Facilitation of Public Participation Process
- > Project Duration: 2018-2019
- > Project Value: Unknown

The South African National Roads Agency Ltd (SANRAL) has commissioned the Detail Design and the Construction Monitoring of the N11-13X Mokopane Ring Road to divert the heavy vehicle traffic that travels to and from the mines on the western side of Mokopane and to Botswana, from the already congested existing N11 section which passes through the existing villages and the Mahwelereng Township.

The N11-13X Mokopane Ring Road is a "greenfields" project where a new road will be constructed. The class of the new road will be Class 1. The new road to be constructed will typically have an overall width of 13.4 m where the initial carriageway will comprise a minimum 2.5 m outer shoulder, 2 x 3.7 m lanes, and 2.5 m inner shoulder. In general, the road reserve varies between 71 – 75 m but there are wider sections where there is a deep cutting or because of allowance for future interchanges.

A limited amount of gravel (G5 – G7 quality) will be available from cut widenings within the road reserve. The remainder of the gravel required for the proposed road construction (gravel layer works) will need to be sourced from borrow pits.

Basic Assessment for the Proposed Construction of a Bridge over the Rooisloot River, Various Culverts and Borrow Pits Associated With the National Route N11 Section 13x (N11-13x) (Mokopane Ring Road) in the Mokopane Area

- > South African National Roads Agency Ltd
- > Limpopo Province, 2018
- > Position: Environmental and Public Participation Consultant
- > Assigned Tasks: Compilation of Basic Assessment Report, Environmental Management Programme, and Facilitation of Public Participation Process
- > Project Duration: 2018
- > Project Value: Unknown

The South African National Roads Agency Ltd (SANRAL) has commissioned the Detail Design and the Construction Monitoring of the N11-13X Mokopane Ring Road. An Environmental Impact Assessment (EIA) study was previously conducted for the proposed re-routing of the N11-13X road. The Environmental Authorisation and subsequent approval of the Environmental Management Plan (EMP) was obtained in 2009. The subject of this Basic Assessment Process was therefore to address the infilling activities within the watercourses which pertain to the Rooisloot Bridge and the associated culverts. There were 5 Borrow Pits associated with this project that were also subject to Basic Assessment Processes.

Final Consultation Basic Assessment Report for the Dismantling of a portion of the existing double-circuit power line and the construction of two (2) 7 km long 88 kV power lines within a 2 km corridor between the Grootpan and Brakfontein Substations

- > Eskom Holdings SOC Ltd
- > Ogies, Mpumalanga, 2015
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of Basic Assessment Report and Environmental Management Programme
- > Project Duration: 2015
- > Project Value: R 458,021

Eskom Holdings (SoC) Pty Ltd (Eskom Distribution – Mpumalanga Operating Unit) proposes to construct two

(2) 7 km 88 kV overhead power lines within a 2 km corridor between Grootpan and Brakfontein Substations near Ogies. The existing power lines are located on GlencoreXstrata mining property. The mine has requested that Eskom relocate the lines as they are within the operational footprint of the mine. The project also involves the dismantling of a portion of the existing 88 kV double-circuit mink power line approximately 5.2 km in length. The new power lines will ensure continuity of supply and access to electricity for the surrounding communities.

Development of Environmental Management Frameworks and Exclusion Standards for: John Taolo Gaetsewe and Watrberg District Municipality

- > The Department of Agriculture, Land Reform and Rural Development
- > John Taolo Gaetsewe District Municipality, Northern Cape Province and Waterberg District Municipality, Limpopo Province, 2022
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of Status Quo, Desired State and Environmental Management Framework reports for the John Taolo Gaetsewe and Watrberg District Municipalities
- > Project Duration: March 2020 –Sept 2022
- > Project Value: R 2430 985.00

The Department of Agriculture, Land Reform and Rural Development (DALRRD) has initiated collaboration between itself the Department of Forestry, Fisheries and the Environment (DFFE), and the respective provincial environmental departments and district municipalities of the three (3) InvestSA prioritised district municipalities of which the John Taolo Gaetsewe District Municipality (JTGDM) and the Waterberg District Municipality were chosen. The aim was to have the EMF and their Listed Activities' Exclusion Standards gazetted as instruments to allow certain development activities to be streamlined insofar as environmental authorisations are concerned.

Most of the projects identified in the District Rural Development Plans are of medium to large scale in nature and they generally occur in sensitive environments and the South African environmental legislative context, they trigger the need for Environmental Authorisation under the Environmental Impact Assessment Regulations (EIA), 2014.

The intention was to conduct a pre-assessment of the environmental sensitivities and opportunities within these

three (3) districts to streamline environmental authorisations. The EMFs were developed through an extensive consultative process that includes all relevant sector departments, provinces and municipalities, as well as any other Interested and Affected Party (I&AP). The EMFs will be developed through the extensive use of spatial tools, positive and negative mapping of environmental attributes, sensitivity mapping and detailed assessment of potential impacts including cumulative impacts and risk assessments.

Environmental Compliance for the Longlakes Extension 2, Longlakes, Modderfontein

- > Capital Propfund (Pty) Ltd
- > City of Johannesburg, Gauteng Province, 2021
- > Position: Environmental Control Officer
- > Assigned Tasks: ECO site Audit and compilation of ECO reports
- > Project Duration: July 2021-September 2022
- > Project Value: Unknown

Capital Propfund (Pty) Ltd are constructing Longlakes Extension 2 at a site in Longlakes, Modderfontein, Johannesburg, Gauteng. The site is located on Erf 195, Longlakes Ext 2 Township off Marlboro Drive in Modderfontein .

