

**ENVIRONMENTAL SCOPING REPORT FOR  
THE PROPOSED SMELTER PLANT ON  
FARM 38 IN WALVIS BAY - ERONGO  
REGION.**

**APPLICATION NUMBER: APP - 006903**

**PREPARED BY:**



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# ENVIRONMENTAL SCOPING REPORT FOR THE PROPOSED SMELTER PLANT ON FARM 38 IN WALVIS BAY - ERONGO REGION, NAMBIA.

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## LIST OF ABBREVIATIONS

| Abbreviation | Full Name                                      |
|--------------|--|
| <b>BID</b>   | Background Information Document                |
| <b>ECC</b>   | Environmental Clearance Certificate            |
| <b>EIA</b>   | Environmental Impact Assessment                |
| <b>EMA</b>   | Environmental Management Act                   |
| <b>ESIA</b>  | Environmental & Social Impact Assessment       |
| <b>ESMP</b>  | Environmental & Social Management Plan         |
| <b>KIN</b>   | Karama Industries Namibia (Pty) Ltd            |
| <b>GG</b>    | Government Gazette                             |
| <b>GN</b>    | Government Notice                              |
| <b>MAWLR</b> | Ministry of Agriculture, Water and Land Reform |
| <b>MIME</b>  | Ministry of Industries, Mines & Energy         |
| <b>MEFT</b>  | Ministry of Environment, Forestry and Tourism  |

## DEFINITION OF TERMS

**“Biome”** A biome is described as an area with similar vegetation and includes all animal life that lives in that area.

**“Competent authority”** is defined as an organ of state which is responsible, under any law, for granting or refusing and authorisation; or the competent authority identified in terms of section 30 of the EMA, Act, 2007.

**“Environment”** – this refers to the ecology, economy, society and politics.

**“Listed activity”** means an activity listed in terms of section 27 (1) or 29.

**“Mineral exploration”** is the process of finding ores (commercially viable concentrations of minerals) to mine. Mineral exploration is a much more intensive, organized and professional form of mineral prospecting and, though it frequently uses the services of prospecting, the process of mineral exploration on the whole is much more involved.

**“Organ of state”** means any office, ministry or agency of State or administration the local or regional sphere of government or any other functionary or institution: exercising a power or performing a function in terms of the Namibian Constitution or exercising a public power or performing a public function in terms of any law but does not include a court or judicial officer.

**“Proponent”** means a person who proposes to undertake a listed activity.

**“Public”** refers to the community or people in general.

**“Stakeholders”** – this refers to the people, organisations, NGOs that are directly or indirectly affected by the project and / or have an interest in the project.

## **PURPOSE OF THE DOCUMENT**

The Environmental Scoping Report (ESR) was compiled as part of the Environmental & Social Impact Assessment (ESIA) for the proposed smelter plant on Farm 38 in Walvis Bay, Erongo Region. It describes the proposed studies or terms of reference of what will be assessed in the ESIA study for this project if necessary and the methodology to be followed. The ESR will be submitted to the Ministry of Industries, Mines and Energy (MIME), Competent Authority and the Ministry of Environment, Forestry and Tourism (MEFT) for approval.

## EXECUTIVE SUMMARY

### Overview of the project

Currently, Namibia has many registered scrap metal dealers who collect and export to other countries mainly South Africa as low value scrap metal. This presence an opportunity for employment creation with other positive economic benefits in downstream industries. The Proponent intends to recycle aluminium, steel, zinc, copper and lead to manufacture various products for both domestic and international markets. This has motivated the Proponent to construct a smelter plant on Farm 38 in Walvis Bay area with a capacity of handling hundreds of tonnes per day.

**Table 1: The capacities of the respective furnaces making up the proposed smelter plant on Farm 38 in Walvis Bay.**

| Type of metal   | Smelter Capacity (Tonnes / Day) |
|-----------------|---------------------------------|
| Steel Plant     | 1500                            |
| Aluminium Plant | 150                             |
| Copper Plant    | 100                             |
| Zinc and Lead   | 200                             |
| Plastic Plant   | 50                              |

The design, construction and operation of a smelter plant is a listed activity and requires environmental clearance by the Ministry of Environment, Tourism and Forestry (MEFT) before construction. The Proponent, Karam Industries Namibia (Pty) Ltd appointed an independent consultant, Outrun Consultants CC to conduct an Environmental and Social Impact Assessment and apply for the Environmental Clearance Certificate (ECC) for this project. This scoping study was undertaken for the proposed design, construction and operation of a smelter plant on Farm 38 in Walvis Bay, Erongo Region.

### Project goal(s)

To manufacture and export value added metal products from scrap metal in Namibia.

### Specific objectives

- To design and build high energy efficiency smelter for recycling scrap metal.
- To manufacture and export high value metal products for both the local and international markets.
- To compile preliminary and detail designs and associated tender and construction drawings, based on the Design Development Model.

- To design and construct sludge disposal ponds to cater for hydrometallurgical wastewater and slag.
- To compile tender documentation and facilitate the procurement of contractor(s).
- To supervise the construction of infrastructure.
- To monitor quality, scheduling and financial control of construction of infrastructure.
- To supervise commissioning of new infrastructure.
- To oversee the Defects Liability Period.

### **Project components**

- The proposed project will comprise of the following infrastructural development components:
  - Pre-treatment facilities
  - Mechanical separation plant
  - Furnace for the different scrap metals
  - Fluxing
  - Slag treatment plant
  - Converter
  - Electrorefining plant
  - Packing despatch
  - All the various products are stored in the packing and despatch shed.

### **Planned project activities**

The planned project activities logically follow the project cycle as highlighted below:

- **Project inception**

During this first phase, the Consultants engaged in familiarisation of the site and engaged the to confirm and approve of the scope and project brief.

- **Design (Design development and preliminary design)**

This phase entailed extensive review of concept design criteria, acceptable specifications, identifying possible additional specialist works, development of multiple appropriate design options and assessing alternatives in terms of engineering, life cycle costs (economic), operation and

maintenance considerations, environmental and social constraints, risk of disruption of services and other risk factors.

- **Detailed design**

Detailed designs will be done taking cognizance of the outcomes of the preliminary design phase detailing all relevant design parameters and assumptions. The designs will be accompanied by relevant drawings and specifications for all engineering disciplines.

- **Construction**

The procurement of contractor(s) marks the beginning of this phase leading to mobilization to site. The consultants will mainly focus on supervision of the contractors to ensure quality and timely and cost-effective delivery of outcomes.

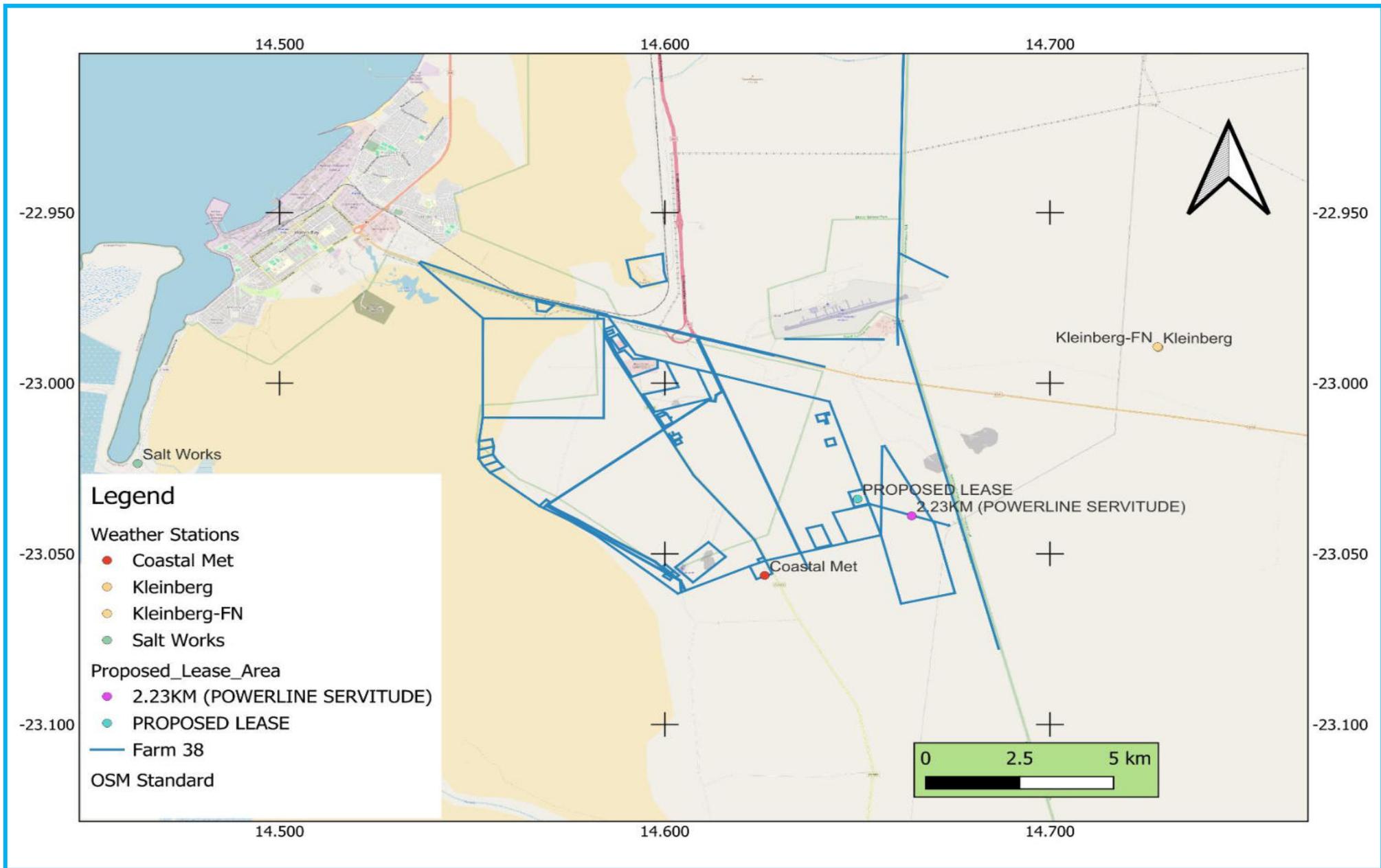
- **Operation**

The operation phase will encompass the following:

- Operation of furnaces, metallurgical plants, sludge drying pond;
- Maintenance of infrastructure; and
- Ongoing consultation with directly affected parties.

- **Decommissioning**

Decommissioning of the proposed developments is not envisioned. However, a generic decommissioning plan will be compiled and submitted a part of the ESMP. Once the smelter plant infrastructure has reached the end of its service life, the Proponent is responsible for removing all redundant infrastructure while restoring and remediating any environmental disorders. Usually, it is a lengthy process as it may include soil remediation, structural demolition and disposal.



