NAMISUN
ENVIRONMENTAL PROJECTS & DEVELOPMENT

PROPOSED OSHIVELA PILOT PROJECT
ON PORTION 4 OF FARM BLOEMHOF 109
ERONGO REGION

ENVIRONMENTAL MANAGEMENT PLAN

February 2024

Prepared for: Hylron Green Technologies (Pty) Ltd

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FIRST OF ITS KIND

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ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED OSHIVELA PILOT PROJECT, ERONGO REGION

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ACRONYMS AND ABBREVIATIONS

The list of key acronyms and abbreviations used in this report and the EIA Scoping (including Impact Assessment) Report are summarized in the table below:

Acronyms / Abbreviations	Definition
amsl	Above mean sea level
AQG	Air Quality Guideline
AQO	Air Quality Objectives
ARD	Acid Rock Drainage
ATC	Arandis Town Council
C	Carbon
CITES	Convention on International Trade in Endangered Species
CMS	Convention on Migratory Species
CO	Carbon monoxide
CO_2	Carbon dioxide
CV	Curriculum vitae
DEA	Department Environmental Affairs
EAP	Environmental Assessment Practitioner
EAPAN	Environmental Assessment Professionals Association of Namibia
EC	European Community
ECC	Environmental Clearance Certificate
EIA	Environmental Impacts Assessment
EMP	Environmental Management Plan
Fe	Iron
Fe_2O_4 or Fe_3O_4.	Iron ore (concentrate)
GHG	Greenhouse gas
GmbH	Gesellschaft mit beschränkter Haftung
H_2	Hydrogen
H_2O	Water
ha	Hectares
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
I&APs	Interested and / or affected parties
IBA	Important Bird Area
IFC	International Finance Corporation
IPP	Independent Power Producer
km	kilometres
kPa	Kilopascal
$kWh/m^2/a$	kilowatt hours per square meter per annum
m^3/h	cubic metres per hour
MEFT	Ministry of Environment, Forestry and Tourism
mg/L	Milligrams per litre
mg/Nm^3	Milligrams per normal cubic metre

MME	Ministry of Mines and Energy
MPE	Ministry of Public Enterprises
m/s	Meter per second
MTPA	Million tons per annum
MURD	Ministry of Urban and Rural Development
MW	Megawatt
MWp	Megawatt peak
MWT	Ministry of Works and Transport
NAAQS	South African National Ambient Air Quality Standards
NAMREP	Namibian Renewable Energy Program
NDP	National Development Plan
NGO	Non-governmental organisation
NIRP	National Integrated Resource Plan
NNNP	Namib-Naukluft National Park
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NPC	National Planning Commission
NSA	Namibia Statistics Agency
O_2	Oxygen
PM	Particulate matter
PPA	Power Purchase Agreements

1 INTRODUCTION

Hylron Green Technologies (Pty) Ltd (Hylron), a partnership of Namibian and German companies, has developed a technology to produce iron at zero emissions[1]. In an airtight rotary kiln, hydrogen reacts with the oxygen contained in iron ore to produce "Direct Reduced Iron (DRI)". "Green hydrogen" is used for this process, meaning that the hydrogen is fully generated from renewable resources.

Hylron intends to develop the Oshivela Pilot Project, which will be the world's first industrial production of iron at zero emissions, on their farm (i.e. Portion 4 of Farm Bloemhof 109), which is located ~75 km north-east of Swakopmund, in the Erongo Region (refer to Figure 1).

This Environmental Management Plan (EMP) documents a series of individual management plans (MPs) which are designed to meet legal requirements, avoid, minimise or manage the impacts associated with the implementation of the proposed Oshivela Pilot Project.

An Environmental Impact Assessment (EIA) process was conducted for the proposed Project and a subsequent EIA Scoping (including Impact Assessment) Report has been produced by Namisun Environmental Projects and Development (Namisun). This process and report identified and assessed the potential environmental (and social) impacts associated with the project. Namisun is an independent environmental consultancy firm appointed by Hylron to undertake the EIA.

The management and mitigation measures recommended by the individual specialists in the above mentioned EIA process have, amongst others, been compiled into this EMP.

[1] Note: The production of iron at zero emissions relates specifically to the "processing" (see section 4.2.2) step in the value chain and not the full value chain with all the associated elements. Hylron, however, aims to further research and develop additional steps in the value chain to further reduce emissions (i.e. the transport of the ore concentrate and the final product).

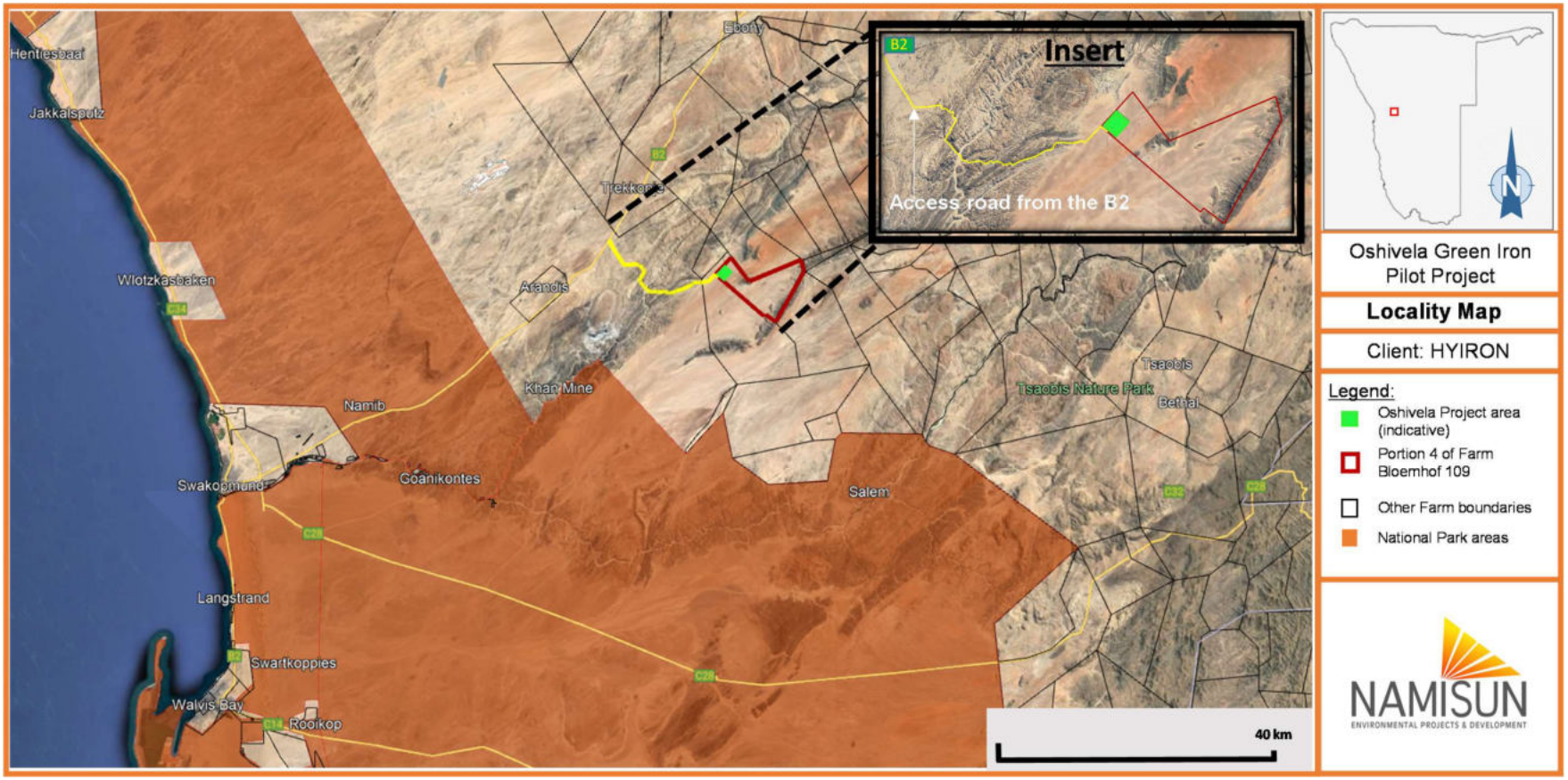

FIGURE 1: LOCATION OF THE PROPOSED OSHIVELA PILOT PROJECT ON PORTION 4 OF FARM BLOEMHOF 109 (REF: GOOGLE EARTH)

1.1 KEEPING THE EMP CURRENT

Hylron will conduct periodic reviews of the EMP should circumstances change.

Should a listed activity(s) as defined in the Environmental Impact Assessment Regulations: Environmental Management Act (EMA), 2007 (Government Gazette No. 4878) be triggered (as a result of future modifications / changes), this EMP will be required to be updated through another EIA process as stipulated in the EMA and its Regulations.

1.2 DETAILS OF THE PERSONS WHO PREPARED THIS EMP AND OTHER REFERENCES

Hylron appointed Namisun as an independent environmental consulting company to undertake the required EIA process, to compile the EIA Scoping (including Impact Assessment) Report and the accompanying EMP (this document) as part of the application process for an Environmental Clearance Certificate) (ECC).

Werner Petrick, the EIA project manager, has more than twenty-four years of relevant experience in conducting / managing EIAs, compiling EMPs and implementing EMPs and Environmental Management Systems (EMSs). Werner has a B. Eng (Civil) degree and a master's degree in environmental management and is certified as lead environmental assessment practitioner (EAP) and reviewer under the Environmental Assessment Professionals Association of Namibia (EAPAN).

Dr Pierré Smit, the EIA project assistant, holds a PhD in Landscape Ecology and has more than twenty-eight years of experience in environmental management, managing environmental assessment, the implementation of EMPs and EMSs in Namibia.

The management and mitigation measures (i.e. actions) and monitoring requirements documented in this EMP was developed, amongst others, by Namisun and the Team of Environmental Specialists, presented Table 1.

TABLE 1: EIA TEAM

Team	Name	Designation	Tasks and roles	Company
EIA Project Management Team	Werner Petrick	Lead EIA Practitioner	Management of the EIA process and reporting	Namisun
	Pierré Smit	EIA Project Assistant Ecology input		
Avifauna	Ann and Mike Scott	Avifauna specialists	Specialist input incorporated into this report: Avifauna study and assessment General biodiversity input	African Conservation Services cc

Team	Name	Designation	Tasks and roles	Company
Groundwater and surface water	Sandra Müller	Hydrogeological Specialist	Specialist input incorporated into this report: Hydrogeological and hydrological study and assessment	S Muller Hydrogeological consultant
Archaeology	John Kinahan	Archaeological specialist	Specialist input incorporated into this report: Archaeological study and assessment	J. Kinahan, Archaeologist
Air Quality and Noise	Nicolette von Reiche	Noise and Air Quality specialist	Specialist input incorporated into this report: Air Quality and noise	Soundscape Consulting (Pty) Ltd

Furthermore, reference was made to the EIA Amendment Report and associated Specialist studies for the Shiyela Iron Project (Namisun, 2022a and Namisun, 2022b). The relevant specialist studies referred to in the above mentioned EIA include:

- An ecology specialist study and assessment conducted by EnviroScience (2022).
- A noise specialist study and assessment conducted by Soundscape Consulting (Pty) Ltd (2022).
- A socio-economic specialist study and assessment conducted by Ashby Associates cc (2022).
- An air quality specialist study and assessment conducted by Airshed (2022).
- A visual specialist study and assessment (GYLA, 2022).
- The groundwater and surface water specialist study and assessment conducted by SLR (2022).
- The archaeology specialist study and assessment conducted by J. Kinahan Archaeologist (2022).