The wider development entails the development of a Commercial, Residential and Light Industrial Township (excluding Maxwell Drive and K113 and the junctions associated with it) on portions of Longmeadow 296 IR IQ and Longmeadow 297IR IQ, and the construction of the K113 Road between D51 (K58) (Allandale Road) and P91-1K155) and associated infrastructure.

Royal HaskoningDHV (Pty) Ltd was appointed by Capital Propfund for the provision of Environmental Control Officer (ECO) services on a fortnightly basis for a period of twelve (12) months.

Bokamoso Solar Photovoltaic Park, North West, Environmental Control Officer

- > African Clean Energy Developments
- > Leeudoringstad, North West, 2020
- > Position: Environmental Control Officer (Temporary)
- > Assigned Tasks: ECO site Audit
- > Project Duration: May 2020
- > Project Value: Unknown

Royal HaskoningDHV has been appointed by African Clean Energy Developments, thereafter, referred to as

ACED, to undertake the Independent Environmental Control Officer (ECO) duties for the project in order to monitor compliance against the following Environmental Authorisations (EA) for the proposed Solar PV Park near Leeudoringstad, North West.

Waterloo Solar Photovoltaic Park, Environmental Control Officer

- > African Clean Energy Developments
- > Vryburg, North West, 2020
- > Position: Environmental Control Officer (Temporary)
- > Assigned Tasks: ECO site Audit
- > Project Duration: May 2020
- > Project Value: Unknown

Royal HaskoningDHV has been appointed by African Clean Energy Developments, thereafter referred to as ACED, to undertake the Independent Environmental Control Officer (ECO) duties for the project in order to monitor compliance against the following Environmental Authorisations (EA) for the proposed Solar PV Park near Vryburg, North West.

Environmental Control Officer for the Construction of the N11 Section 13 X (N11-13X) Mokopane Ring Road

- > South African National Roads Agency Ltd
- > Mokopane, Limpopo Province, 2019-Present
- > Position: Environmental Control Officer
- > Assigned Tasks: ECO site Audit and compilation of ECO reports
- > Project Duration: 2019-Present
- > Project Value: Unknown

The N11 Section 13X Mokopane Ring Road (hereafter referred to as the N11-13X) is a “greenfields” project consisting of the construction of a new road by the South African National Roads Agency SOC Limited (hereafter referred to as Sanral).

The class of the new road will be Class 1. The new road will typically have an overall width of 13.4m; where the carriageway will comprise a minimum 3.0m outer shoulder, 2 x 3.7m lanes, and 3.0m inner shoulder.

Royal HaskoningDHV have been appointed by Sanral to undertake the Independent Environmental Control Officer (ECO) duties for the project in order to monitor compliance against the Environmental Authorisation (and the amendment thereto), Environmental Management Programme and all other permits and licences associated with the project.

Environmental Screening Investigation: Route Determination for the K178 between the Gauteng Provincial Border and PWV1, Gauteng Province

- > Gauteng Department of Roads and Transport (GDRT)
- > Gauteng, 2018
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of ESI report and Spatial Planning assessment
- > Project Duration: January 2018 – May 2018
- > Project Value: Unknown

The purpose of the Gauteng Strategic Road Network (GSRN) conceived by the Gauteng Department of Roads and Transport (GDRT) some 40 years ago was to plan a robust road system, with the objective of preserving transportation corridors and serving as a guideline for the rapid development and urbanisation of Gauteng.

The route for the K178 is the section between the Gauteng Provincial Border (in the east) and the future PWV1 (in the west) with an approximate length of 18.8km. The alignment generally follows the previous planned GDRT route along the alignment of the existing R54.

In the context of integrated environmental management, screening determines whether a development proposal requires environmental assessment, and if so, what level of assessment is appropriate. Screening is thus a decision-making process that is initiated during the early stages of the development of a project.

The main purpose of the ESI was to determine at this stage of the road design whether there are aspects of the development proposal that have the potential to give rise to significant or unacceptable environmental consequences i.e. fatal flaws.

Route Determination and EIA for K86, K118, K181 K208, K217 and K219,

- > Gauteng Department of Roads and Transport
- > Gauteng Province, 2014
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of Spatial Planning assessment
- > Project Duration: 2014
- > Project Value: R 1,251,730.09

Route Determination and Environmental Scan of K-routes in the Gauteng Province.

Water Use Licence Application for the ACWA Power Project DAO PV Solar Plants at Bokpoort Farm, Northern Cape

- > ACWA Power Project DAO (Pty) Ltd
- > ZF Mgcawu District Municipality, Northern Cape Province, 2021
- > Position: Environmental Consultant
- > Assigned Tasks: Facilitation and compilation of Water Use Application process
- > Project Duration: March 2021-February 2022
- > Project Value: R 275,120.25

ACWA Power Project DAO (Pty) Ltd (hereafter referred to as ACWA Power) is proposing to construct a solar energy facility consisting of ten (10) PV plants on the north-eastern portion of the Remaining Extent (RE) of the Farm Bokpoort 390, located 20 km north-west of the town of Groblershoop within the !Kheis Local Municipality in the ZF Mgcawu District Municipality, Northern Cape Province.