**Figure 1: The location of the proposed project in Namibia.**

## **Institutional and legal framework for implementation of the project**

The proposed project is being undertaken by Karam Industries Namibia (Pty) Ltd, a Namibian company. Its mandate is to identify new opportunities for growth and execute in an environmentally friendly manner. This Environmental Scoping Report (ESR) was compiled as part of the ESIA being undertaken for the proposed project in accordance with the requirements of the Environmental Management Act (EMA), No.7 of 2007 and the Environmental Impact Assessment Regulations, No. 30 of 2012. The EMA is implemented by various stakeholders, organs of state and agents. The Minister of the Ministry of Environment, Forestry & Tourism (MEFT) is responsible for developing policies for the management, protection and use of the environment, prepare and publish policies, strategies, objectives and standards for the management of the environment, coordinate environmental management at national level and monitor and ensure compliance with EMA. The implementation of the act directly rests with the Environmental Commissioner (EC). The EC advises Organs of state on the preparation of environmental plans, receives and record applications for Environmental Clearance Certificates (ECCs) and the overall management, protection, reviewing of assessment report and enforcement of monitoring and implementation of environmental plans in accordance with the EMA. Other Ministries, Government agencies, Local Governments and Traditional Authorities participate in the ESIA process for activities that are within their mandate and conduct inspections for monitoring compliance with EMA relevant to their Ministry. According to MEFT, Erongo Regional Council has not been delegated as such and projects taking place there rely on MEFT enforcement.

### **Description of Potential Impacts (major and moderate impacts)**

The potential impacts on environmental and social resources arising from the proposed development include both positive and negative impacts.

#### **Identified potential positive impacts**

- **Job creation:** Direct employment (operations, metallurgy, maintenance, management) and substantial indirect jobs across scrap collection, transport, services and construction. There is potential to create hundreds of direct jobs and thousands in the extended supply chain over the plant lifecycle.
- **Foreign-exchange savings and exports:** Reduced imports of primary/refined metals and potential for exporting standardized secondary products creates positive balance-of-payments impacts on the economy.
- **Government revenue:** Corporate taxes, payroll taxes, customs-related revenue and municipal rates contribute to public finances.

- SME development: Formalised scrap aggregation and processing stimulate micro and small enterprises, formal employment and expansion of the tax base.

Identified potential negative impacts

As aforementioned potential negative impacts emanating from planned project activities at each project phase were identified and are presented in the following table below:

- Poor solid waste management
  - Indiscriminate dumping of solid waste comprising of both domestic and industrial waste during construction phase.
- Dust emissions (air pollution)
  - Temporal during the construction phase
- Noise and vibrations pollution
  - Noise is generated mainly during the construction phase due to machinery and other construction equipment.
- Gender based violence
- HIV / AIDS and Covid – 19 health impacts
- Sexual abuse and harassment

All the 3 above are interrelated and may be elevated due to increased influx of people from other places resulting in decayed social norms and increased disposable income etc.

### **Stakeholder Consultations**

The scoping process was initialized by compiling a Background Information Document (BID) and invitation to interested and Affected Parties (I&APs) to participate, Document (BID) followed by publishing of notices of the Environmental and Social Impact Assessment (ESIA) in the national print media and posters pinned in public places in the project constituency area. Erongo Regional Council was formally informed of the process through the office of the Chief Regional Officer. The meetings were planned and conducted as shown in the following table below:

**Table 2: Meetings conducted and registered Interested & Affected Parties.**

| <b>Date and Time</b>      | <b>Venue</b>                         | <b>Stakeholders or I&amp;APs (Public)</b>                               |
|---------------------------|--------------------------------------|---|
| 15 / 02 / 2026<br>11hrs00 | Farm 37                              | Walvis Bay Rural<br>Constituency Officer,<br>Municipality of Walvis Bay |
| 16 / 02 / 2026<br>10Hrs00 | Walvis Bay Rural Constituency Office | Honourable Councillor   |

The major issues identified for consideration in the ESIA and ESMP relate to short-and medium-term employment benefits linked to the construction phase.

**Table 3: Some of the major issues or concerns raised and responses.**

| Issues / Concerns Raised by Stakeholders  | Responses   |
|---|---|
| <b>Does the Proponent have a Council Resolution to lease the proposed land?</b>   | Affirmative, the Proponent has a Council Resolution to lease the land. It is conditional to conduct the EIA and obtain and Environmental Clearance Certificate (ECC) before proceeding to lease agreement negotiations. |
| We request that you rephrase smelters to furnaces to avoid confusion.   | The 2 words may be used interchangeably but in this case the smelter plant is regarded as one facility which contains several furnaces for smelting different types of scrap metal.                                     |
| Electricity   |   |
| Traffic flow and proximity to the Port  | A preexisting road will be used to access the project site.   |
| Electricity   | There is a power substation very close to the Proponent's proposed plot which makes it affordable in terms of CAPEX.  |
| It is recommended proceed since the project area is located close to the electrical substation  | NOTE  |
| Services on Farm 37: The community on farm 37 does not have a clinic, school nor fire station. We request from well wishers to consider those priorities when you implement your CSR. | NOTE  |

## **Conclusion and way forward**

Through the scoping process, it was found that there were no significant impacts emanating from this project that warrant conducting specialist studies nor detailed Environmental and Social Impact Assessments. This is mainly because the project footprint is on previously disturbed surroundings containing existing infrastructure. In the absence of fauna and flora, potential impacts are minimal or minor in that respect. The planned access will connect from existing roads. The planned associated infrastructure will be located on Municipality of Walvis Bay land zoned for industrial development. A Council resolution was passed to conditionally lease the land to the Proponent at an agreed fee when the ECC is issued. Potential negative biophysical impacts identified were temporary and moderate and can be significantly reduced through implementation of the proposed mitigation measures focused on stack emissions cleaning to remove SO<sub>x</sub>, flouropolymers and dust. Wastewater should be treated before disposal and slag disposed of safely. It is the opinion of the Environmental Assessment Practitioner (EAP) that the scoping process was done in an objective manner and taking cognizance of the findings above propose to adopt the identified impacts and mitigation measures for compilation of an ESMP to apply for an ECC.

## DOCUMENT STRUCTURE / ROAD MAP

The Environmental Scoping Report is intended to meet all requirements as stipulated in environmental management Act (2007) and its Regulations of 2012. To provide clarity to the reader, a document roadmap is provided in terms of the regulatory requirements (Table 1):

| CHAPTER | TITLE  | OVERVIEW   |
|---------|--|--|
|         | Purpose of the Environmental Scoping Report        | N / A  |
|         | Executive Summary                                  | N / A  |
|         | Document Road Map                                  | N / A  |
| 1       | Introduction                                       | This section contains project background information about the proposed project, ESIA process followed, details of the Proponent and the Consultant. |
| 2       | Legislative and Policy Framework                   | Highlights both international and domestic laws and policies that govern the planned project.  |
| 3       | Public Consultation                                | Details the public and stakeholder consultation process followed and its findings.   |
| 4       | Assessment of Alternatives                         | An analysis of various alternatives on the project.  |
| 5       | Description of the Receiving Environment           | Presents baseline environmental description of the project area against which project impacts will be evaluated in the future.                       |
| 6       | Identification and Evaluation of Potential Impacts | Presents both non-significant and significant impacts identified during the scoping phase of the ESIA.   |
| 10      | Conclusion and Way Forward                         | Deductions and recommendations from the study  |
| 11      | List of References                                 | List of references quoted in the document  |

# 1. INTRODUCTION

The proponent, Karam Industries Namibia (Pty) Ltd (KIM) is planning to design, construct and operate a smelter plant on Farm 38 in Walvis Bay Townlands in Erongo Region. The planned work will progressively include conducting a prefeasibility study, development of design development report, detailed designing, construction and commissioning of the smelter. Manufacturing and construction activities are listed activities that require an Environmental Clearance Certificate (ECC) from the Ministry of Environment, Forestry & Tourism (MEFT). It is against this background that the Proponent appointed an independent consultant, Outrun Consultant to conduct the Environmental Impact Assessment (EIA) to comply with the requirements of the Environmental Management Act (2007).

Due to increased awareness of environmental issues being no longer limited to biophysical components, this led to the introduction of Social Impact Assessment (SIA) as a component of the EIA and over time an Environmental and Social Impact Assessment (ESIA) was introduced. An ESIA is now widely used for assessing potential project impacts during the planning phase of listed projects. An Environmental and Social Impact Assessment tool is an integrated process that captures the interrelationships between land and society. Outrun Consultants was tasked to conduct the Environmental and Social Impact Assessment for the design, construction and operation of a smelter plant on Farm 38 in Walvis Bay by the Proponent, KIN.

## 1.1. Aim of the Study

The aim of this study is to identify and prioritise the key issues associated with the proposed development of Ohangwena II Wellfield that need to be assessed in the ESIA and the extent of work that needs to be undertaken to address those issues.

### 1.1.1. Objectives of the Environmental Scoping Study

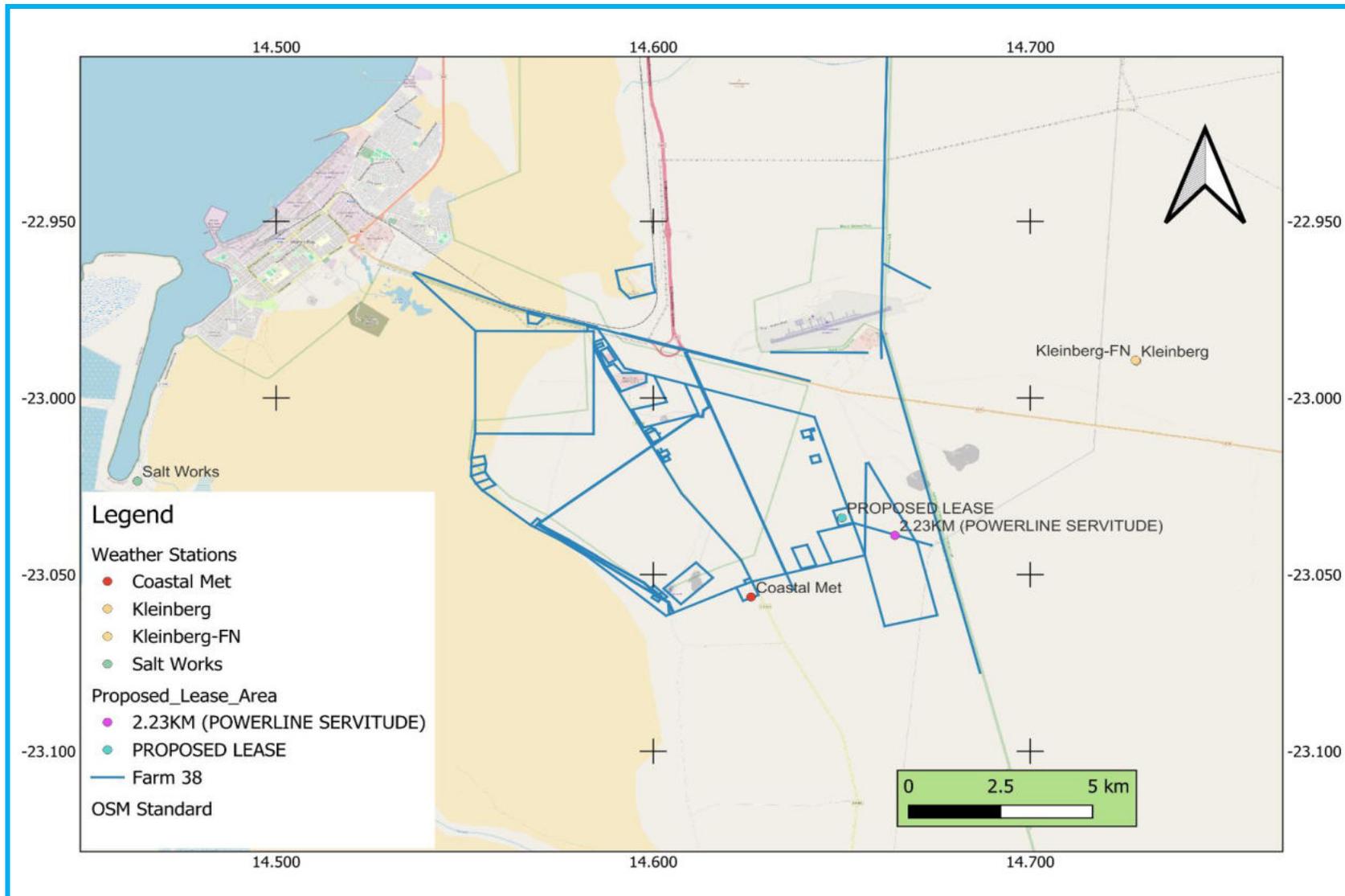
- Identify and engage with Interested and Affected Parties (IAPs) and allow for adequate participation in the process;
- Duly consider alternatives for achieving the project's objectives.
- Identify significant issues to be investigated further during the execution of the ESIA phase;