1.3 Management Plans linked to the Identified Aspects and Impacts

Understanding the biophysical and human environment in which a project is planned is the first step to understanding its environmental impacts (see Chapter 6 of the EIA Scoping (including Impacts Assessment) Report). The next and possibly more important step is to identify the environmental aspects that give rise to the impacts (see Chapters 7 and 8) of the EIA Scoping (including Impacts Assessment) Report).

Successful management will be gauged by how well Hylron avoids, minimizes or mitigates all the impacts associated with each environmental aspect at the Oshivela Pilot Project.

As part of the EIA process for the Oshivela Pilot Project, environmental aspects and potential environmental impacts associated with the activities and facilities were thus identified. The full suite of the proposed project's facilities and activities, associated with both the construction and operations phases are described in the EIA report and summarised in Chapter 4 of this EMP.

Table 2 provides a summary of the key environmental (and socio-economic) aspects and impacts identified / assessed. The associated Management Plans (MPs), where relevant actions that are required to ensure the potential negative impacts are avoided / minimised and positive impacts maximised, are also shown in the table below.

TABLE 2: LIST OF KEY ISSUES AND CORRESPONDING MANAGEMENT PLANS

Environmental Aspect	Environmental Impact (assessed as part of the EIA Amendment Report)	Relevant MP
Fauna and flora and habitat loss	• Loss of vegetation and associated biota due to construction activities. • Impact on animal movement. • Change of habitat due to the construction and operation of the process plant, solar plant modules and associated infrastructure. • Spread of alien invasive plants (operational phase).	• Fauna and Flora and Habitat loss MP
Avifauna (specifically)	• Disturbance of birds during (resulting in avoidance / displacement / barrier effects); this could include road mortalities and / or poaching during construction. • Direct and indirect modification / loss / destruction of bird habitat (resulting in voidance / displacement / barrier effects). • Attraction of birds to novel (artificial) habitats and resources; this impact could lead to negative impacts on infrastructure, caused by bird nesting, perching and other activities • Bird collisions with infrastructure such as solar panel arrays and other associated infrastructure.	• Avifauna (specific) MP
Visual	• General visual impacts and sense of place.	• Visual MP • Waste management MP
Groundwater and Surface water	• Abstraction of groundwater for the project could deplete the limited stored resources. • Project infrastructure impacting surface water flow / drainage. • Spills from the RO plant and disposal of brine mixed with water treatment chemicals could affect soil and water quality. • Disposal of untreated sewage causes soil and water pollution. • Soil, surface and groundwater pollution from domestic sewage effluent, hydrocarbon spills or improperly managed waste negatively affects the soil, groundwater and surface water quality and could reduce the availability of water resources.	• Groundwater and Surface water MP • Waste management MP
Noise	• Noise disturbance to third parties and animals.	• Noise MP

Air quality	• Air pollution, dust nuisance and increased risk of health impact to third parties.	• Air Quality MP
Archaeology	• Damage or destruction of archaeological sites.	• Archaeology MP
Socio-economic	• Economic impacts during construction and operations (positive). • Job creation and skills development during construction and operations (positive). • Potential negative social impacts associated with the construction workers, permanent employees and the accommodation on Hylron's Farm(s) in the area. • Traffic related impacts.	• Socio-economic MP • Third party safety and security MP • Stakeholder consultation / communication MP

The management and mitigation measures relating to other aspects (i.e. waste management) are also addressed in this EMP – refer to section 6 for management and mitigation measures to address potential impacts associated with these aspects.

2 PURPOSE AND SCOPE OF THE EMP

This EMP contains a series of MPs with mitigation measures designed to meet the legal requirements and to minimize or avoid the negative impacts associated with the proposed Oshivela Pilot Project during the construction and operational phases. These plans are based on the overall management objectives for the various environmental and social aspects which have been identified in the EIA process.

In addition, the EMP identifies parties at an early stage of project development to implement the required management and mitigation measures through all phases of the project, from design to operational phase.

The commitments contained in this EMP form the overarching contractual agreement with the Namibian authorities for sound environmental management. All employees, contractors and sub-contractors and any visitors to site will be expected to comply with the commitments contained herein.

2.1 STRUCTURE OF THE EMP

The structure of this EMP is outlined in Table 3, following largely the requirements as set out in Section 8 of the EIA Regulations (2012), promulgated under the Environmental Management Act, No. 7 of 2007.

TABLE 3: REPORT STRUCTURE

Component	Report reference
(a) Details of the EAPs who prepared the EMP and the expertise of the EAPs	Section 1.3
(b) An identification of relevant laws and guidelines	Chapter 3
(c) A detailed description of the aspects that are covered by the EMP	Chapter 4
(d) Information about the proposed management and mitigation measures to be undertaken to address the identified impacts	Chapter 6
(e) Responsibilities and timeframes within which the measures contemplated in the EMP must be implemented	Chapter 7
(f) Proposed mechanisms of monitoring compliance with the EMP and reporting on it	Chapter 8

3 ENVIRONMENTAL LEGISLATION

3.1 LEGISLATION

This section outlines Namibian legislation which is relevant to the Oshivela Pilot Project and with which Hylron must comply with. Where legislation is lacking, Hylron will comply with international best practice and procedures.

Table 3 provides a summary list of the relevant legislation and regulatory frameworks.

TABLE 4: LIST OF LEGISLATION RELEVANT TO THE OSHIVELA PILOT PROJECT

Year	Name
1919	The Public Health Act 36.
1956	The Water Act, No. 54.
1969	National Monuments Act 28.
1969	Soil Conservation Act, No. 76 of 1969 and the Soil Conservation Amendment Act, No. 38 of 1971.
1974	Hazardous Substance Ordinance, No. 14.
1975	Nature Conservation Ordinance, No.14 of 1975 (as amended).
1976	Atmospheric Pollution Prevention Ordinance, No. 11.
1990	Petroleum Products and Energy Act, No. 13.
1990	Foreign Investment Act No. 27.
1990	The Constitution of the Republic of Namibia.
1990	Nature Conservation General Amendment Act of 1990, the Nature Conservation Amendment Act, No.5 of 1996, and the Nature Conservation Amendment Act, No. 3 of 2017.
1999	Road Traffic and Transport Act No. 22.
2001	The Forestry Act, No. 12 of 2001 as amended by the Forest Amendment Act, No. 13 of 2005 and its regulations of 2015.
2003	Pollution Control and Waste Management Bill (3rd Draft September 2003).
2004	National Heritage Act, No. 27.
2007	Electricity Act, No. 4.
2007	Labour Act, No. 11.
2008	Minerals (Prospecting and Mining) Amendment Act, 8.
2009	Draft Protected Areas and Wildlife Management Bill.
2007	Environmental Management Act, No. 7 of 2007 and Regulations promulgated in terms of the Act in 2012.
2013	Water Resources Management Act, No. 11 of 2013 and Regulations promulgated in terms of the Act in 2023.

Year	Name
2016	Civil Aviation Act, No. 6 of 2016 and the Namibia Civil Aviation Regulations of 2001, as amended in 2018.

3.2 ECC, PERMITS AND AUTHORISATIONS

The EIA Regulations promulgated in terms of the Environmental Management Act of 2007, identify certain activities which could have a substantially detrimental effect on the environment. These listed activities require environmental clearance from MEFT prior to commencing. The following activities identified in the regulations apply to the proposed Oshivela Project[2]:

Energy generation, transmission and storage activities

1. The construction of facilities for -

   (a) the generation of electricity;

   (b) the transmission and supply of electricity.

Waste management, treatment, handling and disposal activities

2.1 The construction of facilities for waste sites, treatment of waste and disposal of waste.

2.2 Any activity entailing a scheduled process referred to in the Atmospheric Pollution prevention Ordinance, 1976.

2.3 The import, processing, use and recycling, temporary storage, transit or export of waste.

Mining and quarrying activities

3.3 Resource extraction, manipulation, conservation and related activities.

Forestry activities

4. The clearance of forest areas, deforestation, afforestation, timber harvesting or any other related activity that requires authorisation in term of the Forest Act, 2001 (Act No. 12 of 2001) or any other law

Water resource development

8.1 The abstraction of ground or surface water for industrial or commercial purposes.

8.6 Construction of industrial and domestic wastewater treatment plants and related pipeline systems.

[2] Numbering as per the EIA Regulations.

An addition to the ECC, Hylron might be required to obtain other permits / authorisation to allow them to implementing the proposed Project activities / facilities, as summarised in Table 5 and Table 6.

TABLE 5: NOTIFICATION, REGISTRATION AND APPROVALS THAT MAY BE REQUIRED

Issue	Legislation	Requirement / authority
Permission to sell, discharge, etc. minerals mined	Minerals (Prospecting and Mining) act, No. 33 of 1992, Section 102 (1)	Permission from the Mining Commissioner (MME)
Purification and or discharge of wastewater or dirty water	Section 21 (1) (2) (3) (4) (5) & 22 of the Water Act, No. 54 of 1956	Permit for industrial wastewater and effluent disposal from the Directorate of Water Affairs at the Ministry of Agriculture, Water and Land Reform (MAWF)
Picking and transport of protected plants	Nature Conservation Ordinance, No. 4 of 1975, Section 73	Plant removal permit, approval by the landowner or Directorate of Parks and Wildlife at MEFT or the Namibia Botanical Research Institute (NBRI)
Picking, removal of protected plants	Nature Conservation Ordinance, No. 4 of 1975, Section 73	Permit from Directorate of Parks and Wildlife at MEFT
Registration, selling, operating, installing of infrastructure related to Group I and III hazardous substances	Hazardous Substance Ordinance, No. 14 of 1974 Section 5 (1)(a)(b)(c)	Licences from the MEFT and Ministry of Health and Social Services (MoHSS) required for the sale, use and storage of “hazardous substances”, which are specified in certain groups.
Disturbing or destroying of national heritage, archaeological or paleontological sites.	National Heritage Act, No. 27 of 2004, Section 48 – 52 and 55	Consent from the National Heritage Council
Consumer installation certificate	Petroleum Product Regulations, 2000 Section 18 (5)	Certificate / license from the Directorate Petroleum Affairs of MME
Actions to be taken after a spill has occurred (major petroleum spill means 200 L per spill)	Section 49 (1), (4)	Notify Directorate Petroleum Affairs of MME
30-days notification prior to commencement of construction	Labour Act, No. 6 of 1992, Regulations for Labour Act 1992, Section 20	Notify the Ministry of Labour, Industrial Relations and Employment Creation (MLIREC)
Notification prior to commencement of construction	Labour Act, No. 6 of 1992, Regulations for Labour Act 1992	Notify MME and MoHSS
Transport / operating licence to transport goods on public roads	Road Traffic and Transport Act, No. 22 of 1999, Section 60	Licence from the Ministry of Works and Transport (MWT)

Approval to work on Sundays, public holidays, and continuous operation	Labour Act, No. 6 of 1992, Regulations for Labour Act 1992, Section 33	Approval from the MLIREC
Register for VAT	Value-added Tax Act, No. 10 of 2000	Certification from the Ministry of Finance (MoF)
Register for tax	Income Tax Act, No. 24 of 1981	Certification from MoF
Register for Social Security	Social Security Act, No. 34 of 1994, Section 20	Register at the MLIREC
Valid Affirmative Action compliance certificate	Affirmative Action Act, No. 29 of 1998, Section 42	Certification from MLIREC

TABLE 6: LIST OF PERMITS OR CERTIFICATES THAT MAY BE REQUIRED

ECC	MEFT
Purification or discharge of wastewater or dirty water	MAWLR
Picking, removal of protected plants	MEFT
Archaeological	NHC

4 PROJECT OVERVIEW

This chapter provides a summary of the description of proposed Oshivela Pilot Project. More details can be found in the EIA Scoping (including Impact Assessment) Report (chapter 4).