7 of the PV plants were bid in response to the Department of Mineral Resources and Energy's (DMRE's) Risk Mitigation Independent Power Producer Procurement Programme and on 19 March 2021, the project (Project No. RM-TA-0025-001), received preferred bidder status and has been subsequently designated as an Energy Strategic Integrated Project (SIP) No. 20, which was gazetted in Government Gazette 43547 on 24 July 2020 and is to be managed within the requirements as set out in the Infrastructure Development Act (Act No. 23 of 2014).

The new plants will have shared water provision infrastructure for personnel that will include abstraction from proposed boreholes, associated pipelines, and a septic tank sewerage system. The key activities being applied for in this Water Use Licence Application are the:

- Three (3) proposed water abstraction boreholes; and
- Four (4) proposed septic tank sewerage system.

Water Use Licence application for the Urania-Bronville Powerline Upgrade Project, Matjhabeng Local Municipality, Free State Province

- > Matjhabeng Local Municipality
- > Free State Province, 2019
- > Position: Environmental Consultant
- > Assigned Tasks: Facilitation and compilation of Water Use Application process
- > Project Duration: 2019
- > Project Value: Unknown

The construction of new overhead powerlines to replace the existing underground powerlines that are no longer operational. The works will comprise the supply, delivery, off-loading, installation, erection, commissioning and handing-over (in a proper working condition) of the following infrastructure.

The construction of a new approximately 3.3 km, 132 kV overhead line between the Welkom Main Intake Substation and Urania Substation.

The construction of a new approximately 5.5 km, 11 kV overhead line between the Industries Substation and Bronville Substation.

Water Use Licence for the Proposed Deviation of the 88kV Firnhem-Platrand Powerline near Standerton, Mpumalanga Province

- > Eskom Holdings SOC Limited
- > Mpumalanga Province, 2018
- > Position: Environmental Consultant
- > Assigned Tasks: Facilitation and compilation of Water Use Application process
- > Project Duration: 2018
- > Project Value: Unknown

Eskom Holdings Limited, a State-Owned Company (SoC) proposed a deviation of a portion of the existing 88kV Firnhem-Platrand Powerline from pole 157 to pole 180 within a servitude of 31m and a length of approximately 2km. The purpose of the deviation is to avoid a wetland in which these poles are currently located which poses a network stability risk as it is located within a wetland area. Firnhem Platrand is an interconnector between Standerton and Volksrust for network stability, the line supplies Transnet Traction Stations, should the line fail, the trains in the nearby tractions will not be able to move.

Water Use Licence Application for the Proposed Site Clearance for Planning and Design of a Border Barrier, Patrol Roads and Fencing between the Republic of South Africa (RSA), Swaziland and Mozambique, Phase 1 (KM 0.0 0 KM 54.0)

- > The National Department of Public Works (DPW) and KwaZulu-Natal Department of Transport (KZN DoT)
- > KwaZulu-Natal Province, 2018
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of Water Use Application
- > Project Duration: 2018

> Project Value: Unknown

Proposed the upgrade of existing border control infrastructure, and development of new border control infrastructure along a portion of the South Africa (KwaZulu-Natal) - Mozambique Border in the north-eastern part of the KwaZulu-Natal (KZN) Province. This application is termed the 'Phase 1' application and forms a component of a wider project being undertaken by the DPW for the upgrading of border control infrastructure along the South Africa - Swaziland border and the southern part of the South Africa - Mozambique border (the Phase 2 Project). The Phase 1 alignment is comprised of the section of the international border with Mozambique from the high-water mark of the Indian Ocean (KM0.0) to the eastern boundary of the Ndumo Game Reserve (KM54.0).

Water Use Licence Application for the Proposed Site Clearance for Planning and Design of a Border Barrier, Patrol Roads and Fencing between the Republic of South Africa (RSA), Swaziland and Mozambique, Phase 2 (KM 54.0 0 KM 524.0)

- > The National Department of Public Works (DPW)
- > KwaZulu-Natal and Mpumalanga Provinces, 2018
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of Water Use Application
- > Project Duration: 2018
- > Project Value: R 2,598,000

The National Department of Public Works (DPW) as the applicant, (in conjunction with the KwaZulu-Natal Department of Transport (KZN DoT) as an implementing agent) is proposing the upgrade of existing border control infrastructure, and development of new border control infrastructure along a portion of the South Africa–Mozambique-Swaziland Border in KwaZulu-Natal and Mpumalanga. This application was termed the 'Phase 2' application and forms a component of a wider project being undertaken by the DPW for the upgrading of border control infrastructure along the South Africa - Swaziland border and the southern part of the South Africa - Mozambique border. The Phase 1 alignment is comprised of the section of the international border with Mozambique from the high-water mark of the Indian Ocean (KM0.0) to the eastern boundary of the Ndumo Game Reserve (KM54.0), whilst this Application (Phase 2) is from KM54.0 to KM524.0.

The project is being undertaken by the DPW in conjunction with the Department of Agriculture Forestry

and Fisheries (DAFF) and the South African National Defence Force (SANDF), and Ezemvelo KZN Wildlife (EKZNW) and the iSimangaliso Wetland Park Authority (IWPA) as partner organs of state. The KZN DoT is an implementing agent for one of the infrastructure components (the border barrier structure).

The aim of the project is to stop the illegal trafficking of stolen vehicles and contraband across this section of the international border, as well as to prevent the illegal movement of people as well as livestock that could transmit disease. South Africa has approximately 4 800 km of land border and 2 800 km of coastline border which is required to be secured. South Africa is greatly affected and financial impacted by illegal imports, smuggling and other similar illegal activities which transpire over borders. In order to effectively respond to the range of security and control challenges that are being experienced by responsible organs of the State, it is important to assess the situation and to be able to incorporate a viable solution.