- Clarify the roles and responsibilities of various stakeholders in the process;
- Determine the scope of the ensuing ESIA phase, in terms of specialist studies, public participation, assessment of impacts and appraisal of alternatives; and
- Allow for informed decision-making regarding the ESIA process.
- Identify the relevant policies and legislation applicable to the Activity.
- Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the proposed location;
- Identify and confirm the preferred activity and technology alternative through impact and risk assessment and ranking process;
- Identify and confirm the preferred sites and / or routes, through a detailed site selection process which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on geographical, physical, biological, social, economic and cultural aspects of the environment;
- Identify the key issues to be addressed in the assessment phase;
- Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required, as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and

Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of residual risks that need to be managed or monitored.

#### 1.1.1.1. Project Location

The proposed project is in Walvis Bay Townlands in Erongo region. The locality map of the proposed project is shown in Figure 1 below.



**Figure 2: The location of the project area on Farm 38 in Erongo Region.**

#### 1.1.1.2. Motivation / Justification for the Project

The Proponent, Karam Industries Namibia (Pty) Ltd proposes to establish a medium-to-large scale scrap-metal recycling smelter in Namibia to process ferrous and non-ferrous scrap into marketable secondary metal products (steel, aluminium, zinc, lead, and copper). This project will deliver substantial economic, social, environmental and strategic benefits while leveraging Namibia's port infrastructure, industrial policy objectives and growing private-sector capacity.

#### 1.1.2. Strategic Rationale

- Value addition and industrialisation: Converting scrap into refined metal locally captures value that is currently exported as low-value waste. The smelter will enable downstream manufacturing, supporting Namibia's industrialisation and beneficiation agenda.
- National resource security: Producing secondary metals domestically reduces reliance on imported semi-finished products, strengthens supply chains for construction, automotive and manufacturing sectors, and increases resilience to global market shocks.
- Location advantage: Proximity to Walvis Bay's deep-water port, existing industrial zones and transportation corridors provides logistical efficiency for feedstock import/export and domestic distribution.
- The project location is close to an existing electricity substation which reduces the project's CAPEX.

#### 1.1.3. Economic and Fiscal Benefits

- Job creation: Direct employment (operations, metallurgy, maintenance, management) and substantial indirect jobs across scrap collection, transport, services and construction. Target: hundreds of direct jobs and thousands in the extended supply chain over the plant lifecycle.
- Foreign-exchange savings and exports: Reduced imports of primary/refined metals and potential for exporting standardized secondary products creates positive balance-of-payments impacts on the economy.

- Government revenue: Corporate taxes, payroll taxes, customs-related revenue and municipal rates contribute to public finances.
- SME development: Formalised scrap aggregation and processing stimulate micro and small enterprises, formal employment and expansion of the tax base.

#### 1.1.4. Social and Community Benefits

- Skills and technology transfer: Vocational training, apprenticeships and professional development in metallurgical processes, environmental management and health & safety.
- Improved livelihoods: Formal scrap markets reduce informal salvage hazards and create stable income streams for communities.
- Community investment: Through local procurement and targeted corporate social responsibility, the plant can support local infrastructure, education and health initiatives.

##### 1.1.4.1. Environmental and Public-Health Advantages

- Circular economy impact: Recycling significantly reduces energy use and greenhouse gas emissions versus primary production (notably for aluminium), contributing to Namibia's sustainability commitments.
- Pollution reduction: Properly managed smelting eliminates informal burning and uncontrolled disposal of hazardous scrap (batteries, coated metals), reducing air, soil and water contamination risks.
- Responsible residue management: Modern emission controls, dust capture, wastewater treatment and safe slag/dross handling will meet international best practice and Namibian regulatory standards.

#### 1.1.5. Technical and Commercial Feasibility

- Proven technologies: Electric-arc furnaces, induction melting, hydrometallurgical refining and state-of-the-art emission controls are well-established and scalable to the proposed plant size.
- Feedstock availability: Domestic and regional scrap streams—end-of-life vehicles, industrial offcuts, consumer appliances, end-of-life batteries and construction scrap—provide steady feedstock; Walvis Bay enables regional aggregation and export of surplus material.

- Energy and logistics: Integration with renewable energy and/or long-term power supply agreements will manage operating costs and carbon footprint. Port access reduces logistics costs and supports export markets.
- Market demand: Strong domestic demand from construction, manufacturing and battery sectors and regional export opportunities (SADC) for secondary metal products.

#### 1.1.6. Risk mitigation and compliance

- Environmental safeguards: Comprehensive Environmental and Social Management Plan (ESMP), continuous emissions monitoring, strict hazardous waste protocols and community engagement will control environmental and social risks.
- Health & safety: International H&S standards, worker training and occupational health monitoring will protect employees and communities.
- Feedstock quality: Investment in upstream sorting, certification schemes and supplier development will ensure consistent metal quality for product specifications.

##### 1.1.6.1. The Proponent of the Proposed Project

The proposed project is being undertaken by Karam Industries Namibia (Pty) Ltd. It is a private company involved in manufacturing of various copper products globally.

##### 1.1.6.2. The Consultant

Outrun Consultants CC is a Namibian privately owned consultancy company doing various projects in Southern Africa Development Community (SADC) countries. Our core services are:

- Environmental Impact Assessment;
- Strategic Environmental Assessment;
- Environmental Investigations;
- Research and Training;
- Feasibility Studies;
- Agronomy and;
- Monitoring and Evaluation of Development Projects.

Outrun Consultants draw its experts from regional and international universities such as Rhodes University (South Africa), University of Zimbabwe (Zimbabwe), National University of Science and Technology (Zimbabwe), University of Namibia (Namibia), Namibia University of Science & Technology (Namibia) and the University of Twente (Netherlands). Outrun declares that we have no interest in this project and are independent and acted as such during the ESIA process as required by the EIA regulations. The key team members carrying out this ESIA are presented in Table 4 below:

**Table 4: Outrun Team of Experts and the Roles and Responsibilities in the ESIA Study.**

| <b>ORGANIZATION</b> | <b>AREA OF RESPONSIBILITY / FIELD OF EXPERTISE</b> | <b>TEAM MEMBERS</b>                            |
|---------------------|--|--|
| OUTRUN Consultants  | Project management<br>EIA coordination             | Josiah T. Mukutiri                             |
| OUTRUN Consultants  | EIA process  | Emmerencia<br>Montzinger                       |
| OUTRUN Consultants  | Literature review / Desk study                     | Josiah T. Mukutiri<br>Emmerencia<br>Montzinger |
| OUTRUN Consultants  | Legislation & Policy Review                        | Emmerencia<br>Montzinger                       |

N.B. CVs of the Team members are attached under Annexure 1.

#### 1.1.6.3. Process and Methodology

Given that the development of the proposed project development triggers listed / prescribed activities under the Environmental Management Act No. 7 of (2007) and the Environmental Assessment Regulations of 2012, the process started with the appointment of the consulting company as presented above. The Consultants carried out a scoping phase of the ESIA process as required, and this chapter describes the Environmental Scoping process that was followed during the study and the ESIA process that was followed. The ESIA study was guided by the Namibian Environmental Impact Assessment Policy of 1994, the Namibian Environmental Management Act No. 7 of 2007 and the IFC's Environmental & Social

Management Framework (ESMF) for Category 2 projects as specified under the IFC's Operational Safeguards System on environmental and social assessments. Category 2 projects are likely to have detrimental site – specific environmental and / or social impacts and requires identifying, evaluating and minimizing significant impacts. It is noteworthy that the ESMF is complementary to the national requirements with respect to ESIA. Various methodologies were implemented to fulfill the requirements of each step in the ESIA process as shown below.

#### 1.1.7. Scoping Methodology

The EIA Regulations require a description of the significance of any significant effects, including cumulative effects that may occur due to the undertaking of the activity. To determine the significance of each of the potential impacts identified, the identified impacts have been subjected to the following questions displayed graphically (steps 1 and 2 - Figure 3) and in tabular form (Table 15) below. These questions form the methodology for assessing the significance of the effects or impacts identified through this ESIA process:

1. The first step is to screen out (set aside) all impacts which do not fall within the scope of this project and the responsibility of the proposed project.
2. The next step is to determine whether sufficient information exists to assess the potential impacts of those that remain. If insufficient information is available to assess (with a high degree of confidence) and recommend mitigation measures to address a given impact, further investigation will be required. However, if sufficient information is available to assess (with a high degree of confidence) and recommend mitigation measures to address a given impact, no further investigation will be required, and management actions to mitigate the impact will be addressed in the ESMP.
3. To fully understand the significance of each of the potential impacts, it is necessary to subject each to a range of assessment criteria. The application of these criteria, in determining the significance of potential impacts, uses a balanced combination of duration, extent, and intensity/magnitude, modified by probability, cumulative effects, and confidence.

The definitions of each of the criteria are contained in Figure 8; and finally based on the answers obtained after applying steps 1-3, a decision can be made regarding the significance of the impact based on three categories – low, medium or high (Table 17).