The proposed Oshivela Pilot Project is planned in the north-western Section of Portion 4 of Farm Bloemhof 109 (see Figure 1 and Figure 2) and includes the following key activities:

- Production of 5 tons direct reduced iron per hour (~ 3 000 hours per year), using hydrogen as a reduction agent during the product beneficiation, in a specialised industrial (airtight) furnace.
- Hydrogen will be produced by means of electrolysis (i.e. breaking down water molecules (H_2O) into oxygen (O_2) and hydrogen (H_2)).
- Renewable energy supply (i.e. 25 MWp) in the form of Photovoltaic (PV) power to supply energy for the above-mentioned electrolysis process. The PV power plant will cover an area of ~ 30 hectares (ha).

During the Pilot phase of the Oshivela Project, 5 tons of raw iron will be produced per hour. At an average of nine hours sunshine per day, production time is estimated at approximately 3,000 hours per year and at an estimated production of 5 tons per hour, a total of 15,000 tons of raw iron (i.e. Sponge Iron) can be produced per year.

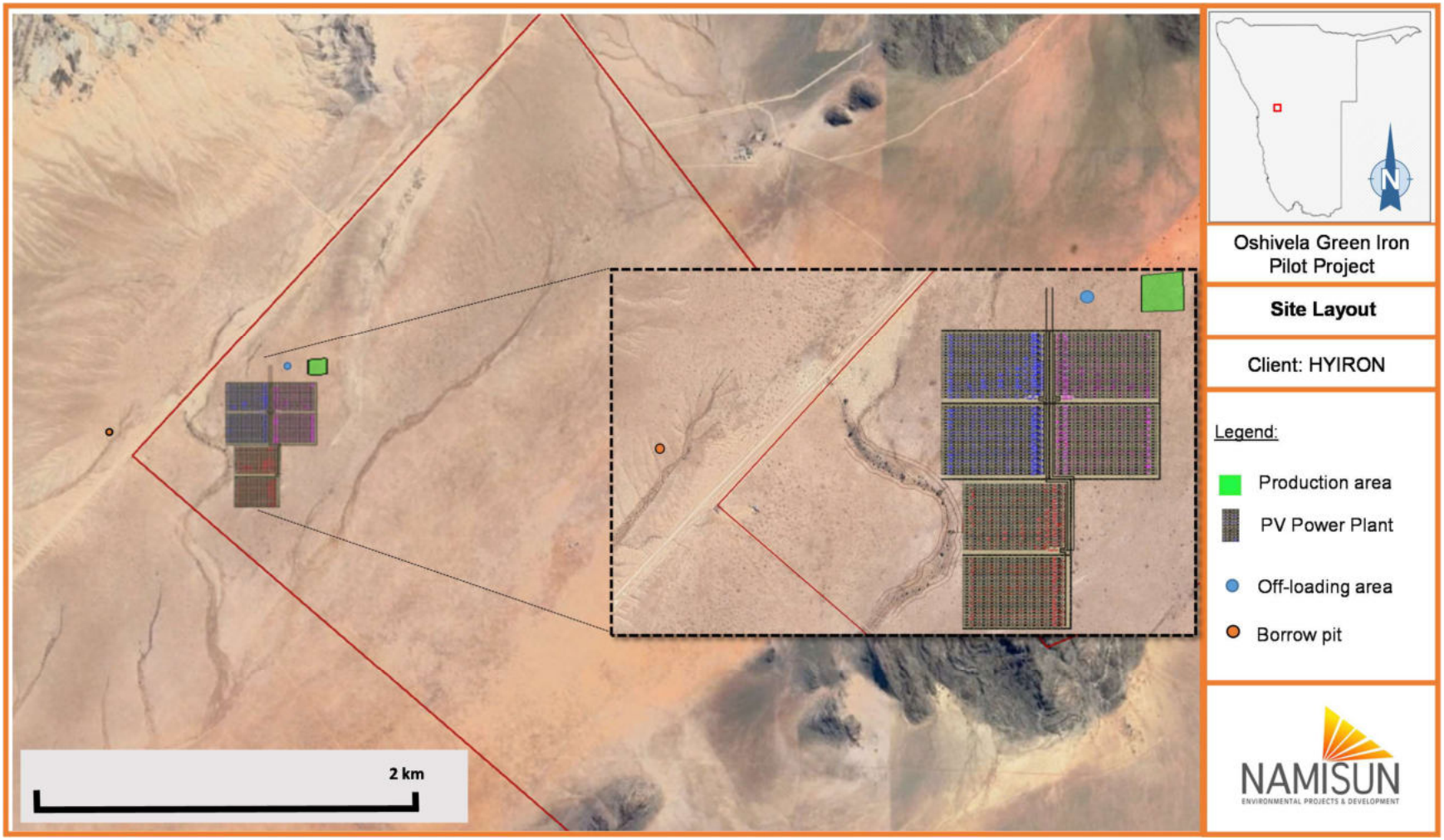

FIGURE 2: PROPOSED LAYOUT OF THE OSHIVELA PILOT PROJECT (SOURCE: GOOGLE EARTH)

4.1 Sources of Iron ore concentrate and transportation of the Iron ore concentrate to site

During the pilot phase, 27 000 tons of iron ore concentrate will be required per annum.

Hylron plans to obtain iron ore concentrate from various sources / suppliers, both locally (i.e. from within Namibian borders) and internationally for processing at their pilot plant. Hylron has received a lot of international attention with a number of countries already expressing keen interest to test their iron ores at the Oshivela plant to assess their potentials for the industrial transition towards zero emissions productions. Some of these countries include Brazil, Urugay, Canada, Australia and South Africa (amongst others). While it is part of Hylron´s objectives to scale the technology worldwide and proof the potential of different countries at the Oshivela Pilot Project in Namibia, it is the medium- and long- term objective to use the majority of local (i.e. Namibian) iron ores.

Hylron estimates that ~ 2.5 truck trips (on average) will be required daily to transport the iron ore concentrate to the Project Site. The trucks will follow an existing access road (i.e. the Norasa Uranium Project private access road) from the B2 Road. Other options for access to the Project Site are also being considered by Hylron, depending on the supplier. These options include the following:

Iron ore concentrate that will be sourced from international suppliers will likely be brought in by shipping vessels through the port of Walvis Bay. From Walvis Bay trucks will transport the iron ore concentrate via the existing road network along the D1984 (i.e. road behind the dunes (i.e. east of the dunes) and the B2. Another option for the transport of the ore to site is following a route along the C28 road turning north onto the 'Welwitschia Drive' and then the D1914. This route cuts through the NNNP in a north-easterly direction.

Iron ore sourced from within Namibia (i.e. Khomas Region or possible Erongo, Otjozondjupa or Kunene Region) would either be transported by rail to Arandis from where it will be loaded onto trucks for transporting to site; or trucks following the existing road network, including the B2.

Hylron is also investigating the possibility to use tractors for the hauling of the ore along the Norasa Uranium Project access road. The ore would then be transferred from the truck to a tractor with a wagon in a dedicated area next to the access road.

A maximum of ~ 3 000 m^3 ore concentrate will be stockpiled near the furnace (Refer to Figure 2). The ore concentrate delivered to site will be dry, fine grained (< 2mm) iron ore.

4.2 PROCESSING / BENEFICIATION

Depending on the purity of the ore, Hylron might need to mill the ore, either after or before the reduction process. The ore will be further concentrated by means of a gravity and magnetic separation process.

The (milled) iron ore concentrate will be transported, using a front-end loader, to a specialised industrial furnace, together with hydrogen produced on-site. In this airtight furnace, the Hydrogen reacts with the Oxygen contained in the Iron Oxide (Iron ore concentrate as Fe_2O_4 or Fe_3O_4). As a result, an Iron product (i.e. “sponge iron”) of between 90 and 99 % purity is produced. No chemicals are required in the process.

This sponge-iron (i.e. “green iron”) is produced in the furnace, generating net zero CO_2 emissions and has 30% less weight than iron ore. A by-product from the furnace would be water, which would be recycled for hydrogen production.

A by-product from the furnace would be water (H_2O), which would be recycled for hydrogen production. The process of hydrogen production is further discussed below.

The final product – Sponge Iron – will be transported to Walvis Bay for export. Approximately 2 truck trips would be required from site to Walvis Bay daily for the transportation of the ~ 15 000 tons Sponge Iron per annum.

4.3 HYDROGEN PRODUCTION AND WATER CYCLE

Renewable energy will be produced onsite. This energy will also be used to split water into hydrogen and oxygen by means of electrolysis. During electrolysis water molecules (H_2O) are broken down into oxygen (O_2) and hydrogen (H_2) and in the reaction of the hydrogen with the oxygen of the iron ore concentrate (which could be Fe_2O_3 or Fe_30_4), water is again produced.

Therefore, even though water is split into hydrogen and oxygen in the electrolysis process, there is limited water use in the overall process because water will be recycled.

In addition to the water formed during reduction, only small volumes of water (less than ~ 15 m^3 / week) will be required to make up process losses.

In addition, some low-quality water will be required for dust suppression on the roads around the plant, which could either be untreated borehole water or brine from the reverse osmosis (RO) plant, or a mix of these two sources.

A maximum of ~40 m^3 water would be required on average per week (i.e. ~ 2,000 m^3 / annum) during the pilot phase. The water will be supplied by abstracting from an existing borehole(s) (i.e.

groundwater) on site that will either be conveyed through pipeline between the borehole(s) and the site or transported with a water bowser. A water storage tank with a size of 40 m³ would be required on site.

A small reverse osmosis (RO) desalination plant will be set up to produce pure demineralised water for hydrogen production and for mixing with untreated water to produce less mineralised drinking water.