Integrated Water Use Licence Application for the Rehabilitation of the Existing P236 and Culvert from km 6.235 to km 14.0

- > KwaZulu-Natal Department of Transport
- > Ubombo,, KwaZulu-Natal, 2017
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of Water Use Application
- > Project Duration: 2018
- > Project Value: R 546,186

The P236 is located north of Mkhuze and starts at km 0.0 at the intersection with P2-9 and ends at km 32.0, intersecting P449. The application, however, was only for the rehabilitation of km 6.235 to km 14.0 of the P236 as well as the replacement of a culvert at Km 6.240.

Water Use Licence Application for the Proposed Upgrade of Dango Bridge (B1372) and Bedlane Bridge (B1336) situated along P393 (R34) Road Between Nkwalini Pass (Km0,0) and Empangeni (Km24,0)

- > KwaZulu-Natal Department of Transport
- > Empangeni, KwaZulu-Natal, 2017
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of Water Use Application
- > Project Duration: 2017
- > Project Value: Unknown

The KwaZulu-Natal Department of Transport (DoT) proposed to improve the Provincial road P393 (R34) from P47-4 at Nkwalini Pass (km 0.0) to P230 at Empangeni (km 24.0) within the King Cetshwayo District Municipality in KwaZulu-Natal Province. The project starts at the intersection of P47-4 (R66) with P393 (R34) at Nkwalini Pass (km 0.0) and ends at P230 (km 24.0) towards Empangeni. The Bedlane river bridge (B1334) is situated at km 2.6 from Nkwalini Pass and the Dango river bridge (B1372) is situated at km 3.9 from Nkwalini Pass. The existing P393 road is 8.8m wide and the proposed road geometry for the rehabilitation is 10.0m wide including shoulders.

Water Use Licence Application for the Proposed Culvert Rehabilitation along Provincial Road P230 from Km37.0 to Km47.0

- > KwaZulu-Natal Department of Transport
- > Umhlatuze Local Municipality, KwaZulu-Natal, 2017
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of Water Use Application
- > Project Duration: 2017
- > Project Value: Unknown

This project formed part of the Empangeni Road Rehabilitation Programme and covers the rehabilitation of the provincial road P230 between km 37,0 and km 47,0 within the uMhlatuze Local Municipality which forms part of the King Cetshwayo District Municipality (DC28), KwaZulu-Natal. Provincial Road P230 from the intersection with P393 at km 37,0 to km 47,0 near Empangeni is defined as an undivided two lane road, and has been classified as a Class R1 Rural Arterial Road (in terms of the TRH26). The P230 forms part of the R34 long distance heavy haul freight route, which connects the harbour of Richards Bay and the surrounding industrial and commercial areas, with inland provinces.

Integrated Water Use Licence Application for the Canelands Extension Development, KwaZulu-Natal

- > Tongaat Hulett Developments
- > Kwadukuza Municipality, KwaZulu-Natal, 2017
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of Water Use Application
- > Project Duration: 2017
- > Project Value: Unknown

Tongaath Hulett Development wishes to develop the site for industrial purposes. The site lies adjacent to the existing Canelands Industrial estate. Potential land uses may include general / industrial, logistics, warehousing and

distribution. These land uses will complement those of the existing Canelands Industrial Estate and will ensure that this land parcel reads as an extension to the existing development. It is proposed, due to the proximity of the floodplain and numerous other constraints located on-site, that a single platform covering an area of approximately 1.67 hectares (1.67 ha) is created. Both a servicing and traffic report has been completed, which details how this development will be accommodated by the existing bulk infrastructure within the region.

Environmental Impact Assessment and Integrated Water Use Licence Application for the Tinley Manor Southbanks Coastal Development, KwaZulu-Natal

- > Tongaat Hulett Developments
- > Kwadukuza Municipality, KwaZulu-Natal, 2017
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of Water Use Application
- > Project Duration: 2017
- > Project Value: Unknown

Tongaath Hulett Developments proposes to develop the Tinley Manor Southbanks Coastal Development into a mixed-use coastal development including a large residential component. Tinley Manor Southbanks Coastal Development is an approximately 485 ha site, located between the coastal towns of Tinley Manor and Sheffield Beach within the KwaDukuza Municipality, KwaZulu-Natal.

The proposed Tinley Manor Southbanks Coastal Development is set to be the first phase of the development of Tongaat Hulett Developments' land holdings in Tinley Manor, which is situated to the south and north of the Umhlali River.

Cornubia Human Settlement - Integrated Water Use Licence Application, South Africa

- > Tongaat Hulett Developments (Pty) Ltd
- > Cornubia, KwaZulu-Natal, 2013
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of Water Use Application
- > Project Duration: 2013-2015
- > Project Value: Unknown

Water Use Licence Application for the Cornubia Industrial and Business Estate, Phase 1-Retail Park, Cornubia Phase and Cornubia Bridge

Gauteng Province Environment Outlook Report

- > Gauteng Department of Agriculture and Rural Development
- > Gauteng, 2017
- > Position: Environmental Consultant
- > Assigned Tasks: Chapter Author
- > Project Duration: Aug 2016 –January 2018
- > Project Value: 1,063,524.00

State of the Environment Report (SoER) is a report card on the condition or quality of the environment. It provides information on how we affect the environment, how the environment affects us, and how this condition has changed over time. Environmental conditions are analysed through the use of environmental indicators which are proxies of environmental status, and which can be monitored over time and space. Reporting on the State of Environment (SoE) is therefore an important tool in identifying, assessing and setting priorities for environmental issues, as well as in determining whether environmental policies and actions are effective. Furthermore, the 'environment outlook' component attempts to describe or predict how environmental challenges will evolve in the near future, and what needs to be done to achieve a more sustainable state of living for all people in the province. The ultimate value of environmental outlook reporting lies in the degree to which that assessment can be used for adaptive environmental management to address anticipated future environmental conditions and pressures.