### Screening process to determine project scopes environmental impacts.

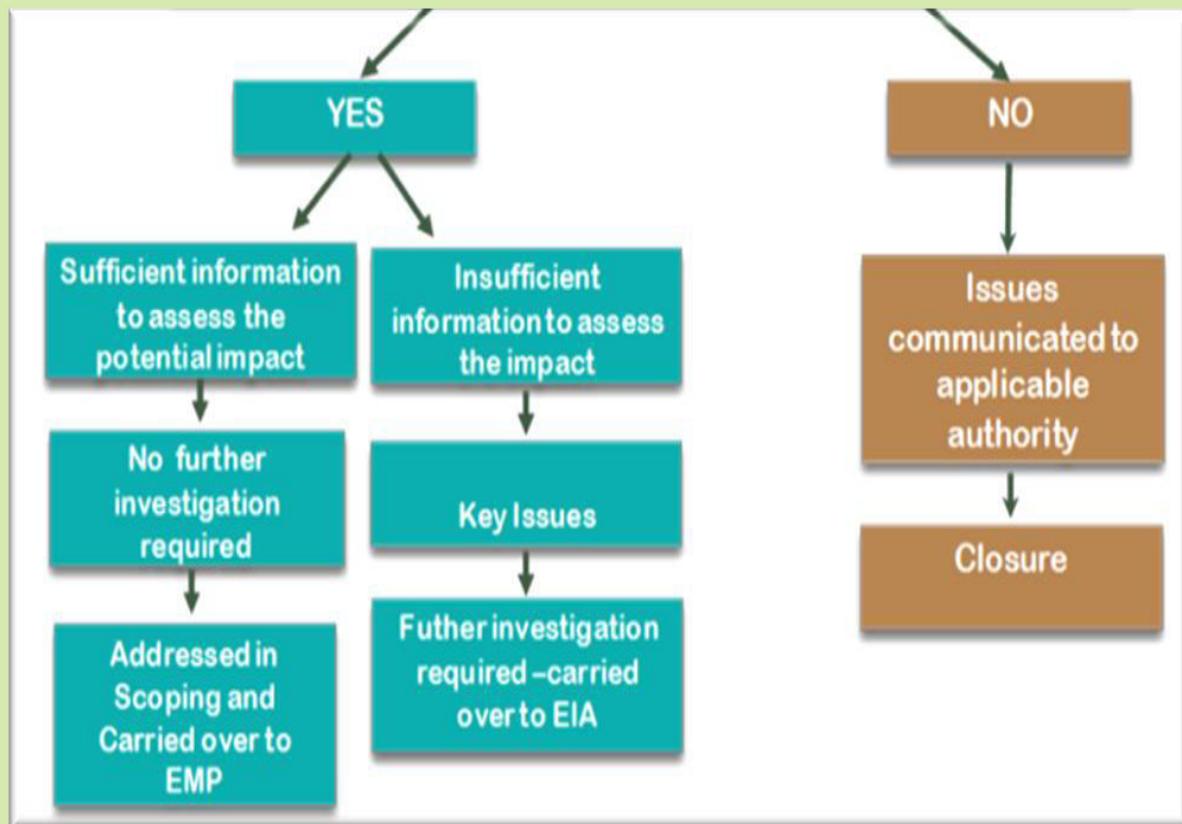


Figure 3: The screening process was followed to determine key issues.

#### 1.1.8. The Environmental and Social Impact Assessment (ESIA) | Process

The ESIA study was conducted as follows:

- Preliminary activities setting terms of reference for the ESIA, selecting the consultant (agent who would prepare the ESIA) to do the ESIA;
- Literature review of all relevant information;
- Field work for conducting baseline studies. This included bio-physical environment and socio-economic conditions;
- An analysis of the potential environmental impacts. This included impact prediction and significance assessment;
- Public participation;
- The preparation of an environmental and social management plan for the project and finally;
- The compilation of the ESIA Report.

The description of the ESIA process phases and stages mentioned above are provided under the following subheadings:

#### 1.1.9. Clarification of the Terms of Reference and Levelling of Expectations

Leveling of expectations – an opening meeting was held between the consultancy team and the Proponent. The purpose of the meeting was to clarify the methodology, communication process between the Consultants and the Proponent, time frame, and expected outcomes of the ESIA study.

#### 1.1.10. Literature review

Various related documents were reviewed to gather information on the potential impacts, the alternatives, how to mitigate the impacts, decommissioning, and rehabilitation plans. The literature included maps, publications, and reports on the topography, climate, land use, and socio-economic setting of the project area where the project site is located. The literature review helped in undertaking components and areas that would deserve attention during field assessment. The literature review which was mainly based on the desk study method and included the following:

- Information from the internet, journals, books, and stakeholders

Examples of similar projects, i.e., water infrastructure construction and upgrade projects, from both developed and mainly developing world were reviewed, including their merits and demerits. Besides its operation, the potential associated potential environmental impacts were also reviewed including other EIAs done in the area?

#### 1.1.11. Identification and analysis of the potential environmental impacts of the project activities from similar environmental setting, data and research.

The major environmental and social components of the receiving environment were chosen to be observed and discussed in detail. Environmental data were analyzed to determine the potential environmental impacts of the project activities. The potential impacts were ranked as impact significance as presented later in this report. This exercise was informed by literature review of similar projects conducted in Namibia and SADC countries.

#### 1.1.12. Field Survey

Field surveys were carried out to verify some facts and information obtained from the literature review. A more informed assessment was, however, the main objective of field studies. This was done to confirm the condition of the area in terms of climate, soil, land use, topography, and socio-economic setup of the area and stakeholder perceptions regarding the proposed project.

#### 1.1.13. Public Involvement

A wide range of key stakeholders including but not limited to Government Ministries, Erongo Regional Council, Walvis Bay Municipality, Traditional Authorities and Non-Governmental Organizations (NGOs) were invited to participate and express their views through various media communication such as email, social media. The consultations were done mainly to get a view of the affected parties as well as how they think the project should be carried out for minimum impacts on health, environment, and the well-being of the people. Stakeholder engagement was also key to register concerns and assess if specialist studies were required. Issues which were highlighted by stakeholders were incorporated into the ESIA process, the project design and the Proponent has committed the same during project implementation.

#### 1.1.14. Identification and analysis of impacts in terms of magnitude and significance

Construction or upgrading and operation of water supply infrastructure projects have both positive and negative impacts on the environment. Impacts will depend on the sensitivity of the environment and the stress already imposed on it. To accurately predict the various impacts caused by the above mentioned, the ecological and socio-economic impacts were delineated. Potential environmental impacts were identified at each project phase, and an analysis criterion shown in the chapter on impact prediction and analysis Chapter 9 was used to rank the impacts.

#### 1.1.15. Recommended mitigation measures for identified impacts

Mitigation measures were developed based on practical measures supported by research and scientific evidence. Extensive literature reviews of reputable publications and journals helped the formulation of mitigation measures.

#### 1.1.16. Analysis of alternatives of the project – both economic and environmental

The analysis of alternatives was done to ensure that resources were used efficiently and that decisions were made environmentally sound. Main aspects covered were related to the “No-Go alternative”, alternative routes, site alternative and alternative options for infrastructure development.

#### 1.1.17. Development of an Environmental & Social Management Plan

An Environmental & Social Management Plan (ESMP) will be prepared to give a guideline base to the project Proponent on how the identified impacts could be mitigated and managed. The Plan will be presented in a tabular format indicating the impact, indicator, monitoring frequency and the responsible agent. When all the important information is derived from the impacts’ prediction and analysis section, all the important aspects will be noted down and responsibilities assigned to monitor the different aspects.

#### 1.1.18. Preparation of the ESIA Report

The completion of the various tasks assigned to the team members during the ESIA scoping study gave rise to separate individual reports which were collated to give this ESR. The ESIA process followed is provided under the flow chart shown in figure 6 below.

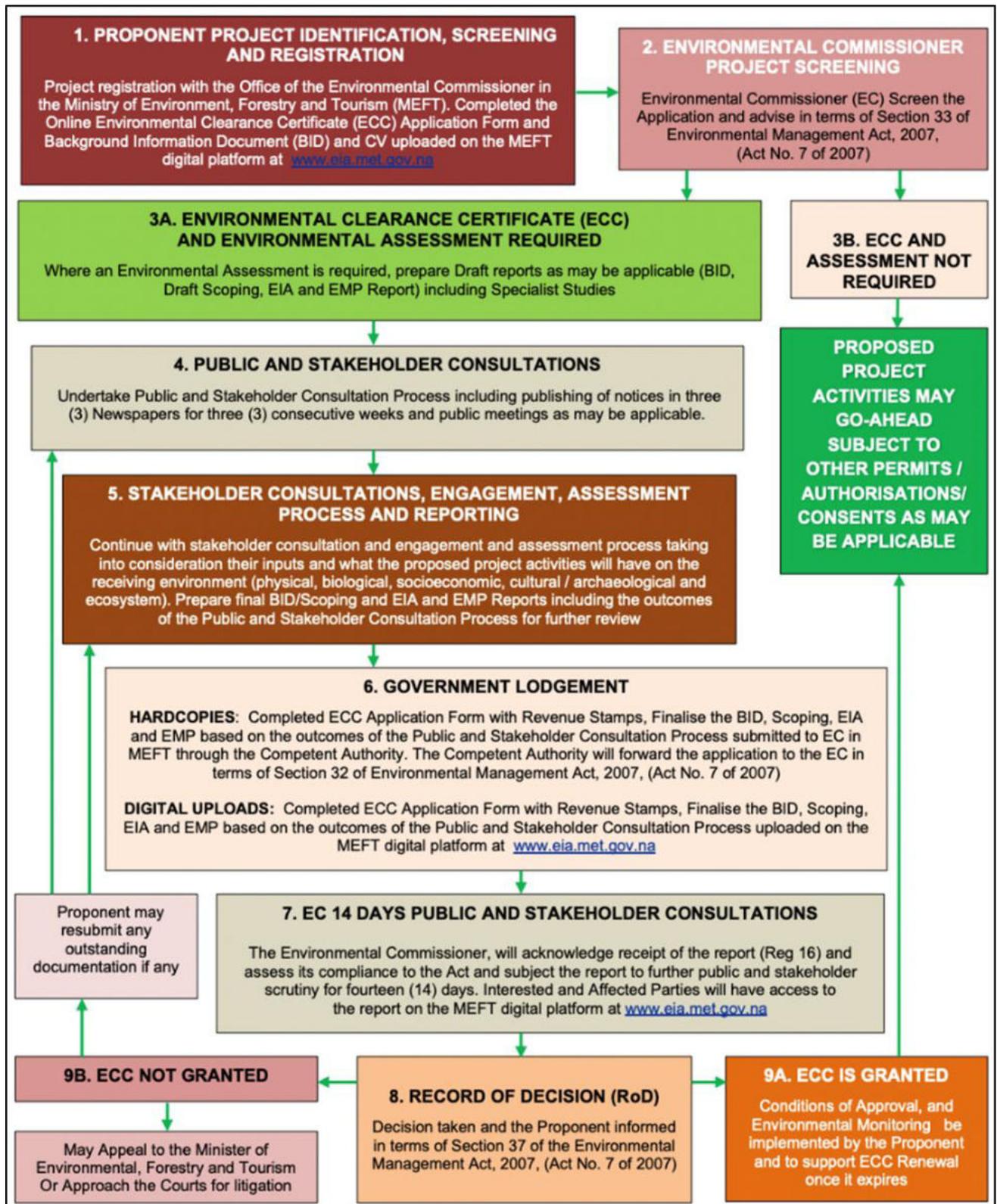


Figure 4: The ESIA Process flow.