Hylron also considers to truck the initial volume of water intake for the processing in to the site.

4.4 Power Supply

The proposed project will receive its power exclusively from renewable energy sources, i.e. PV power onsite. No grid power will be required onsite and therefore no transmission lines will be installed. All cabling will be underground or on the ground, and electric installations will be bundled in the main process area.

Hylron proposes to install 25 MWp of Solar power. The PV panels are planned to be built in a north-facing alignment at a tilt of 25° and will need a maximum of 30 Ha of space. A total of 44,000 panels / modulus will be installed.

4.5 Associated Support Structures / Infrastructure and Services

Within the proposed Project area internal roads, internal power lines, pumps, pipes, water storage, sewage treatment system (septic tank) and other associated infrastructure and services, process and non-process plant buildings, product handling and loading areas, fuel storage facilities, general waste handling and storage facilities, etc. would need to be constructed.

The fuel storage facilities will entail a 10,000 litre above ground tank with the required bunding.

4.6 Employment and Accommodation

The required staff during operations will be at a maximum ~ 20 people at a time.

The staff will be accommodated on the farm(s) belonging to the Hylron group. Accommodation will be provided in already existing fully furnished flats and in newly build flats. On and off times will be organised in blocks to allow family visits and time for entertainment. Some staff might choose accommodation in Arandis or Swakopmund to travel to site for the shifts.

4.7 WASTE MANAGEMENT DURING OPERATIONS

4.7.1 SANITATION

Onsite biotreatment plants will be installed on site which will process sewage waste from operations ablutions. Treatment plants will be installed during early stages of the project.

The septic tanks will be emptied on a regular basis and the effluent disposed in the plant site treatment plants.

Treated effluent water from the treatment plants may be reused onsite for plant road dust suppression.

4.7.2 OTHER WASTE (HAZARDOUS AND NON-HAZARDOUS)

The types of waste that could be generated during operations include hazardous industrial waste, general industrial waste, medical waste from the staff medical station, and domestic waste. Waste will be sorted at source, stored in a manner that there can be no discharge of contamination to the environment and recycled or reused where possible. The remainder will be transported off site to appropriate recycling or disposal facilities (Swakopmund or Walvis Bay for general waste and Walvis Bay for hazardous waste).

4.7.3 MINERALISED WASTE

A maximum volume of 1,000 to 2,000 tons of silica material (i.e. waste sand) will be produced per year, which would either be used for road maintenance (i.e. access road) or backfilling of borrow pits (where Forsys potentially use material for the access road maintenance). Any remaining silica material could ultimately be trucked back to the mine (i.e. local supplier of the iron ore concentrate) or used to backfill / rehabilitate the borrow pit.

4.8 CONSTRUCTION PHASE ACTIVITIES AND INFRASTRUCTURE

Construction activities will be undertaken for the process plant, which will be inside a steel structure with shade netting; the adjacent warehouse as well as the associated support structures / infrastructure. The following (key) activities are expected to take place during the construction of the above-mentioned facilities:

- Appoint contractors, labours, etc.
- Limited earth moving activities to create flat surfaces.
- Foundation excavations.
- Setting up contractors' laydown areas.

- Maintaining the Norasa Uranium Project access road as and when require – in liaison with Forsys.
- Digging of foundations and trenches.
- Delivery of materials – storage and handling of material such as sand, rock, cement, etc.
- General building / construction activities including, amongst others: mixing of concrete; operation of construction vehicles and machinery; refuelling of machinery; civil, mechanical and electrical works; painting; grinding; welding; etc.
- Handling and storage of hazardous material, including lubricants, paints, gas (welding), cement, chemical additives for cement, diesel and petrol.
- Handling, storage and disposal of hazardous waste, including empty paint containers, cements bags, chemical additives (for cement) containers, contaminated PPE and other (with oil, etc.).
- Handling, storage and disposal of non-hazardous waste, including steel off-cuts, domestic waste, wood off-cuts, grinding wheels, other construction waste, redundant concrete packaging, e.g. plastic wrapping, styrofoam.

Based on the geotechnical investigations carried out on the site, the uprights for the PV panels can be installed following the methodology described below:

- 'Hammer' holes with a modified excavator / jack hammer for each of the upright structures.
- Auger holes in some parts of the project area for the upright structures.
- Drill holes in some parts of the project area for the upright structures.

Hylron plans to create a relatively small borrow pit on the north-western side of the Norasa Uranium Project Private access road, which is on Portion 4 of Farm Bloemhof 109. The borrow pit will have the following (maximum) dimensions:

- Area: ~2,500 m^2.
- Depth: ~2 m.

The borrow material will be used for road maintenance / construction (i.e. onsite access road).

During construction there will be up to maximum ~ 80 people on site at a time.

The core team of the construction workers will be accommodated on the farm(s) belonging to Hylron and neighbouring (guest-) farms. For some of the workers, Hylron will build fixed housing with own kitchens, bathrooms etc. on their farm(s).

Day labourers will also be brought in from Arandis and Swakopmund.

5 ENVIRONMENTAL OBJECTIVES

The following overall environmental and social objectives are applicable to the proposed Oshivela Pilot Project:

- To ensure compliance with relevant national legislation and standards, corporate environmental policies and objectives as well as this EMP.
- To minimize, as far as is possible, the unacceptable loss of biodiversity and related functionality through physical destruction and disturbance by minimizing the footprint and the conservation of residual habitat as far as possible.
- To monitor the impacts of bird strikes and interactions with the power infrastructure and determine additional suitable management and / or mitigation measures as and where required.
- To limit contaminated effluent discharge into the environment, and to protect soils and surface and groundwater resources through the implementation of measures for spill prevention and clean-up and the containment, recycling and removal of contaminated water.
- To ensure the legal and appropriate management and disposal of general and hazardous waste, through the implementation of a strategy for the minimization, recycling, management, temporary storage, and removal of waste.
- To minimize the potential for dust emissions.
- To minimize the potential for noise disturbance to third parties.
- To avoid additional negative visual impacts.
- To prevent and minimize pollution.
- To undertake rehabilitation wherever possible.
- To develop, implement and manage monitoring systems to ensure good environmental performance in respect of the following: groundwater, air quality (i.e. dust), noise and biodiversity.
- To support and encourage environmental awareness and responsibility amongst all employees and service providers.
- To provide appropriate environmental education and training for all employees and service providers.
- To ensure that all the employees and contractors adhere to the relevant management commitments.
- To minimize cumulative negative socio-economic impacts and enhance positive socio-economic impacts.

- Where relevant, to ensure compliance with the NNNP Rules and Regulations and to take cognisance of the NNNP Park Management Plan[3].

[3] The proposed Oshivela Pilot Project is located outside the NNNP. However, one of the options for transporting material to the Project Site is through the Park.

6 MANAGEMENT AND MITIGATION MEASURES (ACTION PLANS) TO ACHIEVE THE OBJECTIVES

The MPs listed in this chapter are applicable to all the relevant facilities and activities of the Oshivela Pilot Project. The respective MPs are:

- Stakeholder consultation / communication MP.
- Third party safety and security MP.
- Groundwater and Surface water MP.
- Biodiversity MP.
- Avifauna MP.
- Soil MP.
- Waste MP.
- Air quality MP.
- Noise MP.
- Visual MP.
- Archaeology MP.
- Socio-economic MP.

6.1 STAKEHOLDER CONSULTATION / COMMUNICATION MP

It is important that channels of communication are maintained over the life of the Project for relevant surrounding landowners (i.e. neighbours) and other relevant stakeholders.

6.1.1 OBJECTIVE

The objective is to keep site neighbours (and other relevant / key stakeholders) informed, as far as is possible, about developments and the associated facilities and activities of the Pilot Project through the implementation of forums for communication and constructive engagement.

6.1.2 ACTIONS REQUIRED

The respective management commitments apply to *all phases* of the project.

a) Understanding who the I&APs are

Action 1: Maintain the I&AP database developed as part of the EIA process. Further identify key stakeholders to consult with during the implementation of the project.

b) Liaison with I&APs during all phases of the project

Action 1: Devise and implement a stakeholder communication and engagement strategy. Hylron will engage with the key I&APs to inform them of the commencement of the activities and to share relevant information.

Action 2: Meetings with the Valencia Farm owner (or person leasing from the owner) will be carried out (the frequency of the meeting will be determined between Hylron and the farm owner at the outset of the project).

Meetings with other neighbouring (and surrounding) farmers to be arranged on an ad-hoc basis, depending specific complaints being raised. However, at the outset of the project, Hylron will engage with the immediate farm neighbours (as a minimum) to inform them of the commencement of the activities and also to share relevant safety related information.

c) Managing perceptions, issues and or complaints

Action 1: Develop and implement a concerns / complaints (grievance) process for stakeholders and publicise the channels through which issues can be submitted to Hylron.

- Document all complaints in an external communication register.

- Respond immediately to acknowledge receipt of complaints and comments.
- Investigate and report on findings of issue to the complainant.
- Keep complete auditable records of complaints, responses and actions taken.
- Introduce an independent mediator if the grievance / complaint cannot be resolved between Hylron and the affected party.

6.2 THIRD PARTY SAFETY AND SECURITY MP

It is essential that safety and security measures are defined and implemented to adequately protect the project site from being accessed by unauthorised people. The proposed Oshivela Project Site is located on Portion 4 of Farm Bloemhof 109, which belongs to Hylron.

A separate Occupational Health and Safety Plan shall be developed by Hylron, which does not form part of this EMP. An emergency response plan for incidents is also essential and will be developed by Hylron.

6.2.1 OBJECTIVE

The objective is to prevent physical harm to third parties and animals from potentially dangers associated with the facilities and activities of the Project. Also no to compromise the safety and security of the neighbouring farm owners from Project workers, both during the construction and operational phase.

6.2.2 ACTIONS REQUIRED

a) Access of unauthorised people on the Project Site

Construction and operational phase

Action 1: Warning signs will be erected and maintained at the (relevant) site boundaries / access roads (and the entrance to the Project Site – i.e. farm gate on the Norasa Uranium Project private access road).

Action 2: Security control will be in place at the access point to the processing activities to prevent uncontrolled vehicle and pedestrian access.

Action 3: Any persons entering the Project area will be required to undergo a formal induction.

Action 4: Operate and publicise a security plan for the Project Site among all site workers and visitors. This includes information to all workers, contractors and visitors of the detailed consequences of anyone found in breach of the security measures.

b) Safety risks

Construction and operational phases

Action 1: Operate an alcohol-free site.

Action 2: Ensure all security personnel are well vetted and trained.

Action 3: Prevent workers and contractors / visitor from collecting any plant or animal species, dead or alive.

c) Emergency

Construction and operational phases

Action 1: Develop and implement an emergency response plan relating to the safety of third parties.

d) Handling, storage, transport and use of hazardous substances

Construction and operational phases

Action 1: All legal health and safety requirements will be implemented when transporting hazardous substances to site.

Action 2: Transport companies will comply with all legal requirements for the handling and transport of hazardous substances.

Action 3: Storage facilities / tanks will comply with all relevant health and safety requirements applicable for Namibia.