North West Environmental Outlook/State of the Environment Trend Analysis

- > North West Department of Rural, Environment and Agricultural Development
- > Mahikeng, 2017
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of Trend Analysis
- > Project Duration: 2017
- > Project Value: R 218,880

The *Environmental Trend Analysis Report* focused on the publications of the North West Province State of Environment and Environment Outlook Reports dated 1995, 2002, 2008 and 2013, in an effort to expand this trend reporting to fully cover the period 1995 to 2013. This exercise followed on from the 2013 Environment Outlook Report which reported on environmental trends and made related recommendations to guide the province towards a more sustainable future. As such, the following objectives were achieved:

- > The indicators for each chapter were tracked through the reporting period
- > Data Gaps Identified
- > the value of the indicator set determined

NW Environment Outlook, South Africa

- > North West Department of Rural, Environment and Agricultural Development
- > Mahikeng, 2018
- > Position: Environmental Consultant
- > Assigned Tasks: Chapter Author
- > Project Duration: Aug 2017–March 2020
- > Project Value: R1993799.00

Compilation of the water chapter as part of the publication of the North West Environment Outlook

Dube Tradeport State of the Environment Report

- > Dube Tradeport Corporation
- > KwaZulu-Natal, 2014
- > Position: Environmental Consultant
- > Assigned Tasks: Chapter Author
- > Project Duration: 2014
- > Project Value: R171,000.00

Compilation of the Dube Tradeport State of the Environment Report 2013/2014

State of Environment Report (SOER) for City of Johannesburg, South Africa

- > >South African Cities Network
- > City of Joburg, 2014
- > Position: Environmental Consultant
- > Assigned Tasks: Chapter Author
- > Project Duration: 2014
- > Project Value: Unknown

Compilation of the State of the Environment Report for the City of Johannesburg 2014

NW Environment Outlook, South Africa

- > North West Department of Economic Development, Environment, Conservation and Tourism
- > Mahikeng, 2013
- > Position: Environmental Consultant
- > Project Duration: 2013
- > Project Value: R1,303,344.00

Compilation and Publication of the North West Provincial

Update of the Dube Tradeport State of the Environment Report

- > Dube Tradeport Corporation

- > KwaZulu-Natal, 2015
 - > Position: Environmental Consultant
 - > Assigned Tasks: Chapter Author
 - > Project Duration: 2015
 - > Project Value: R 403424.34
- Compilation of the Dube Tradeport State of the Environment Report 2016/2017

Integrated Open Space Plan – Greater Khayalami and Ruimsig-Honeydew Sub-Regions, Johannesburg, South Africa

- > Client: City of Johannesburg, 2016
 - > Position: Environmental Consultant
 - > Assigned Tasks: Compilation of status quo, literature review and open space document
 - > Project Duration: 2016
 - > Project Value: 1,286,950 .00
- Development of two integrated open space plans for the Greater Khayalami and Ruimsig-Honeydew Sub-regions which aim to ensure that ecological goods and services are maintained and enhanced so as to contribute to spatial planning in the City of Johannesburg, and both economic and social development.

Integrated Open Space Plan - Linbro Park & Greater Bassonia, Johannesburg, South Africa

- > City of Johannesburg, 2015
 - > Position: Environmental Consultant
 - > Assigned Tasks: Compilation of status quo, literature review and open space document
 - > Project Duration: 2015
 - > Project Value: R1,314,695.00
- Development of two integrated open space plans for the Linbro Park and Greater Bassonia which aim to ensure that ecological goods and services are maintained and enhanced so as to contribute to spatial planning in the City of Johannesburg, and both economic and social development.

Integrated Open Space for the Greater Khayalami and Ruimsig/Honeydew Sub Regions

- > City of Joburg, 2017
- > Position: Environmental Consultant
- > Position: Environmental Consultant
- > Assigned Tasks: Compilation of status quo, literature review and open space document
- > Project Duration: 2017
- > Project Value: Unknown

Development of two integrated open space plans for the Greater Khayalami and Ruimsig-Honeydew Sub-regions which aim to ensure that ecological goods and services are maintained and enhanced so as to contribute to spatial planning in the City of Johannesburg, and both economic and social development.

Review and Update of the City of Windhoek's Environmental Policy

- > Consulting Services Africa (CSA)
 - > Windhoek, Namibia, 2014
 - > Position: Environmental Consultant
 - > Assigned Tasks: Literature Review
 - > Project Duration: 2014
 - > Project Value: R190,377.50
- Review the existing City of Windhoek Environmental Management Policy, 2004 and revise and improve the existing policy so that it may be approved, launched, and implemented by the Windhoek City Council.