## 2. DESCRIPTION OF THE PROPOSED PROJECT

### 2.1. Project Components

The proposed project, as portrayed in Chapter 1, seeks to design, construct and operate a smelter plant on Farm 38 in Walvis Bay. The smelter plant will comprise of several furnaces and manufacturing plants making use of scrap metals: steel, copper, aluminium, zinc and plastics. The production capacities are presented in the following table:

**Table 5: The capacities of the respective furnaces making up the proposed smelter plant on Farm 38 in Walvis Bay.**

| Type of metal   | Smelter Capacity (Tonnes / Day) |
|-----------------|---------------------------------|
| Steel Plant     | 1500                            |
| Aluminium Plant | 150                             |
| Copper Plant    | 100                             |
| Zinc and Lead   | 200                             |
| Plastic Plant   | 50                              |

#### 2.1.1.1. Basic Infrastructure Components

#### 2.1.2. Raw materials receiving bay / shed

The proposed infrastructure will comprise of a scrap metal receiving bay or shed where it is sorted and weighed. At this stage the material is also inspected for potential contaminants and other inherent associated material to guide material preparation or pretreatment before smelting. The main activities at this stage are sorting, shredding and decoating.

#### 2.1.3. Pre-treatment

This section is mainly to remove plastics/insulation, ferrous contaminants, oils to improve furnace feed quality.

#### 2.1.4. Mechanical separation

Recovers high-value copper materials and is shredded before feeding into the furnace

#### 2.1.5. Smelting

There are various options to consider for a furnace, and it mainly depends on the quality of the scrap metal being used a raw material. Induction or reverberatory is usually used for clean scrap copper.

#### 2.1.6. Fluxing

This process uses reagents such as silica, borax and lime to form slag that captures impurities from the charge material.

#### 2.1.7. Slag treatment

This is done to recover any of the copper and other valuable material such as gold, silver and zinc.

#### 2.1.8. Converter

This is done to remove sulphur and iron to produce blister copper.

#### 2.1.9. Electrorefining

This process makes use of the electrowinning plant and produces 99.99% copper cathodes and recover precious metals in anode slimes.

#### 2.1.10. Environmental controls

The system will require dust capturing equipment, robust gas cleaning equipment fitted on furnace chimneys to remove particulates, Sox and fluoropolymers.

#### 2.1.11. Packing despatch

All the various products are stored in the packing and despatch shed.

### 2.2. Planned utilities

#### 2.2.1. Electricity

Electricity will be connected and supplied by Erongo red. This will be the main energy supply for the smelter furnaces and lighting for the offices.

#### 2.2.2. Water

Water will be bought from Municipality of Walvis Bay and transported by a water bowser and stored in 2 x 10 000litre tanks.

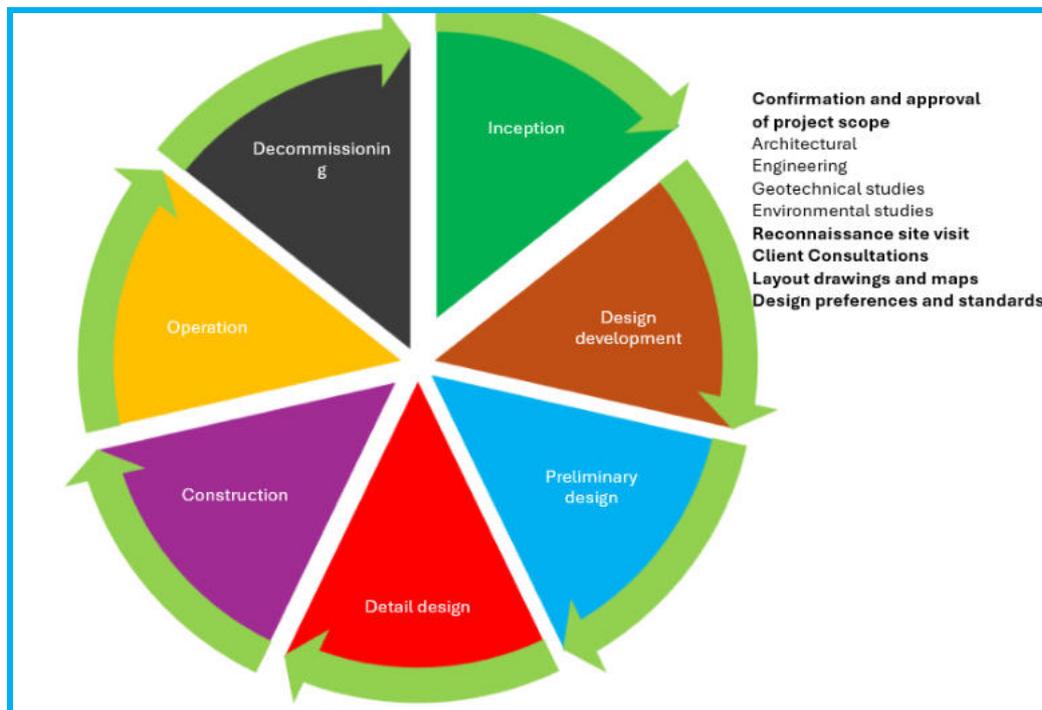
### 2.2.3. Fuel

No fuel will be stored onsite, but all vehicles will be refueled from service stations in Walvis bay.

To adequately consider the potential impacts associated with the proposed development of the smelter plant, the major project activities based on proposed project components were adopted and incorporated into the project cycle, Fig. 7 to Fig. 13 below. The ESIA process underway only includes the project components described above covering the design, construction and operational phases only. The ESMP generated from this exercise will be incorporated into the final Bill of Quantities and its implementation will form part of the contractual performance terms binding the appointed Contractor. Any infrastructure additions will require a new ESIA study and environmental clearance.

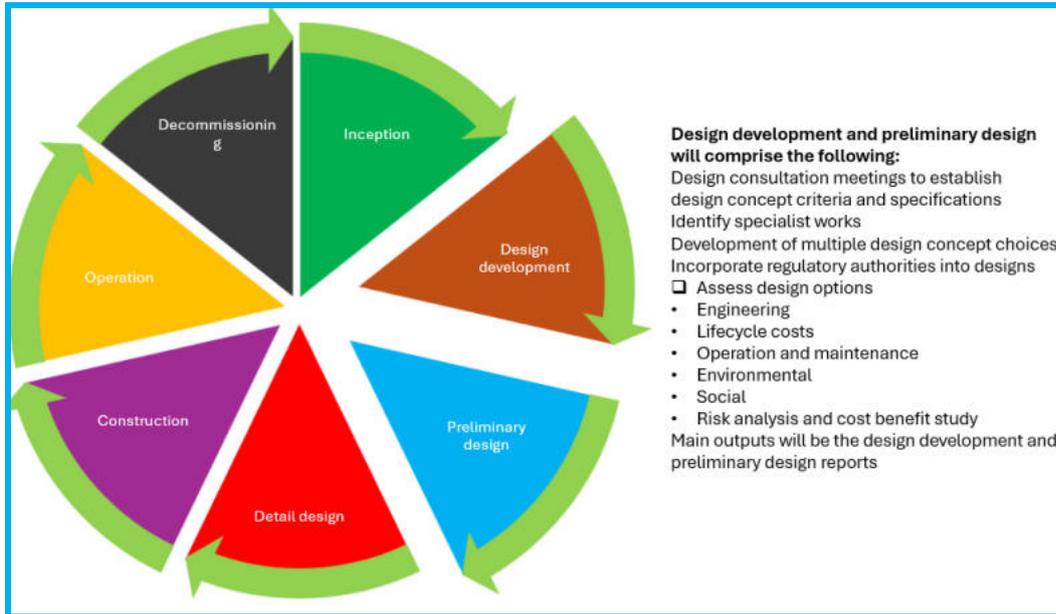
## 2.3. Project activities to be undertaken at the respective Project cycle Phases

### 2.3.1. Inception Phase



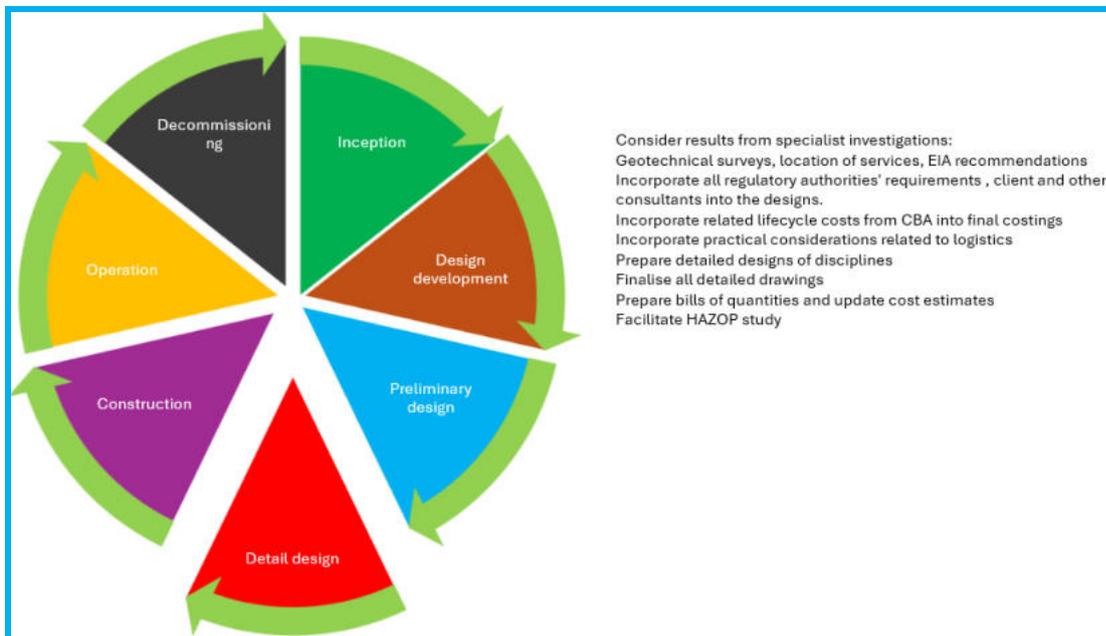
**Figure 5: Inception phase project activities**