Action 4: Major spillage incidents will be handled in accordance with emergency response procedures. Any significant spills will be reported to the authorities within 24 hrs and corrective action taken.

Action 5: Induct all relevant employees and contractors in the Project's spillage management procedure.

e) 3rd party safety and security and workers safety and well being

Throughout the Project development

Action 1: See General (third party) safety and security

Action 2: The Project cannot lock workers in but it must inform all employees / contractors of the detailed consequences of anyone found in breach of the security measures. It must include a contingency plan to protect the local community if labours goes on strike.

Action 3: Occupants of the employee camp / village will remain within the area after working hours.

Action 3: No workers will be allowed to visit neighbouring / surrounding farms.

Action 4: Ensure that the infrastructure used for the housing of the workers are suitable and conform to Namibian Labour regulations and relevant standards on workers' housing.

Action 5: Minimise the number of shared rooms, occupied at the same time, to reduce the real risk of spreading HIV and other sexually transmitted diseases within the workforce and to their families.

Action 6: Provide fencing around the female construction workers' accommodation area to offer protection from unwanted male visitors.

Action 7: Provide compulsory training to all employees and contractors on personal safety, mutual respect and sexual health including posters and other means of communication to remind and highlight expected behaviour.

Action 8: Provide recreational and educational facilities, examples of these may include TV (and DSTV) and / or computers, internet and study area; as well as games and sports area(s), to keep off-duty employees happily occupied, to reduce the risk of them interacting in the neighbouring / surroundings farms.

Action 9: Reduce the number of shared rooms to a minimum to reduce the real risk of spreading HIV and other sexually transmitted diseases within the workforce and their families.

Action 10: Ensure that laundry services are provided for all personnel on a daily basis.

Action 11: Provide a comprehensive voluntary counselling and testing programme for all employees and contractors.

Action 12: Implement an employee wellness programme, including HIV/AIDS information in all changing rooms.

Action 13: Install video surveillance cameras at strategic access roads.

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6.3 GROUNDWATER AND SURFACE WATER MP

6.3.1 OBJECTIVE

The objective of the management measures is to prevent the pollution of surface water, and by doing so, restrict indirectly the potential to pollute groundwater as well. Also, reduced storm water flow must be minimised.

6.3.2 ACTIONS REQUIRED

a) Groundwater abstraction

Design, construction and operational phase

Action 1: Consider / investigate the option of drilling and installation of additional boreholes on site, spreading the load to other aquifers or trucking in water from elsewhere.

Action 2: If new boreholes are drilled for the project in future, they should be test pumped to establish the aquifer parameters and sustainable pumping rates. Testing can also determine the extent of the area that will be affected by water level drawdown, so that the potential effect on boreholes in the vicinity can be assessed. These borehole(s) also then need to be registered with the MAWLR (DWA).

Action 3: Groundwater abstraction for Project use must mostly be done from the existing borehole no. 61617 on Farm Bloemhof. The existing borehole at the foot of the Chuosberge on Portion 4 of Farm Bloemhof 109 is unlikely to yield the volumes required sustainably.

Action 4: Monitor the water level of the existing borehole(s) (where water will be abstracted for the Project) for early detection of excessive drawdown. Establish new boreholes, if required. See section 8.7 for further details.

Action 5: Consider potable water supply from Arandis (i.e. municipal water to be trucked in) for the construction phase as well as the initial volume of water intake for processing.

b) Infrastructure impacting surface water flow / drainage

Design and construction phase

Action 1: Avoid construction of the process plant and PV Power plant and related infrastructure within the (main) drainage lines as per the proposed Project Layout presented in the EIA Scoping (including Impact Assessment) Report.

Action 2: Where necessary, divert surface drainage to keep the surface flow open and free from obstacles.

Action 3: Ensure the sturdy anchoring of the PV panels to withstand storms and local runoff

Action 4: ensure that the borrow pit (i.e. excavation of material) is placed well outside the drainage line on the north-western side of the Norasa Uranium Project Private access road.

c) Desalination Plant Operation and Brine Discharge

Operational phase

Action 1: Limit the use of treatment chemicals to minimum practicable quantities.

Action 2: Use low-toxicity chemicals.

Action 3: Ensure compliance with wastewater discharge permit conditions, especially effluent sampling and analysis requirements.

Action 4: Use the brine from the desalination plant on the project access road for dust suppression.

Action 5: When the brine is not used for dust suppression it needs to be discharged into a (plastic) lined evaporation pond constructed adjacent to the desalination plant.

Action 6: Monitor the product and brine water quality as specified in the DWA permit.

d) Sewage Management

Construction and operational phases

Action 1: Construct the septic tanks according to DWA specifications.

Action 2: Apply for a wastewater discharge permit and comply with its conditions. Under no circumstance will water that is not suitable for discharge be released.

Action 3: For health and safety reasons do not spray treated sewage on the roads.

Action 4: Monitor the build-up of sludge in the tanks and have it pumped out when necessary.

Action 5: During construction suitable sanitary facilities must be available and easily accessible. There should be one toilet for every 15 workers onsite.

Action 6: Conduct regular monitoring to ensure that effluent is contained and not being discharged.

Action 7: Report spillages as per the incident management procedure and clean-up spills within as soon as possible in line with the spillage management procedure.

Action 8: In the event of domestic effluent discharge, stop the incident as soon as possible and find the root cause.

Action 9: In the event of soil or water pollution, decontaminate the polluted area(s) using an appropriate methodology. Once clean, rehabilitate the area.

Action 10: Ensure that toilets are working properly and are cleaned at least weekly, so they do not pollute the surrounding environment or create hygiene problems.

e) Water and Soil Pollution

Construction and operational phases

Action 1: Follow the waste management hierarchy with emphasis on avoidance and recycling (refer to Waste Management MP for further details).

Action 2: Store hydrocarbons in bunded areas able to accommodate 110% of the largest container or tank, equip parked vehicles and generators with spill trays.

Action 3: Prevent pollution of the drainage lines by containing dirty water from pumps, pipes, water storage and other associated infrastructure and services, process and non-process plant buildings, product handling and loading areas, fuel storage facilities, general waste handling and storage facilities, etc. This will be implemented through one or more procedure(s), work instruction(s) and or method statement(s) covering the following:

- Clean water systems will be separated from dirty water systems.
- Clean run-off and rainfall water should be diverted around dirty areas and back into the environment.

- Contaminated water to be contained in systems that allow for the reuse and/or recycling.
- All hazardous substance / waste must be handled in such a manner that they do not pollute surface water or soil.
- Pollution prevention through basic infrastructure design such as waste storage containment and bunds.
- Pollution prevention through maintenance of equipment.
- A Spill clean-up plan to enable containment and remediation of pollution incidents.
- Review plans and mitigations to adapt to changing operations.
- Comply with lining / design requirements and engineer the containment (contained areas with impermeable floors) of process areas, sewerage facilities, wastewater, waste storage areas, concrete works, painting areas and hydrocarbon storage areas.
- Maintain concrete or lined impermeable bunded areas around diesel generators, hazardous material stores, wash bays, workshop floors etc.
- Ensure the correct off-loading, storage and handling of hydrocarbons and hazardous substances. Fuel transporting companies must adhere to the Petroleum Products and Energy Act, No. 13 of 1990 and its regulations and their spill containment (emergency clean-up) plan and spill clean-up agreement shall be in place.

Action 4: Train employees in the importance of waste management and spill emergency response to avoid littering and to clean up spills immediately.

Action 5: Establish a bioremediation facility to treat hydrocarbon-contaminated soil on site.

Action 6: Alternatively, used hydrocarbon liquid waste will be provided to third parties for environmentally acceptable recycling thereof. Related records will be kept.

Action 7: Carry out regular inspections to detect spills and improper waste management.

Action 8: Keep a record of the various waste volumes (recycled, disposed, hydrocarbons, hazardous) and disposal certificates recycling (refer to Waste Management MP for further details).

Action 9: In the event of a hydrocarbon or hazardous substance spill, the source of the spillage shall be isolated, and the spillage contained. Any hydrocarbon and other hazardous substance spills will be cleaned up immediately.

Action 10: Spill kits or adsorbent materials will be kept on hand to clean up spills. Once used, this material will be treated as hazardous waste and disposed of accordingly.

Action 11: Ensure good housekeeping and proper sanitation and treatment of wastewater during construction and operations.

f) Training and awareness

Construction and operational phases

Action 1: Prevent surface water pollution through induction, education and training (also refreshers) of workers (permanent and temporary).

Action 2: Train selected staff in the remediation of surface water contaminated by hydrocarbon or hazardous substance spills.

6.4 FAUNA AND FLORA AND HABITAT LOSS MP

6.4.1 OBJECTIVE

The objective is to prevent, as far as is possible, the unacceptable disturbance and loss of species and habitats, and related ecosystem functionality as well as to minimize impacts on sensitive areas.

6.4.2 ACTIONS REQUIRED

a) Disturbance and loss of species, habitats and sensitive areas:

Design, construction and operational phases

Action 1: Keep the Pilot Project development footprint as small as practically possible.

Action 2: Identify all sensitive areas as described in the EIA Scoping (including Impact Assessment) Report prior to construction and clearly demarcate all sensitive areas where activities are planned. Therefore, map areas to be avoided as far as possible. Demarcate these areas to guide detail designs.

Action 3: Avoid disturbance and placement of infrastructure and the borrow pit on the sensitive habitat areas, as identified in the EIA Scoping (including Impact Assessment) Report. These include the low hills / rocky outcrops, drainage lines, and sand plains areas.Therefore, implement the proposed layout as presented in Figure 2.

(Further investigate the (very) shallow extension of the dolerite ridge on the PV plant site prior to construction to determine critical area(s) to be avoided. Disturb this feature as little as possible).

Action 4: Clear vegetation only where necessary (e.g. not below solar modules, if plants are not in the way).

Action 5: Ensure that drainage lines are not blocked by solar panel supports.

Action 6: On the ground clearly demarcate movement areas and environmentally sensitive areas near activity zones.

Action 7: Be vigilant regarding invasive aliens plants near artificial water sources.

Action 8: Minimise illuminating areas at night (i.e. for security purposes), use yellow-orange light and ensure and direct light downwards.

Action 9: Avoid traffic at night to prevent disturbance and the killing of animals (on the road). Keep record of road kills, and use these records to develop

management measures, should certain areas emerge as prone to road kills.

Action 10: Use dust suppression where necessary (see Air Quality MP).

Action 11: Monitor sites where additional water could potentially lead to the establishment of invasive alien plants.

Action 12: Eradicate all emerging invasive alien plants immediately (see below for more details).

Action 13: With reference to any potential disturbance of large mammal movement, keep records of wildlife incidents.

b) Spread of alien invasive species

Construction and operational phases

Action 1: Regularly check for leaks near artificial water sources, monitor sites for invasive alien plants and eradicate immediately.