Green existing by-laws and develop a set of new environmental by-laws or amend the existing by-laws,

- > Ekurhuleni Metropolitan Municipality
 - > Ekurhuleni, 2014
 - > Position: Environmental Consultant
 - > Assigned Tasks: Literature Review
 - > Project Duration: 2014
 - > Project Value: R1,511,140.00
- Review the existing Ekurhuleni by-laws by introducing environmental considerations and develop a set of new environmental by-laws if required.

Application for Postponement of Compliance Timeframes to achieve New Plant Standards at ArcelorMittal South Africa, Vanderbijlpark Works, Emfuleni Local Municipality

- > ArcelorMittal South Africa
- > Gauteng Province, 2019
- > Position: Environmental Consultant
- > Assigned Tasks: Project Manager and Facilitation of public participation process
- > Project Duration: 2019
- > Project Value: R87,100.00

In response to Section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No.39 of 2004) (as amended in 2018), ArcelorMittal applied for a postponement of the compliance timeframes to achieve

the new plant minimum emission standards, as well as alternative emission standards for certain plants at the Vanderbijlpark Works (AMSAVW), Emfuleni Local Municipality, Gauteng.

Application for an Alternative Plant Standard and Suspension Application for activities associated with the ArcelorMittal Pretoria Works, City of Tshwane, Gauteng.

- > ArcelorMittal South Africa
- > Gauteng Province, 2019
- > Position: Environmental Consultant
- > Assigned Tasks: Project Manager and Facilitation of public participation process
- > Project Duration: 2019
- > Project Value: R60,996.00

In response to Section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (as amended in 2018), ArcelorMittal intends to apply for an alternative plant standard and submit a suspension application of the compliance timeframes to achieve the new plant minimum emission standards for the Pretoria Works, City of Tshwane, Gauteng.