### 2.3.2. Design Development and Preliminary Design Phase



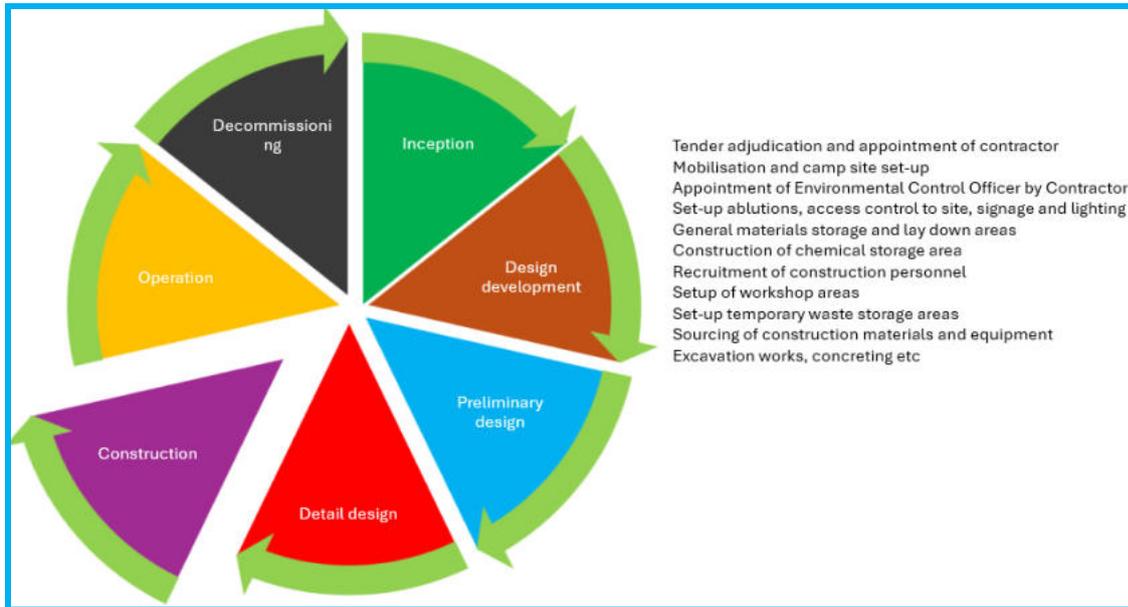
**Figure 6: Design development and preliminary design phase.**

### 2.3.3. Detailed Design Phase



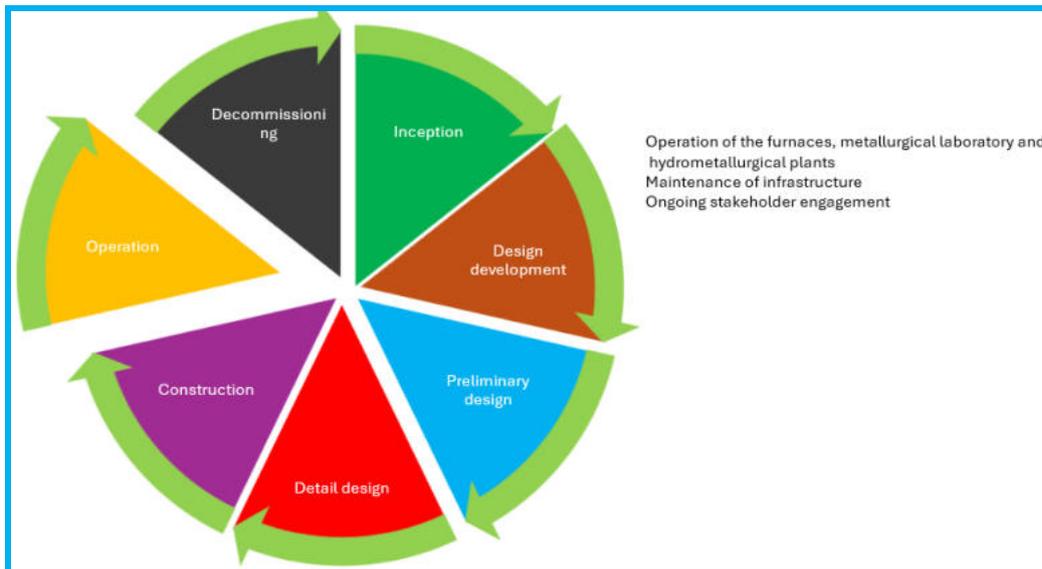
**Figure 7: Planned activities for detailed design phase.**

### 2.3.4. Construction Phase



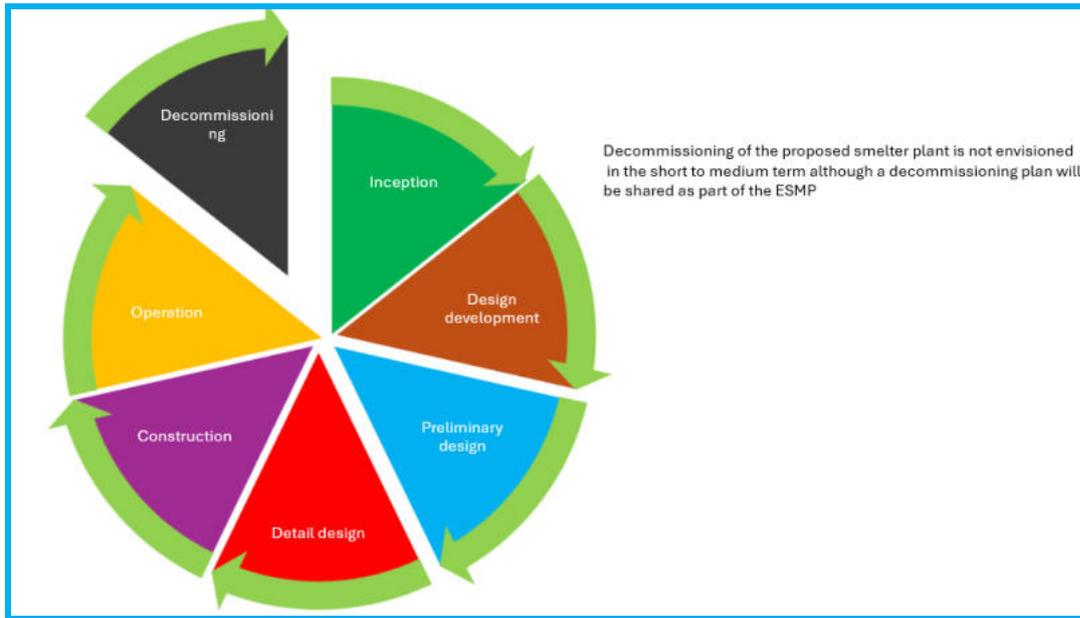
**Figure 8: Planned activities for construction phase.**

### 2.3.5. Operation Phase



**Figure 9: Planned activities for the operation phase.**

### 2.3.6. Decommissioning Phase



**Figure 10: Planned activities for the decommissioning phase.**

### **3. LEGAL AND POLICY REVIEW**

#### **3.1.1.1. Proposed Project Authorization Requirements**

The Environmental Management Act, No. 7 of 2007 stipulates that an environmental clearance certificate is required to undertake Listed Activities under the act, and its supporting regulations of 2012. Listed activities triggered by the proposed project in accordance with the Environmental Management Act, No. 7 of 2007 and regulations falls under the Hazardous Substance Treatment Handling and Storage part of the EIA Regulations:

- The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974.
- Any process or activity which requires a permit, license or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, license or authorisation or which requires a new permit, license or authorisation in terms of a law governing the generation or release of emissions, pollution, effluent or waste.

#### **3.1.1.2. Overview of Legislation**

This Section is aimed at presenting a concise description of the policy and legislative context of the project including an identification of all legislation, policies and guidelines that are applicable to this activity and are to be considered in the assessment process. Some of the pertinent environmental legislation that has bearing on scrap metal recycling and manufacturing is presented in Table 4 which describes the linkage between project activities and relevance of the various legal and policy instruments. The legislation outlined in this document is for both the local (institutional), regional, national and international perspectives.

#### **3.1.1.3. International treaties and protocols**

The following international treaties and protocols have been ratified by the Namibian Government:

- **Bamako Convention (1991):** Governs hazardous waste management and restricts the importation of hazardous materials, including specific types of scrap metal that may pose environmental risks.
- **National Frameworks:** These international commitments are implemented locally through the National Solid Waste Management Strategy and the Environmental Management Act (2007), which govern the handling, storage, and recycling of industrial and hazardous waste.
- Vienna Convention for the Protection of the Ozone Layer (1985).
- Montreal Protocol on Substances that Deplete the Ozone Layer (1987).
- Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal (1989).
- United Nations Framework Convention on Climate Change (1992).
- Kyoto Protocol on the Framework Convention on Climate Change (1998).

**Table 6: National Legal and Policy Instruments Relevant to the proposed smelter plant on Farm 38 in Walvis Bay.**

| Theme                                       | Legislation Instrument                                | Relevance Provisions   | Relevance to Project   |
|---|---|--|--|
| The Constitution                            | Namibian Constitution First Amendment Act 34 of 1998. | “The State shall actively promote and maintain the welfare of the people by adopting policies that are aimed at maintaining ecosystems, essential ecological processes and the biological diversity of Namibia. It further promotes the sustainable utilisation of living natural resources basis for the benefit of all Namibians, both present and future.” (Article 95(I)). | Ecological sustainability concepts within the constitution should guide all projects. Protect the environment and ensure citizens enjoy their right to a safe environment. Mineral exploration and mining are known to be very destructive to the environment and to comply with the Namibian Constitution, it is important for the Proponent to embrace environmental principles in its policies and management throughout the project life cycle stages to comply. |
| Environmental Protection and Sustainability | National Solid Waste Management Strategy              | This provides a framework for managing waste through sustainable practices like the 5 Rs—Refuse, Reduce, Reuse, Repurpose, and Recycle—aiming to minimize landfill dependence.   | It typically covers domestic, industrial, and commercial waste, prioritizing waste minimization, improved infrastructure, and environmental protection.  |

| Theme          | Legislation Instrument                           | Relevance Provisions   | Relevance to Project   |
|----------------|--|--|--|
| Climate Change | National Policy on Climate Change Namibia (2011) | <p>The National Policy on Climate Change supports constitutional obligations of the Government of the Republic of Namibia, namely for “the state to promote the welfare of its people and protection of Namibia’s environment for both present and future generation.”</p> <p>The goal of the National Policy on Climate Change is to contribute to the attainment of sustainable development in line with Namibia’s Vision 2030 through strengthening of national capacities to reduce climate change risk and build resilience for any climate change shocks.</p> <p>The policy reckons that Namibia has limited capacity to adapt to climate change impacts. The policy projected that Namibia would become drier with more</p> | <p>The project by virtue of it utilizing hydrocarbon fuel, it emits potentially ozone depleting gases and the Proponent should consider technologies and incorporate measures to prevent any form of pollution and contribute towards sustainable development.</p> |