Note: Invasive alien plants such as *Argemone*, *Datura Nicotiana*, *Prosopis* and *Ricinus* could be inadvertently encouraged in areas where water is provided. Alien invasive plants are pioneers and establish quickly at water leaks of pipelines.

c) Managing the workforce

Construction and operational phases

Action 1: Ensure environmental staff is present during construction and operation

Action 2: Strictly enforce no poaching and collection of wildlife or plants, off-road driving, littering, etc., and track control by the workforce.

Action 3: Ensure environmental performance remains at a high standard during operation by including environment as topic in all planning, reporting and evaluation, thereby adopting continuous improvement in environmental management.

Action 4: Conduct regular education and training (refreshers) of workers (permanent and temporary).

d) Rehabilitation

Construction

Action 1: Repair of degradation or damage to biodiversity features and ecosystem services from project-related impacts that cannot be completely avoided

and / or minimised, e.g. by restoration of temporary-use and lay down areas as soon as reasonably practicable after construction activities are complete.

Operational and decommissioning phase at the end of the Project Life

Action 2: Develop a rehabilitation plan during the Operational phase of the Project.

Action 3: It is essential to make financing available for a rehabilitation plan, to be implemented at the end of the Project Life.

Action 4: Rehabilitate the borrow-pit.

6.5 AVIFAUNA MP

6.5.1 OBJECTIVE

The objective is to prevent, as far as is possible, the unacceptable disturbance and loss of birds, the collision of birds with infrastructure, the modification, loss or destruction of bird habitats and to minimize the attraction of birds to novel (artificial) habitats and resources.

6.5.2 ACTIONS REQUIRED

a) Physical / human disturbance of birds, resulting in avoidance, displacement or barrier effects, including (road) mortalities and or poaching:

Construction phase

Action 1: Schedule the timing of construction (and maintenance) activities to avoid disturbance to birds during sensitive periods (e.g. during breeding season), as far as practically possible.

Action 2: Before construction starts, the proposed solar PV site and surroundings should be inspected for any signs of bird nesting activity. Disturbance of nesting birds, in particular of Ludwig's Bustard, Rüppell's Korhaan or raptors, should be avoided.

Action 3: Install abatement controls to reduce noise disturbance where required (see Noise MP).

Action 4: Introduce operational controls to manage and regulate contractor activity, such as exclusion fencing / barricading around sensitive areas.

Action 5: Enforce speed limits and off-road driving.

Action 6: Strict enforcement of anti-poaching measures, with zero tolerance, and this should be emphasised during induction / general awareness to contractors and employees.

Action 7: Ongoing training and awareness shall be promoted about the value of biodiversity and the negative impacts of disturbance, especially to breeding birds, and of poaching and road kills.

b) Direct and indirect modification / loss / destruction of bird habitat (resulting in avoidance / displacement/barrier effects)

Design phase

Action 1: Micro-siting: where possible, the unnecessary destruction of habitat or degradation of the environment, including sensitive habitats such as

ephemeral drainage/wash systems, and hill/outcrop habitats, should be avoided. The final layout of project infrastructure should thus avoid the above designated sensitive areas.

Action 2: The solar PV arrays will not be fenced, which is a primary mitigation against barrier effects to the movement of terrestrial bird species.

Construction phase

Action 3: Repair of degradation or damage to biodiversity features and ecosystem services from project-related impacts that cannot be completely avoided and / or minimised, e.g. by restoration of temporary-use and lay down areas as soon as reasonably practicable after construction activities are complete.

Operational phase

Action 4: Install abatement controls where required to reduce emissions and pollutants (erosion, dust, waste) created during construction; wastewater management and water conservation measures.

Action 5: Install operational controls to manage and regulate contractor activity, such as exclusion fencing / barricading around sensitive areas at risk, designated machinery and lay-down areas, minimisation of vegetation loss and disturbance to soil; managing the timing of vegetation control activities at suitable intervals.

Action 6: Ongoing training and awareness shall be promoted about the value of biodiversity / avifauna and the negative impacts of habitat destruction

c) Attraction of birds to novel artificial habitats and provision of otherwise scarce resources

Construction phase

Action 1: Ensure strict and effective waste management (including of food and kitchen waste), to discourage an unnatural increase in scavenging species such as Pied Crow.

Operational phase

Action 2: Prevent bird perching or nesting activities on solar infrastructure through adaptive management measures (e.g. anti-perch measures, see Avifauna

Specialist report). Nesting activities on infrastructure must be discouraged early in the cycle, before any eggs are laid.

d) Bird collisions with infrastructure such as solar panel arrays, fences, guyed masts and other structures

Design phase

Action 1: Careful siting of the solar panel arrays has ensured that sensitive habitats and potential flyways, such as drainage lines, hills/outcrops and ridges, have been avoided at an early stage.

Action 2: Arrange solar PV arrays in rows with the maximum inter-row spacing, to help reduce the "lake effect" of a solid, condensed mass of solar PV panels.

Action 3: In order to further reduce the chances of the panels being mistaken for sheets of water, minor modifications could be made to the panel design (e.g. by means of applying visual cues: see Operational phase: minimisation, below), but at this stage these should rather be considered as an adaptive mitigation, to be retro-applied once there is a recorded need.

Action 4: Security lighting should be kept to a minimum, and directed downward and away from the PV panels if possible.

Action 5: The solar PV panels themselves should not be directly illuminated. Non-reflective surfaces (e.g. anti-reflective coating) should be used if possible.

Action 6: The solar PV array area will not be fenced.

Operational phase

Action 6: Avoid unnecessary disturbance to birds near solar PV infrastructure.

Action 7: If monitoring results indicate that bird collisions are taking place on the solar panels, adaptive mitigations could include the retrofitting of visual cues to existing panels. Such minor modifications to the panel design could reduce the chances of the panels being mistaken for sheets of water. These visual cues may include UV-reflective or solid (white) contrasting bands spaced no further than 28 cm from each other, or even closer. This arrangement has been shown to significantly reduce the number of small passerine birds hitting expanses of windows on commercial buildings. Non-polarising white tape used around and/or across panels can also

minimise reflection, which can attract aquatic insects, as it mimics reflective surfaces of waterbodies.

Action 8: In extreme cases of repeated collisions by night-flying birds (e.g. flamingos), the possibility of tilting the panels to a non-horizontal position at night is a standard mitigation that could be investigated.

Action 9: Monitoring of any potentially negative impacts is considered essential, as a basis for adaptive management if required. Monitoring is especially important in view of the fact that the solar PV area will not be fenced, which could make it more difficult to prevent the removal of any carcass material by scavengers before it is recorded

6.6 SOIL MP

6.6.1 OBJECTIVE

The objective is to limit the loss of soil because of disturbance and pollution.

6.6.2 ACTIONS REQUIRED

a) Physical disturbance of soil

Design and construction phase

Action 1: Apply the principle of selective clearing and grubbing and demarcate the routes of movement to minimize areas of compaction, the magnitude of earthworks and the levelling of the site prior to construction.

Action 2: All roads and tracks must be planned to minimize the disturbance of soil. Allocate and demarcate areas for movement, parking and storage of equipment and machinery.

Action 3: Where possible, use uprights of differentiating heights to compensate for topographic variation, instead of levelling the ground to get equal heights of the solar structures.

Action 4: Strip and store available topsoil (< 10cm surface soil) of any areas to be cleared and developed (i.e. relating to the processing plant area) prior to any construction and stockpile this topsoil in the demarcated stockpile areas. Identify the topsoil types for its suitable applications later.

Operational phase

Action 5: Limit off-road driving and restrict all activities to demarcated areas through enforcement, awareness and training. MEFT should be informed about offenders.

b) Soil pollution

Construction and operational phase

Action 1: Ensure that all potentially polluting substances and materials such as effluent (wastewater), hydrocarbons and waste are handled in a manner that they do not pollute soils. This shall be implemented through one or more procedure(s), work instruction(s) and or method statement(s) covering the following:

- Pollution prevention through basic infrastructure design

- Comply with lining / design requirements and engineer the containment (contained areas with impermeable floors) of process areas, sewerage facilities, wastewater, waste storage areas, concrete works, painting areas and hydrocarbon storage areas.
- Follow correct off-loading, storage and handling procedures.

Action 2: Develop and implement an appropriate work instruction, method statement or procedure to detail cement storage, concrete batching areas and methods, the method of transport of cement and concrete, storage and disposal of used cement bags, etc. The following aspects should be covered:

- Cement and concrete mixing directly on the ground shall not be allowed and shall take place on impermeable surfaces
- Used cement bags shall be stored in weatherproof containers to prevent windblown and disposed appropriately.
- All excess concrete shall be removed from site on completion of concrete works and disposed of at a licensed site (in Walvis Bay or Swakopmund). Washing of the excess concrete into the ground is prohibited.

Action 3: To prevent the possible soil pollution due to hydrocarbon spills and leaks, the following measures apply:

- Repairs and maintenance to machinery, vehicles and equipment shall be done within a lined and bunded area.
- All major repairs and maintenance shall be done off-site.
- Dispensing of petroleum products and refuelling must take place over a drip tray or within a lined and bunded area.
- Maintain all vehicles free of leaks (oil, hydraulic fluid etc.).
- Daily Inspections and regular planned maintenance programmes to be enforced.

Action 4: To handle hydrocarbon or hazardous substance spills and leaks in a correct way, ensure alignment with the following actions in the Surface Water MP:

- Isolate the source of the spillage.
- If possible, contain the spillage.
- Clean up immediately.
- Spill kits or adsorbent materials will be kept on hand.
- Once used, this material will be treated as hazardous waste and disposed of accordingly.

Action 5: All hydrocarbon (e.g. fuel, oils, contaminated soil and materials) and hazardous waste (e.g. paint, bitumen, tar, etc.) resulting from spills, shall be disposed of at a licensed hazardous waste site or, where possible, sold to an approved used-oil recycling company, according to the actions stipulated in the Waste MP. Keep records of the disposal certificates onsite.

Spill remediation options include in situ treatment or disposal of hydrocarbon contaminated soils as hazardous waste. The former is generally considered to be the preferred option because with successful in situ remediation the soil resource is retained. The *in situ* options include bioremediation at the point of pollution, or removal of soils for washing and/or bio remediation at a designated area after which the soils are replaced. Soils contaminated with more hazardous materials should be disposed of at a registered hazardous landfill site.

c) Training and awareness

Construction and operational phase

Action 1: Enforce measures to prevent soil pollution through induction, education and training (also refreshers) of workers (permanent and temporary).

Action 2: Train selected staff in the remediation of soils contaminated by hydrocarbon or hazardous substance spills.

Action 3: Emphasis the importance of good housekeeping to prevent soil pollution by not littering and accumulating waste.

Action 4: Practice regular inspections and clean-up actions.

6.7 WASTE MP

6.7.1 OBJECTIVE

The objective of this MP is to prevent pollution, environmental degradation and the impacts associated with waste in general. Waste may affect biodiversity, soil, water and the sense of place. As a result, the Waste MP must be read in correspondence with the Biodiversity MP, the Soil MP, the Surface Water MP, and the Visual MP.