Annexure B – Maps

Locality Map

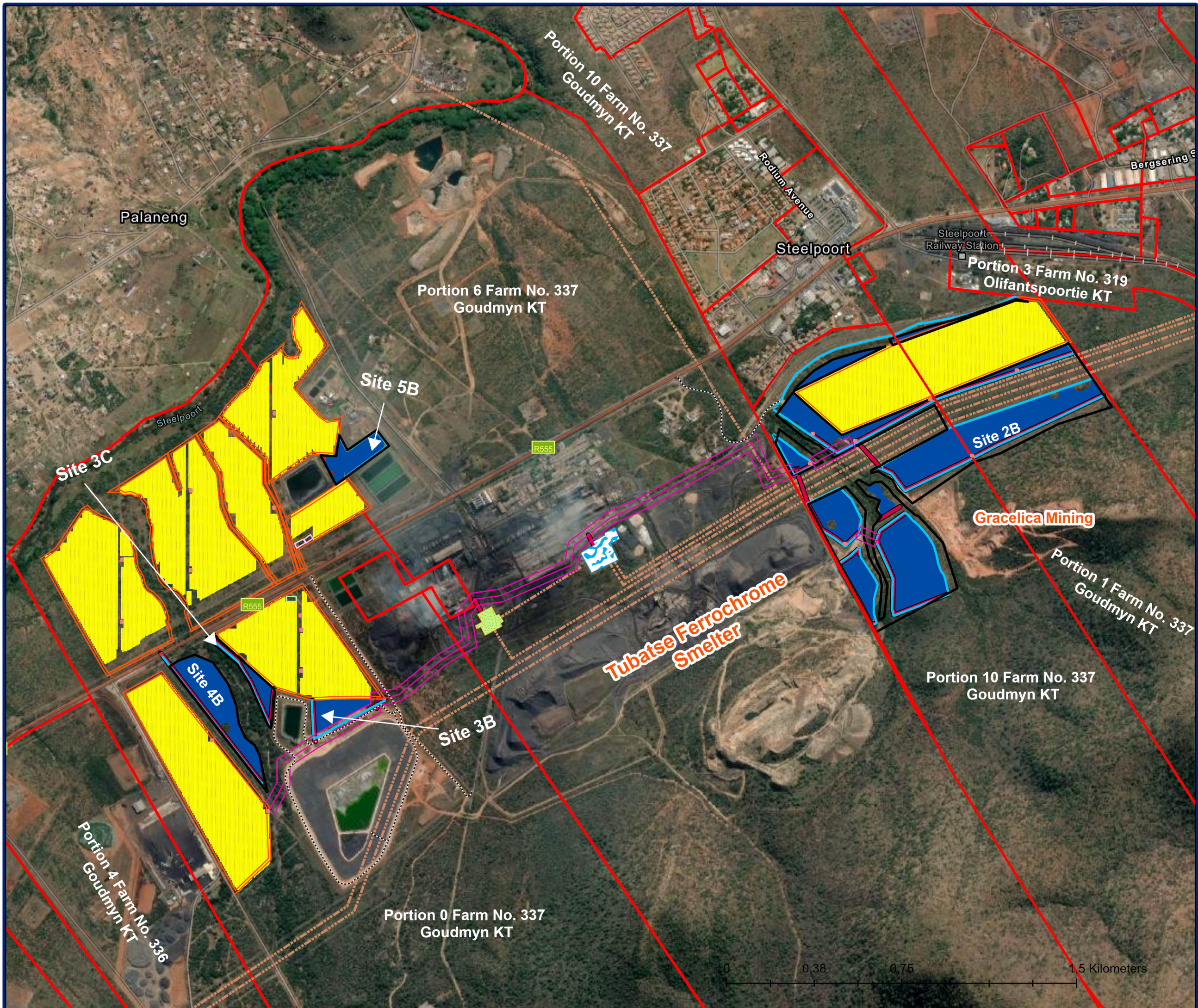
Legend

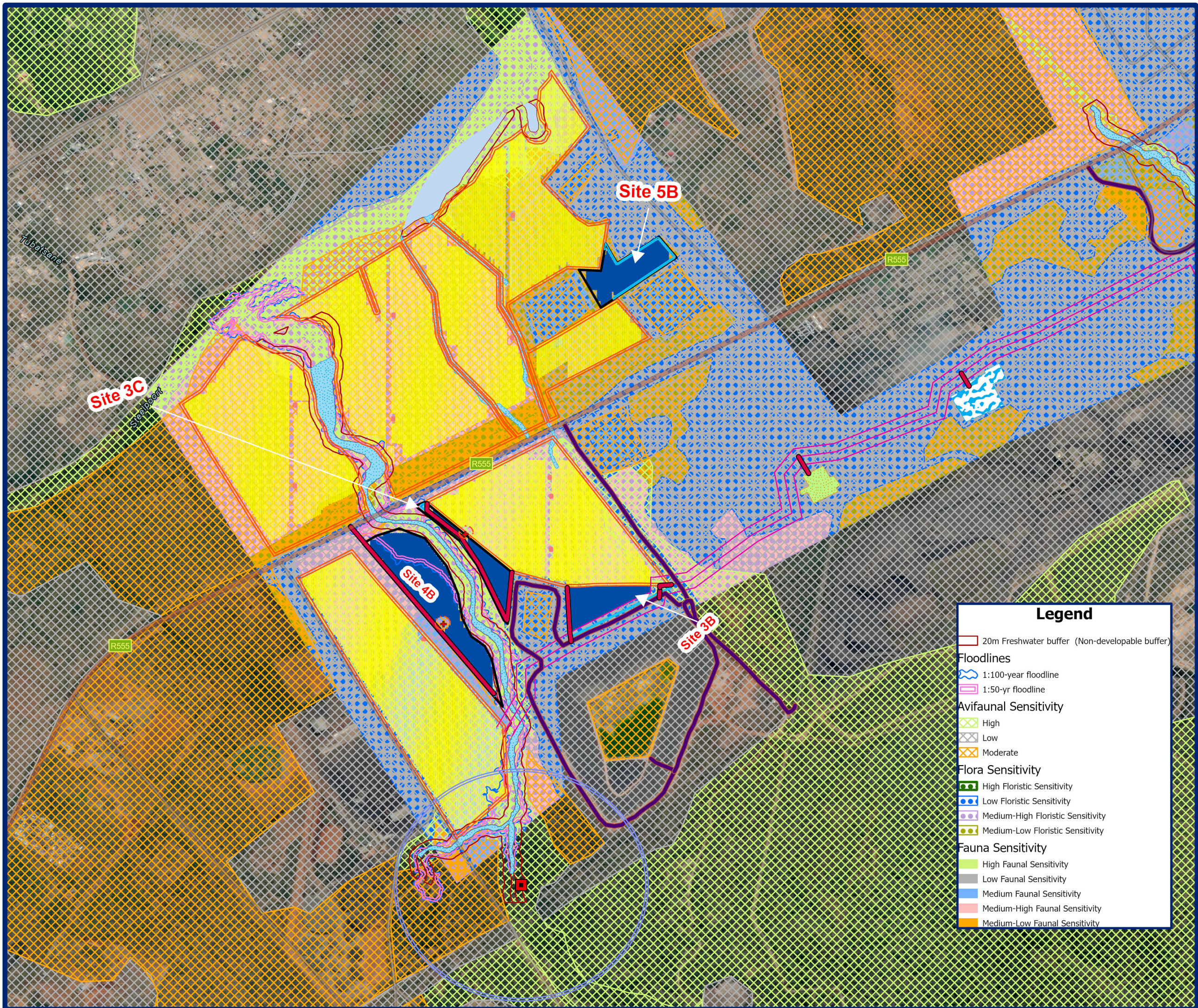
- Phase 1 Arrays
- Phase 2 Arrays
- Proposed Phase 2 Powerlines
- - - Existing Eskom Powerlines
- Storage Yard
- Warehouse
- Underground Cables
- - - Existing Access Road
- Cadastral Boundary
- West Plant Substation
- East Plant Substation
- Switching Stations
- Phase 2 Project Boundaries
- Phase 1 Project Boundaries
- Internal Access Road
- Box transformers

Source:
ESRI
Samancor Chrome
SIGMA



Scale: 1:15 000





Legend

- Wahlbergs Eagle nest
 - Wahlbergs Eagle Nest - 350m buffer
 - + Heritage Features
 - Heritage Buffer
 - Underground Cables
 - Phase 2 Arrays
 - Phase 1 Arrays
 - Existing Access Road
 - Internal Access Road
 - Proposed Phase 2 Powerlines
 - Phase 2 Project Boundaries
 - Phase 1 Project Boundaries
 - East Plant Substation
 - West Plant Substation
 - Box transformers
- Delineation Watercourses**
- Episodic Drainage Line
 - River