| Theme       | Legislation Instrument                            | Relevance Provisions   | Relevance to Project   |
|-------------|---|--|--|
|             |   | variability in rainfall and developed strategies and action plan to cope with adverse climate change impacts, (Namibia, 2010).   |  |
| Environment | Environmental Assessment Policy of Namibia 1994.  | The policy narrates guidelines to environmental management its principles as well as the EIA process to be followed for listed projects that requires environmental clearance.   | The project implementation should follow the requirements of the policy starting with the guidelines for EIA for which this is the process underway. As one of the long-term key objectives, protection of resources including water should be embraced in the Proponent modus operandi. |
|             | Environmental Management Act, (Act No. 7 of 2007) | The Act gives general principles for the management of the environment and natural resources.<br><br>Requires that projects with significant environmental impact are subjected to an environmental assessment process (Section 27).<br><br>Requires for adequate public participation | The EMA and its regulations should inform and guide this EIA / ESIA process and implementation of the ESMP and environmental monitoring when ECC is obtained.  |

| Theme | Legislation Instrument  | Relevance Provisions  | Relevance to Project |
|-------|---|---|----------------------|
|       | <p>EIA Regulations Government Notice (GN) 57/2007 (Government Gazette (GG) 3812).</p> | <p>during the environmental assessment process for interested and affected parties to voice their opinions about a project (Section 2(b-c)).</p> <p>According to Section 5(4) a person may not discard waste as defined in Section 5(1)(b) in any way other than at a disposal site declared by the Minister of Environment and Tourism or in a manner prescribed by the Minister.</p> <p>Details principles which guide the EIA process.</p> <p>Details requirements for public consultation within a given environmental assessment process (GN No 30 Section 21).</p> <p>Section 3 (2) (e) states that “assessments must be undertaken for</p> |                      |

| Theme             | Legislation Instrument                   | Relevance Provisions   | Relevance to Project  |
|-------------------|--|--|---|
|                   |  | <p>activities which may have a significant effect on the environment or the use of natural resources”.</p> <p>Details the requirements for what should be included in a Scoping Report (GN No 30 S8) an EIA report (GN No 30 S15).</p>                     |   |
|                   | Second Hand Goods Act (Act 23 of 1998)   | Regulates and controls scrape metal in the country. It regulates scrap metal dealers, requiring registration, record-keeping of acquisitions, and reporting to police to manage stolen materials.  | The Proponent should comply with the requirements of the Act and ensure all suppliers are registered and be able to verify and authenticate origins of all scrap metal bought for processing.         |
| Health and Safety | Labour Act 11 of 2007.<br><br>Health and | Empowers the minister responsible for labour to publish regulations pertaining to health and safety of labourers (S135).<br><br>Details requirements regarding minimum wage and working conditions (S39-47).<br><br>Details various requirements regarding | <p>All contractors involved in the construction activities for this project are required to comply with this Act and its regulations.</p> <p>Potential nuisances (e.g. dust generation) should be</p> |

| Theme | Legislation Instrument  | Relevance Provisions  | Relevance to Project   |
|-------|---|---|--|
|       | <p>Safety Regulations GN 156/1997 (GG 1617)</p> <p>Public Health Act 36 of 1919.</p> <p>Public and Environmental Health Act No. 1 of 2015</p> | <p>health and safety of labourers.</p> <p>Section 119 states that “no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”</p> <p>The Act serves to protect the public from nuisance and states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.</p> | <p>considered during the construction phase and avoided.</p> <p>Stack emissions should be monitored and ensure no air pollution takes place.</p> <p>The Proponent and all its employees and contractors should ensure compliance with the provisions of these legal instruments.</p> |

| Theme | Legislation Instrument                                  | Relevance Provisions   | Relevance to Project  |
|-------|---|--|---|
|       | Pollution Control and Waste Management Bill             | <p>The bill aims to “prevent and regulate the discharge of pollutants to the air, water and land” Of reference to the Project is: Section 21 “(1) Subject to sub-section (4) and section 22, no person shall cause or permit the discharge of pollutants or waste into any water or watercourse.”</p> <p>Section 55 “(1) No person may produce, collect, transport, sort, recover, treat, store, dispose of or otherwise manage waste in a manner that results in or creates a significant risk of harm to human health or the environment.”</p> | <p>The project activities trigger section 21 and 22 of the bill, this so because construction and smelters activities can potentially directly pollute the atmospheric air.</p> <p>Contractors should make it mandatory that they manage their waste in a manner that does not cause environmental threat and risk to the surroundings.</p> |
|       | Minerals (Prospecting and Mining) Act (Act 33 of 1992): | Governs mining activities, including smelting, and vests mineral rights in the state. Regulates emissions from smelting processes ("noxious or offensive gases").  | The Proponent and Contractors should comply by ensuring relevant permit are obtained for the import and export of scrap metal and it products.  |

| Theme                        | Legislation Instrument                             | Relevance Provisions   | Relevance to Project   |
|------------------------------|--|--|--|
|                              | Atmospheric Pollution Prevention Ordinance (1976): | This Act regulates metal recovery works: That is to say, processes in which metal is recovered from any form of scrap material containing combustible components.                                      | The proposed project involves recycling of scrap metals.   |
|                              | Hazardous Substances Ordinance (1974):             | Governs the handling and processing of hazardous materials that may be found in scrap.   | Scrap metal may contain hazardous substances inherited from their origins and all necessary precautions should be considered in compliance with the hazardous substances' ordinance. |
| Social and Human Environment | Labour Act 11 of 2007.                             | Empowers the minister responsible for labour to publish regulations pertaining to health and safety of labourers (S135). Details requirements regarding minimum wage and working conditions (S39- 47). | All employees hired to work for the proposed project should be compensated fairly in line with the labour laws of the country as required.   |

| Theme | Legislation Instrument   | Relevance Provisions   | Relevance to Project  |
|-------|--|--|---|
|       | <p data-bbox="421 325 613 592">Public Health Act 36 of 1919 and Safety Regulations GN 156/1997 (GG 1617)</p> <p data-bbox="421 999 613 1198">Public and Environmental Health Act No. 1 of 2015</p> | <p data-bbox="651 325 1234 687">Section 119 states that “no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”</p> <p data-bbox="651 871 1234 959">Details various requirements regarding health and safety of labourers.</p> <p data-bbox="651 999 1234 1361">The Act serves to protect the public from nuisance and states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to</p> | <p data-bbox="1279 325 2040 632">Provision of community labour, the input of the local communities is usually in the form of labour during the project life cycle especially construction phase. The safety of these people is crucial particularly women, who do not have prior knowledge of handling dangerous, risk and strenuous jobs.</p> <p data-bbox="1279 999 2040 1198">The Proponent should ensure that the project infrastructure, vehicles, equipment, and machinery are designed and operated in a way that is safe, or not injurious or dangerous to public health.</p> |

| Theme                | Legislation Instrument               | Relevance Provisions  | Relevance to Project  |
|----------------------|--------------------------------------|---|---|
|                      |                                      | health.<br><br>The public and environmental health should be preserved and remain uncompromised.  |   |
| Heritage             | National Heritage Act 27 of 2004     | Section 48(1) states that “A person may apply to the (Heritage) Council for a permit to carry out works or activities in relation to a protected place or protected object” Protects and conserves cultural heritage and cultural resources with special emphasis on places and sources of National heritage including graves, artefacts and any objects older than 50 years. | Construction has a potential to unearth unknown heritage sites, graveyards or unearth heritage resources (e.g. human remains etc.). Heritage resources discovered during excavations would require a permit from the National Heritage Council of Namibia for relocation. |
| Aviation Regulations | Construction of chimneys within less | <b>Approval Authority:</b> The NCAA Regulatory Unit manages approvals for obstacles, particularly under NAMCARs   | The proposed project site is located less than 5km from Walvis Bay International Airport and relevant approvals should obtained at the design phase of the  |

| Theme | Legislation<br>Instrument   | Relevance Provisions  | Relevance to Project |
|-------|---|---|----------------------|
|       | <p>than 15 km from airport aerodrome require approval by Executive Director of Namibia Civil Aviation Authority</p> | <p>and NAMCATS-AH 139.11 regarding project. an obstruction restriction.</p> <p><b>Distance Restriction:</b> Any structure within a 15 km radius of an aerodrome must obtain prior approval.</p> <p><b>Height Limitation:</b> Structures higher than 45 meters, even outside the immediate vicinity of an aerodrome, require consultation with the Executive Director.</p> <p><b>Application Process:</b> Applicants must use forms FSS-AGA-FORM-032 and/or FSS-AGA-FORM-033 to apply for approval of fixed or mobile objects.</p> <p><b>Marking and Lighting:</b> Chimneys and masts often require specialized, high-intensity obstacle lighting (especially if over 45m) and painting (orange/white or</p> |                      |

| Theme                           | Legislation Instrument  | Relevance Provisions   | Relevance to Project   |
|---------------------------------|---|--|--|
| Fire hazard and explosion risks | Explosives Act 26 (1956) and Explosives Regulations 1972 (GNR 1604 of 1972) | red/white) to ensure visibility.<br>The Explosives Act 26 of 1956 is a statute designed to control the manufacture, storage, sale, transport, import, export, and use of explosives. It requires licenses for factories and authorized explosives, restricts unauthorized materials, and is enforced by the Namibian Police. | Several explosives storage sites were identified in the Walvis Bay area. It is thus important to understand the allowable buffer distance from these sites and other facilities like a smelter. Identified explosives storage facilities are: <ul style="list-style-type: none"> <li>• Native storage</li> <li>• Vibrant upstream / Erongo quarry</li> <li>• Orica production plant</li> <li>• Desert storage</li> <li>• Bulk Haulage Logistics</li> </ul> |

## 4. PUBLIC CONSULTATION

Public and stakeholder consultation and participation form an important component of an EIA process as required by Section 21 to 24 of the EIA Regulations. The consultation process afforded the stakeholders and potential Interested and Affected Parties (I&APs) an opportunity to comment on and raise any issues relevant to the proposed development for consideration in the assessment documents (Environmental & Social Impact Assessment (ESIA) Report) and Environmental & Social Management Plan (ESMP)). The comments, issues and suggestions raised and submitted to the Environmental Consultant greatly aid and influence the planning of the proposed project in the early stages.

Furthermore, the public and stakeholder' consultation and engagement process also assists the Environmental Consultant to thoroughly identify and record potential impacts that they may have missed and determine to what extent further investigations are necessary. This process can also aid in identifying possible mitigation measures to some potential adverse impacts or to maximize the benefits of the development in the environment. The public and stakeholder consultation for this mineral exploration project has therefore been conducted in accordance with the EMA and its EIA Regulations. The consultation activities done for this development are presented under the next subsections and as per the associated Proof Public Consultation Document (Appendices).