6.7.2 ACTIONS REQUIRED

a) Waste management and pollution impacts

Construction and operational phase

Action 1: All hydrocarbon (e.g. fuel, oils, contaminated soil and materials) and hazardous waste (e.g. paint, bitumen, tar, etc.) resulting from spills, refuelling and maintenance activities shall be disposed of at a licensed hazardous waste site (at Walvis Bay) or, where possible, sold to an approved used-oil recycling company. Records of disposal certificates must be kept onsite (see also the Surface Water MP, Section 6.3 and Soil MP, Section 6.7).

Action 2: Consider the development of a bioremediation facility on site for the treatment of hydrocarbon contaminated soil. Developed a detailed procedure prior to implementing such a facility.

Action 3: No hydrocarbon and hazardous waste shall be burnt or buried onsite. The spoiling or burial of tar or bituminous products shall not be allowed onsite.

Action 4: Solid waste includes all construction waste (rubble, cement bags, old cement, tags, wrapping materials, timber, cans, wire, nails, PPE, etc.), recyclables and domestic waste (surplus food, food packaging, organic waste, etc.).

Action 5: Hylron must investigate (with input from Waste Recycling Companies where possible) the best practical solutions for the recycling / disposal of broken / used PV panels. The “sponsoring” of panels to communities, with a relatively small efficiency percentage remaining must be carefully investigated as this could become a significant waste challenge in other areas in Namibia.

Action 6: Where possible, Hylron must give preference to suppliers who minimizes the usage of plastic / Styrofoam packaging of the PV infrastructure.

Action 7: Hylron liaises with contractors to ensure the solid waste control and removal system is in line with the standards stipulated by Hylron.

Action 8: Prevent the spread of waste in, and beyond, the project area (see also the Visual MP). An integrated waste management approach shall be used, based on the principles of waste minimization, reduction, reuse and recycling of materials. Separate waste and ensure containers for recyclable and non-recyclable waste are provided. In this regard, develop a waste management procedure cover the recycling, re-use, storage, handling, transportation and disposal. Ensure that the contractor's responsible for the above are made aware of these procedures.

Action 9: Contractors must prepare the necessary protocols and procedures to make provision for issues relating to the management of waste, in line with the requirements stipulated by Hylron.

Action 10: Contractors shall provide skips / bins (with lids) of sufficient number and capacity to store waste produced daily. The lids shall be always kept firmly on the bins.

Action 11: Bins / skips shall be emptied on a regular basis to prevent itr from overfilling and spilling. The general cleanliness of the site shall form part of the site management and frequent inspections.

Action 12: All solid waste may be temporarily stored onsite in a demarcated area. All solid waste shall be disposed of off-site at a licensed landfill site.

Action 13: Mobile toilets will be provided during construction activities, and it is the responsibility of dedicated personnel to manage the toilets during this period (see also the Surface Water MP.

Action 14: Waste management onsite will be done according to best practice – the necessary protocols and procedures will be created and adhere to, encompassing the different types of waste, cleaning and removal routines and the safe disposal of waste (with safe disposal certificates in the case of hazardous waste).

Action 15: Where possible, the use of Styrofoam food packaging, etc., plastic bags, danger tape and snow netting should not be encouraged onsite.

Action 16: Screen the iron ore concentrate at the respective suppliers to ascertain the level of radiation exposure that might be associated with the material, in order to provide for safety measures should there be a need.

6.8 AIR QUALITY MP

6.8.1 OBJECTIVE

The objective is to limit Hylron's contribution to air pollution impacts, specially relating to third parties.

6.8.2 ACTIONS REQUIRED

a) Air pollution

Construction and operational phase

Action 1: Visually inspect the dust generation sources regularly (i.e. daily at the beginning of new construction activities for at least a week, then weekly for a month and then monthly). Similarly inspect the operational dust generation sources regularly. Keep photographic record.

Action 2: Where milling of the iron ore concentrate is required, this would be done inside the warehouse.

Action 3: Apply dust suppression on the (gravel) access road to the site, within the farm boundaries as a minimum.

Action 4: Depending the visual monitoring and any complaints received, further dust suppression need to be implemented on sections of the Norasa Uranium Project private access road close to the Oshivela Pilot Project Site. Dust monitoring, through the placement of dust buckets must also then be considered, in consultation with an Air Quality Specialist / Environmental Practitioner.

Action 5: Air quality impacts during construction of the processing plant as well as the solar PV sites, would be minimized through basic control measures such as

- Limiting the speed of haul trucks.
- Limit unnecessary travelling of vehicles on untreated roads.
- Apply water sprays on gravel roads, as described above.

Action 6: A register for complaints relating to air quality should be maintained. It must include the name, contact and affiliation details of the complainant, the date of the complaint, the date and time of the pollution incident, and a detailed description of the incident. In response to a complaint, Hylron should investigate possible causes and, if required, make use of a specialist to

determine the likely source through a site inspection. Remedial actions to prevent such events in future should then be taken, as described above.

6.9 NOISE MP

6.9.1 OBJECTIVE

The objective is to limit the noise impacts of the Oshivela Pilot Project.

6.9.2 ACTIONS REQUIRED

a) Noise pollution

Construction and operational phase

Action 1: Hylron must establish and maintain a complaint register where interested and affected parties can lodge noise related complaints. It must include the name, contact and affiliation details of the complainant, the date of the complaint as well as the date and time of the disturbing event, the location where the event was observed, a detailed description of the event including details such as noise character, impulsiveness and tonality.

In response to a complaint, Hylron should investigate possible causes and if required make use of a specialist to determine the likely source through monitoring and or a site inspection. Remedial actions to prevent such events in future should then be taken.

Action 2: No construction and operations activities during night time that can generate noise.

Action 3: A noise specialist must re-evaluate the noise impact of the project, should any changes be made to the Project activities.

Action 4: To reduce the impact of noisy equipment, the following recommendations apply:

- Avoid unnecessary revving of engines and switch off equipment when not required.
- Maintain internal road surfaces.
- Minimize drop height of materials.
- Start-up equipment sequentially rather than simultaneously.
- Audible reversing warning systems on mobile plant and vehicles should be of a type which, whilst ensuring that they give proper warning, have a minimum noise impact on nearby sensitive receptors.

- Enforce speed limits
- Avoid excessive use of exhaust brakes and hooters.
- Maintain machinery, vehicles and equipment in good condition to prevent unnecessary noise outputs. The contractor shall ensure that workers do not create unnecessary noise such as hooting.

6.10 VISUAL MP

6.10.1 OBJECTIVE

The objective is to minimize, as far as is possible, the change to the visual landscape because of the Oshivela Pilot Project for receptors in the area.

6.10.2 ACTIONS REQUIRED

a) General visual impacts and sense of place

Design, construction and operational phases

Action 1: With the preparation of the land within the full extent of the project site onto which activities will take place, the minimum amount of existing vegetation and topsoil should be removed (see also the Biodiversity MP and Soil MP.

Action 2: Waste areas, storage areas and placement of ablution facilities should either be screened or positioned in areas where they would be less visible from nearby main roads.

Action 3: Construction and operational activities must be limited to daylight hours.

Action 4: Adopt responsible construction practices that strictly contain the construction / establishment activities to demarcated areas.

Action 5: Building or waste material discarded should be undertaken at an authorised location, which should not be within any sensitive areas (see also the Waste MP.

Action 6: Earthworks should be executed so that only the footprint and a small 'construction buffer zone' around the proposed activities are exposed. In all other areas, the naturally occurring vegetation should be retained, especially along the periphery of the sites (see also the Biodiversity MP).

Action 7: All cut and fill slopes (if any) and areas affected by construction work should be progressively top soiled and re-vegetated as soon as possible (see also Biodiversity MP and the Soil MP).

Action 8: Avoid contrasting colours of paint on all structures; instead colours that reflect and compliment the colours of the surrounding landscape are recommended.

Action 9: "Housekeeping" procedures should be developed for the project to ensure that the project site and lands adjacent to it are kept clean of debris, litter, or waste generated on-site; procedures should extend to control of the access roads to the Project Site.

Action 10: Minimize the number of light fixtures to the bare minimum, including security lighting.

6.11 ARCHAEOLOGY MP

6.11.1 OBJECTIVE

The objective is to prevent the unacceptable loss of archaeological sites associated with proposed Oshivela Pilot Project.

6.11.2 ACTIONS REQUIRED

a) Damage or loss to archaeological sites and landscapes from the proposed project

Construction and operational phase

Action 1: Apply for consent from the National Heritage Council of Namibia, based on the recommendations by the Archaeologist.

Action 2: In the unlikely event that archaeological resources are discovered during construction, a chance find emergency procedure will be implemented.

If there are any chance finds of archaeological sites that have not been identified and described yet, a chance find procedure shall be followed. The key component of which is to ensure that the site remains undisturbed until a specialist has assessed the site, assessed the potential damage, advised on the necessary management steps, and advised on the requirements for authority consultation and permitting.

To cater for this possibility the client is encouraged to peruse the “Archaeological Guidelines for Mining in the Namib” by J. Kinahan.

6.12 SOCIO-ECONOMIC MP

Refer to Third party Safety and Security MP for management measures related to potential negative social impacts associated with the construction workers, permanent employees and the accommodation on Hylron's Farm(s) in the area.

6.12.1 OBJECTIVE

The objective is to enhance positive socio-economic impacts and to avoid minimize or mitigate the negative socio-economic impacts of the Shiyela Iron Project.

6.12.2 ACTIONS REQUIRED

a) Enhance the positive economic and job creation impacts of the project

Construction and operational phase

Action 1: Hylron and its contractors will implement a procurement policy which promotes the use of small and medium enterprises (SMEs), owned and / or managed by previously disadvantaged Namibians.

Action 2: Hylron and its contractors will purchase Namibian-made goods and services whenever possible or those from businesses within the South African Development Community.

Action 3: Promote local recruitment: Hylron shall give preference to train and employ / contract local residents as far as possible (people who currently live or who originate from the central coastal region).

Action 4: Support service providers which demonstrate their use of the local labour force: Hylron shall give tender preferential weighting to supply companies which demonstrate their use of the local labour force.

Action 5: Pay fair salaries and wages.

Action 6: Be gender sensitive and select women for interview, training and recruitment, where possible.

b) Traffic impacts

Construction and operational phase

Action 1: Promote basic road safety behaviour for all Hylron employees and contractors through training and awareness. Typical issues include the following:

- Keeping to safe speed limits, but as a minimum all specified road speeds will be adhered to.
- Operational protocol for spacing between other slower moving trucks, to enable passing of other vehicles.
- Ensuring that drivers all have valid licences.
- Making sure that all vehicles are roadworthy.
- Zero tolerance for drinking and drugs whilst driving.
- Using lights appropriately.
- Prohibit night driving to and from the Project site other than in exceptional circumstances as approved.

Action 2: Hyiron to liaise with the relevant representatives of the Norasa Uranium Project to ensure agreement is reached between both parties regarding the Norasa Uranium Project private access road.