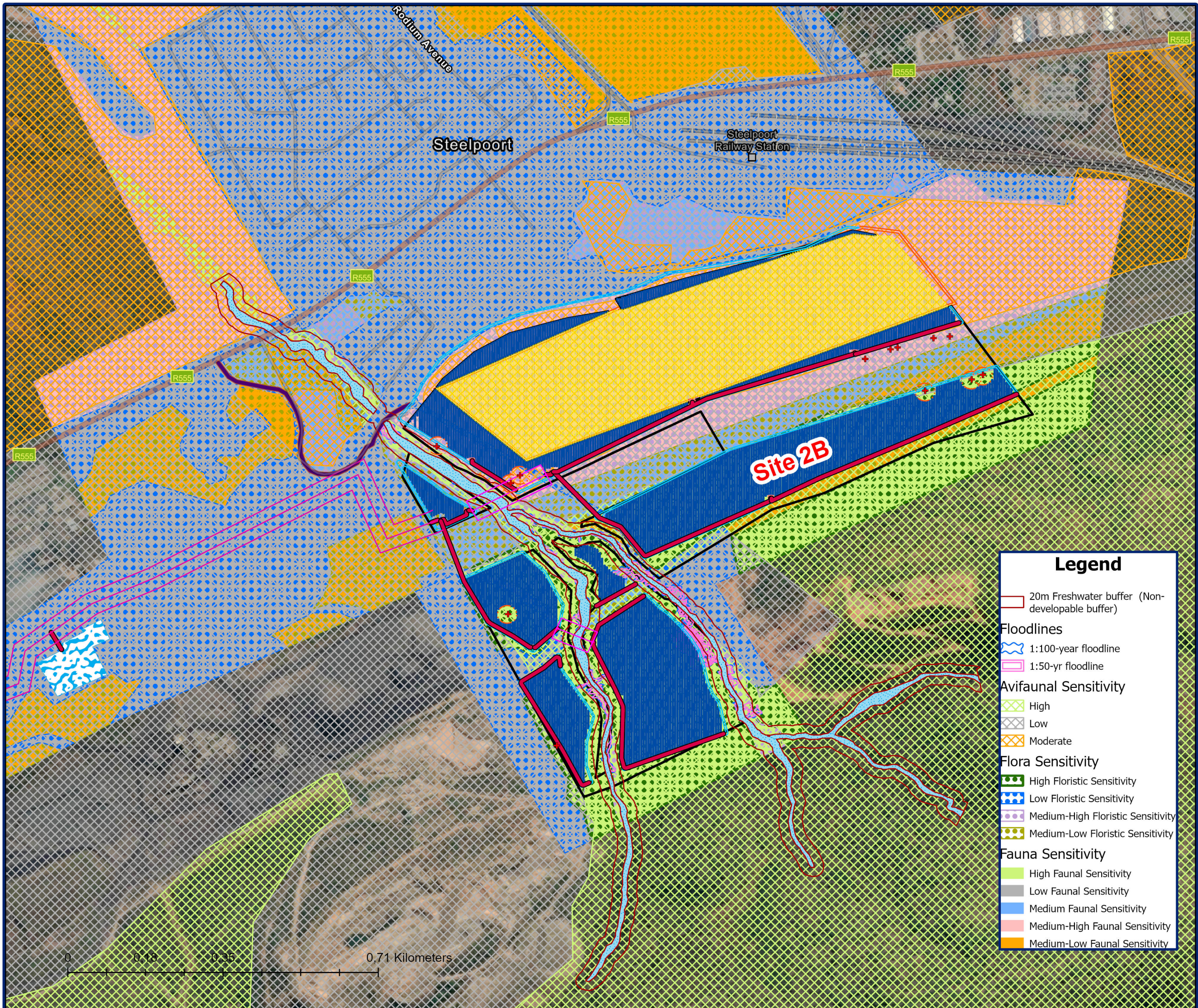
Legend

- 20m Freshwater buffer (Non-developable buffer)
- Floodlines**
- 1:100-year floodline
 - 1:50-yr floodline
- Avifaunal Sensitivity**
- High
 - Low
 - Moderate
- Flora Sensitivity**
- High Floristic Sensitivity
 - Low Floristic Sensitivity
 - Medium-High Floristic Sensitivity
 - Medium-Low Floristic Sensitivity
- Fauna Sensitivity**
- High Faunal Sensitivity
 - Low Faunal Sensitivity
 - Medium Faunal Sensitivity
 - Medium-High Faunal Sensitivity
 - Medium-Low Faunal Sensitivity

Source:
ESRI
Samancor Chrome
SAS
BEC
GCS
PGS



Scale: 1:10 500



Legend

- + Heritage Features
- - - Heritage Buffer
- Proposed Phase 2 Powerlines
- Phase 2 Arrays
- Phase 1 Arrays
- Existing Access Road
- Underground Cables
- Phase 2 Project Boundaries
- Phase 1 Project Boundaries
- Internal Access Road
- Storage Yard
- Warehouse
- East Plant Substation
- West Plant Substation
- Switching Stations
- Box transformers

- #### Delineation Watercourses
- Episodic Drainage Line
 - River

- ### Legend
- 20m Freshwater buffer (Non-developable buffer)
 - Floodlines**
 - 1:100-year floodline
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 - Moderate
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 - High Floristic Sensitivity
 - Low Floristic Sensitivity
 - Medium-High Floristic Sensitivity
 - Medium-Low Floristic Sensitivity
 - Fauna Sensitivity**
 - High Faunal Sensitivity
 - Low Faunal Sensitivity
 - Medium Faunal Sensitivity
 - Medium-High Faunal Sensitivity
 - Medium-Low Faunal Sensitivity



Source:
ESRI
Samancor Chrome
SAS
BEC
GCS
PGS

Scale: 1:8 000