Action 3: Hyiron to liaise with the MEFT: Directorate of Wildlife and National Parks to obtain their consent for using the roads through the NNNP to the Project Site and adhere to any conditions stipulated by them. This would include maintenance requirements, speed control measures, all Park Rules and Regulations and avoiding impacts to third parties (i.e. tourists) using sections of the same gravel road(s).

Action 4: HyIron to ensure ongoing road maintenance of the access road to the Project Site within their farm boundaries.

Action 5: All standard safety protocols relating to working within public roads to be adhered to.

Operations phase

Action 1: All vehicles should be fitted with a trackers to monitor speed.

7 RESPONSIBILITIES

This section describes the roles and responsibilities for implementing the different parts of the EMP. The implementation of the EMP will involve the following parties including their scope of responsibility.

7.1 HYIRON PROJECT MANAGER

The Hylron Project Manager shall ensure compliance to this EMP.

The EMP will be part of the contract with all contractors working on the project. The Project Manager shall also ensure that contractors have a copy of the approved EMP and relevant site documentation to familiarize themselves with other relevant management and mitigation measures. Wherever possible, the contract with a contractor should include conditions of adherence to environmental performance and stipulate corrective measures, retentions / penalties, environmental close-out / audit and conditions for the issuing of an ECC.

7.2 ENVIRONMENTAL MANAGER / OFFICER

Hylron shall appoint an Environmental Manager / Officer, which has the overall responsibility for all environmental related matters on the Project area. The Environmental Manager / Officer will assist the Project Manager for ensuring contractors comply with all the management and mitigations measures stipulated in this EMP as well as conditions listed in the environmental authorization (ECC), should the project be approved.

The Environmental Manager / Officer shall perform random site inspections to check compliance with the EMP. A site close-out audit shall also be conducted at the end of the construction phase and an 'Environmental Completion Certificate' issued if environmental performance by contractors is found satisfactory.

The The Environmental Manager / Officer's duties shall include, inter alia, the following:

- Reviewing Method Statements / Procedures.
- Advising the Project Manager (and contractors) on environmental issues within defined construction areas.
- Undertaking regular (preferable daily) site visits to ensure compliance with the EMP and / or Method Statements / Procedures and verifying that environmental impacts are kept to a minimum throughout the contract.
- Completing environmental checklists during site visits.

- Monitoring and verifying that the EMP and / or Method Statements / Procedures are adhered to at all times and taking action if specifications are not followed.
- Monitoring and verifying that environmental impacts are kept to a minimum.
- Keeping a photographic record of progress onsite from an environmental perspective.
- Assisting the Project Manager (and contractors) in finding environmentally acceptable solutions to construction problems.
- Recommending additional environmental protection measures should this be necessary.
- Giving a report back on any environmental issues at site meetings and during monthly reports.
- Reporting any incidents that may or have caused damage to the environment or breaches of the EMP to the Environmental Section.
- Prepare an environmental audit report at the conclusion of the construction phase.
- Provide training to personal / contractor staff.

The Environmental Manager / Officer shall communicate directly with the Project Manager.

7.3 CONTRACTORS

The contractors shall have the following responsibilities:

- To implement all provisions of the EMP. If the contractors encounter difficulties with specifications, he / she must discuss alternative approaches with the Hylron Project Manager and / or the Environmental Manager / Officer prior to proceeding.
- To ensure that all staff are familiar with the EMP.
- To make personnel aware of environmental issues and to ensure they show adequate consideration of the environmental aspects of the project.
- To prepare required Method Statements / Procedures indicating how the requirements of the EMP will be implemented.
- To report any incidents of non-compliance with the EMP to the Hylron Project Manager and / or the Environmental Manager / Officer and to correct them.
- To rehabilitate any sensitive environments damaged due to the contractors' negligence. This shall be done in liaison with the Hylron Project Manager and / or the Environmental Manager / Officer.

Failure to comply with the EMP may result in fines through legal persecution and reported non-compliance may result in the suspension of work or termination of the contract if not rectified or monitored to ensure no future adhesive impacts may arise.

7.4 Internal Review and Auditing

An internal review process and procedure shall be established by the Project Manager with the assistance of the Environmental Manager / Officer, to monitor the progress and implementation of the EMP. Where and when necessary, method statements / procedures that require modification shall be changed to improve the efficiency of the EMP. Different forums will be used for the ongoing training / awareness. Hylron will conduct regular inspections and audits, throughout the various project phases.

7.5 Induction and Environmental Awareness Training

All persons who work or visit the site will be required to undergo induction before the commencement of any work onsite. Different induction programs will be developed and implemented for managers, employees, contractors, and visitors. The environmental management and mitigation plans highlight the areas where training is required.

All members of Hylron as well as the contractors are expected to understand the EMP requirements and implement them.
Different forums will be used for the ongoing training / awareness by the Environmental Manager / Officer. As a minimum, training / awareness shall include:

- Explanation of the importance of complying with the EMP and / or Method Statements / Procedures.
- Discussion of the potential environmental impacts of construction and future operational activities.
- Explanation of the management structure of individuals responsible for matters pertaining to the EMP.
- Employees' roles and responsibilities.
- Explanation of the mitigation measures that must be implemented when carrying out their activities.
- Explanation of the specifics of the EMP and / or Method Statements / Procedures and its specification.

The Environmental Manager / Officer shall keep records of all environmental training sessions and inductions, including names of attendees, dates of their attendance and the information presented to them.

7.6 MANAGEMENT SYSTEM

Hylron will need to develop and implement an EMS. The specific requirements of this EMP will be incorporated into this EMS, prior to construction. Hylron will have overall accountability for ensuring the EMP and EMS get implemented.

8 MONITORING AND AUDITING COMPLIANCE

8.1 AUDITS AND INSPECTIONS

The Environmental Manager / Officer will conduct internal management audits against the commitments in the EMP. During the construction phase, daily inspections and monthly audits will be conducted. In the operational phase, weekly inspections and quarterly audits will be conducted initially. The frequency can be reviewed and changed after a few months of operations. The audit findings will be documented for both record keeping purposes and for informing continual improvement.

In addition, an independent professional will conduct an EMP performance assessment on an annual basis. Compliance with the commitments of the EMP and the continued adequacy of the EMP relative to the onsite activities will be assessed in this report.

8.2 SUBMISSION OF INFORMATION

Monitoring reports will be provided to the relevant authorities as per permits and authorisations issued by the relevant authorities.

8.3 AIR QUALITY MONITORING

Visually inspect the dust generation sources regularly (i.e. daily at the beginning of new construction activities for at least a week, then weekly for a month and then monthly). Similarly inspect the operational dust generation sources regularly.

Keep a photographic record at respective dust sources.

Depending the visual monitoring and any complaints received, further dust monitoring, through the placement of dust buckets must also then be considered, in consultation with an Air Quality Specialist / Environmental Practitioner. As a minimum, dust bucket should then be installed near the Project Site and near the closet sensitive receptor(s). Monthly exchanges of the buckets and measurements of the fallout dust be undertaken until such time that the issues have been resolved through further management and mitigation measures.

8.4 NOISE MONITORING

The noise monitoring requirement are provided in Table 7.

TABLE 7: NOISE MONITORING REQUIREMENTS

Requirement	Description and detail
Frequency	If required, as part of resolving complaints.
Procedure	SANS 10103: 2008.
Parameters to be recorded	Minimum L_{AFeq}, L_{Aleq}, statistical levels i.e., L_{A90}, octave or 3rd octave frequency spectra.
Field notes	Weather conditions, noise incidents, observations as to the general acoustic climate, and if applicable, traffic, should be noted during measurements.

Source: Soundscape, 2022

8.5 BIODIVERSITY MONITORING

To better understand some of the impacts of the project on biodiversity, it is important to do regular monitoring.

8.5.1 BIODIVERSITY MONITORING REQUIREMENTS

Regular monitoring requirements include:

- Monitor the effect of the solar panels on vegetation and habitats to better understand associated impacts in future.
- Monitor sites where additional water could potentially lead to the establishment of indigenous and invasive alien plants.
- Monitor the attraction of animal species to the site because of the artificial provision of otherwise scarce resources. Use this information to guide adaptive management measures.
- Monitor fauna and flora in general to update the species list for the Project area.
- Monitor the effect of the solar panels on vegetation and habitats to better understand associated impacts in future.
- Monitor rehabilitated sites to measure progress and success.

8.6 AVIFAUNA MONITORING

The following monitoring initiatives should be conducted by Hylron, in collaboration with and with the support of the avifauna specialist, and any other relevant partners.

- Continuation of monitoring programme, both pre-construction and post-construction. The additional pre-construction monitoring data would be used to further inform the project's detail design and final infrastructure layout, e.g. should activity of any significant (priority) species be recorded, and this activity require further mitigation (or monitoring). The post-construction monitoring should take the form of a repetition of the above pre-construction monitoring protocols, covering a two-day period, repeated for a total of four times over one year, with the addition of regular carcass searches following an identified, repeatable method. Interim

carcass searches could also be conducted, at a frequency indicated by the need, and also taking into account the possible occurrence of scavengers such as black-backed jackal *Canis (Lupulella) mesomelas*. The results should be reviewed periodically, and also compared with the results of the pre-construction monitoring.

- The solar PV structure should be monitored in the form of searching the ground between arrays of solar panels, and checking on the panels themselves. The searches should be done on foot.
- Any additional structures (e.g. masts [and especially under guy cables], fencing – if any) should also be monitored.
- Both mortalities and live birds should be monitored; these would include any species that appear to be attracted to the area. If there is a need, camera traps could be used to document the occurrence of sensitive species, such as raptors and/or waterbirds, or problematic species.
- The need for reporting any incidents should be stressed, and reporting procedures should be clarified. All bird mortalities should be recorded on a standardised form, with the GPS coordinates and structure involved and other details, and photographs of the carcass (including head and beak), structure and point of impact if possible. For any collision incidents on the solar panels, the presence/absence of (low) fog the night before, and the moon phase should be noted, to investigate any climatic patterns.
- Monitoring results should be evaluated and discussed with the avifauna specialist on a quarterly basis, or more frequently if required, and used as a basis for adaptive management recommendations, especially as the project is in a pilot phase.

8.7 WATER MONITORING

To ensure that the potential of water pollution is avoided, or otherwise minimized and mitigated, regular monitoring is required.

Groundwater monitoring should be initiated to measure water levels and groundwater quality on a regular basis. Groundwater monitoring is implied in Namibian legislation, requiring also periodical reporting to the authorities.

The following groundwater monitoring is required:

- Carry out regular inspections to detect spills and improper waste management.

- Monitor the water level of the existing borehole(s) for early detection of excessive drawdown.
- Monitor the product and brine water quality as specified in the DWA permit.
- Monitor the build-up of sludge in the sewage tanks.

9 REFERENCES

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SOUNDSCAPE 2022. ENVIRONMENTAL NOISE IMPACT ASSESSMENT REPORT – SHIYELA IRON PROJECT. UNPUBLISHED SPECIALIST STUDY FOR NAMISUN.

Note: Various references were made in the respective Specialist Reports, which were not all repeated in this report. For the detailed lists of references see the “reference Sections” in the Specialist Reports in Appendices E and F.