### 3.1. Pre-identified and Registered Interested and Affected Parties (I&APs)

The relevant and applicable national, regional and other interested members of the public were identified and registered in the list of stakeholders and I&APs. The list was updated throughout the ESIA consultation process. The completed Attendance Register and list of registered I&APs and stakeholders are provided in **Annexure 3**.

Table 7: Pre-identified stakeholders.

| Institution                            | Representative                                     |
|--|--|
| Dorob National Park                    | Control Warden<br>Parks and Wildlife Management    |
| Walvis Bay Municipality                | Department of Solid Waste and Environmental Health |
| Erongo Regional Council                | Constituency Councilor                             |
| Ministry of Mines and Energy           | Mining Commissioner                                |
| Tour and Safari Association of Namibia | Mureal van Rooyen                                  |

### 3.2. Means of Notification and Communication for Consultation

The steps taken that guided this public consultation process are detailed under section 21 to 24 of the EIA Regulations. The notifications and communication with I&APs and stakeholders with regards to the proposed development were facilitated through the following means and order:

- The Background Information Document (BID): A Summary of the proposed Project and ESIA Process

A non-technical summary or Background Information Document (BID) containing brief information about the proposed project was compiled and shared with registered I&APs – **the BID was shared as an accompanying document, (Annexure 1).**

- Public Notification (Newspaper Advertisements) and Communications

The notice of the ESIA Study for the proposed project activities were published in the following newspapers while notices were posted at various points close to the project area, as presented below.

Table 8: Environmental scoping announcements published.

| <b>Communication channel used</b> | <b>Date (s)</b>  |
|-----------------------------------|------------------|
| The New Era                       | 08 January 2026  |
| The New Era                       | 14 January 2026  |
| The Windhoek Observer             | 08 January 2026  |
| The Windhoek Observer             | 14 January 2026  |
| <b>Site Notices</b>               | <b>Place</b>     |
| 1                                 | Farm 37          |
| 2                                 | Along D1983 Road |



**Figure 11: Site notices posted prior to the Public Consultation Meeting held on site. Source: Own photograph.**

### 3.2.1. Public and Stakeholders' Consultation Meetings

- Consultation Meetings

The newspaper adverts briefly explained the proposed mineral exploration activities, its locality, consultation meeting details and public invitation to register as I&APs as well as submit their comments/concerns to the Environmental Assessment Practitioner using the contact details provided. Minutes that narrate the proceedings

of the public meeting held onsite and the preceding email correspondences with IA&Ps are contained in the “*Proof of Public Consultation Document*”, **Annexure 2**.



**Figure 12: A consultative focus group discussion was held between the Municipality of Walvis Bay; the Walvis Bay Rural Constituency Council staff, Honourable Councillor and the Proponent. Source: Own photograph taken during the discussion.**

### 3.2.2. Feedback from Stakeholders and Interested & Affected Parties

Various issues were raised by I&APs during the consultations. These issues have been recorded and form the basis of the ESR and ESMP documents. The summary of key issues and how they were managed is presented below:

**Table 9: Summary of issues raised during the stakeholders' consultations and responses.**

| Issues / Concerns Raised by Stakeholders  | Responses  |
|---|--|
| <b>Does the Proponent have a Council Resolution to lease the proposed land?</b>   | Affirmative, the Proponent has a Council Resolution to lease the land. It is conditional to conduct the EIA and obtain an Environmental Clearance Certificate (ECC) before proceeding to lease agreement negotiations. |
| We request that you rephrase smelters to furnaces to avoid confusion.   | The 2 words may be used interchangeably but in this case the smelter plant is regarded as one facility which contains several furnaces for smelting different types of scrap metal.                                    |
| Electricity   |  |
| Traffic flow and proximity to the Port  | A preexisting road will be used to access the project site.  |
| Electricity   | There is a power substation very close to the Proponent's proposed plot which makes it affordable in terms of CAPEX.   |
| It is recommended proceed since the project area is located close to the electrical substation  | NOTE   |
| It is recommended proceed since the project area is located close to the electrical substation  | NOTE   |
| Services on Farm 37: The community on farm 37 does not have a clinic, school nor fire station. We request from well-wishers to consider those priorities when you implement your CSR. | NOTE   |

#### 4.1. Review of Draft Environmental Scoping Report and Management Plan

The draft ESR was shared with Proponent to endorse proposed mitigation measures before it was publicized to stakeholders for commenting. The stakeholders were given 14 days from the day of the first publication to comment on the draft ESR.

#### 4.2. Public Participation: Way Forward

Comments on the reports were incorporated to generate the final reports before submission to the Competent Authority: MEFT and the decision will be published.

## 5. ESIA SCOPING METHODOLOGY

### 5.1. Methodology

The EIA Regulations require a description of the significance of any significant effects, including cumulative effects that may occur because of the undertaking of the activity. To determine significance, each of the potential impacts identified have been subjected to the following questions displayed graphically (steps 1 and 2 - Figure 2) and in tabular form (Table 2) below. These questions form the methodology for assessing the significance of the effects or impacts identified through this EIA process:

1. The first step is to screen out (set aside) all impacts which do not fall within the scope of this project and responsibility of the proposed project.
2. The next step is to determine whether sufficient information exists to assess the potential impacts of those that remain. If insufficient information is available to assess (with a high degree of confidence) and recommend mitigation measures to address a given impact further investigation will be required. However, if sufficient information is available to assess (with a high degree of confidence) and recommend mitigation measures to address a given impact no further investigation will be required, and the impact will be addressed in the ESMP.
3. To fully understand the significance of each of the potential impacts, it is necessary to subject each to a range of assessment criteria. The application of these criteria, in determining the significance of potential impacts, uses a balanced combination of duration, extent, and intensity/magnitude, modified by probability, cumulative effects, and confidence.

The definitions of each of the criteria are contained in Table 15; and finally based on the answers obtained after applying steps 1-3 a decision can be made regarding the significance of the impact based on three categories – low, medium or high (Table 13).

**Does the issue fall within the scope of the project and the responsibility of the Proponent (Karam Industries Namibia (Pty) Ltd)**

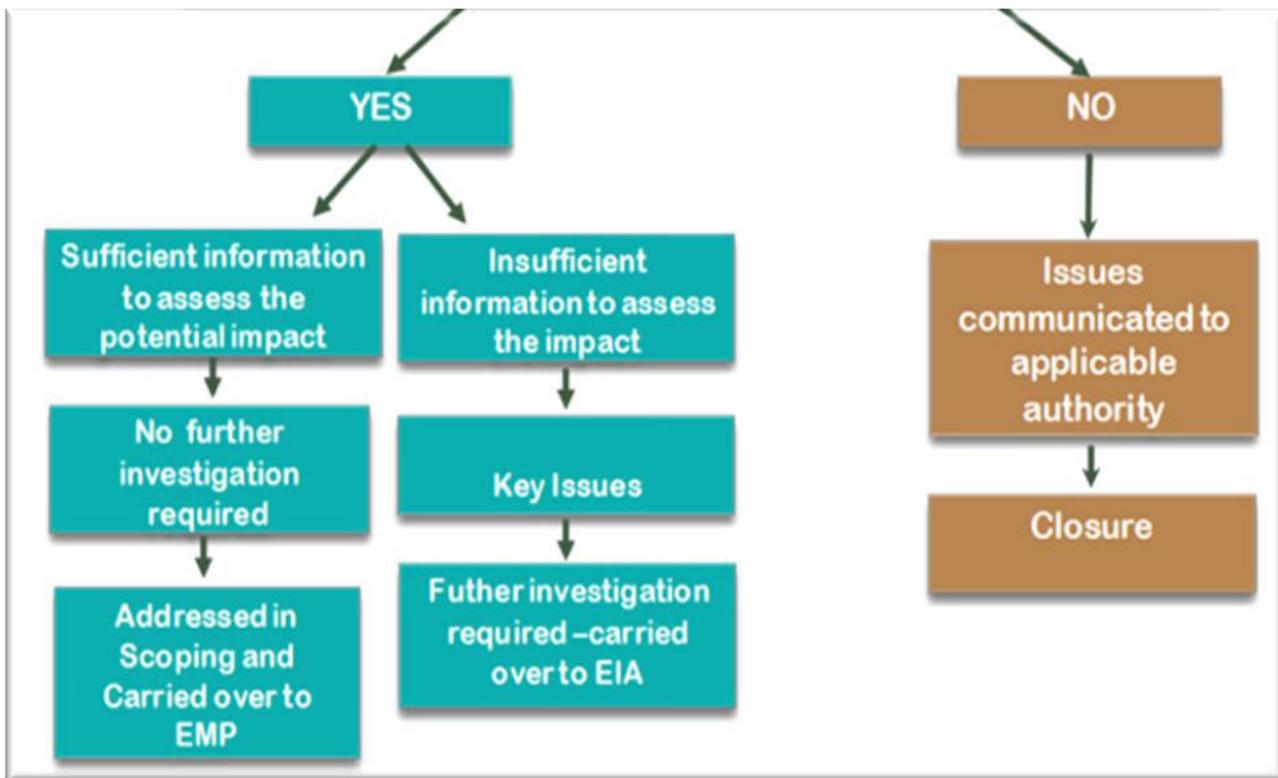


Figure 13: The screening process followed to determine key issues.

## 5.2. Assessment of Alternatives

### 5.2.1. Assessment of Alternatives

According to the EMA EIA Regulations, assessment of alternatives must be considered during the ESIA process. The Regulations state that “an alternative, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity.

### 5.2.2. The “No – Go” Alternative

Given that the “No-go” option is the best option for the environment since it means maintaining the status quo in which no project is implemented. However, given the developmental need of the project, this option cannot be considered because potential positive economic benefits will be lost.

### 5.2.3. Location Alternatives

No assessment of alternative sites was done for the proposed project. Leaser offered one portion of land on Farm 38 to setup the smelter. As a result, no other site was considered. This aspect becomes more relevant when setting out the planned infrastructure.

## 5.2.4. Technical Alternatives

This section presents the technical alternatives that should guide the design, construction and operation of the proposed scrap metal smelter. Below is a concise overview of metallurgical approaches and processing routes suitable for recycling steel, aluminium, zinc, lead, copper and plastics into common secondary products. We considered scrap type for each metal, primary recycling methods, key refining/clean-up steps, typical downstream product routes, and important quality/contamination considerations.

### 5.2.4.1. Steel

- Scrap types comprise of Heavy Melting Steel (HMS), shredded scrap, turnings, sheet/plate, galvanized/painted steel.

#### 5.2.4.1.1. Primary processing

- Magnetic separation to remove non-ferrous metals.
- Eddy-current separators for non-ferrous removal.
- Manual picking of contaminants (plastic, wood and insulation)
- Baling, shredding and cutting to size for furnace feed / charge.
- Removal of hazardous items (batteries, refrigerants)
- Segregation of heavy melt scrap from lighter scrap types.

#### 5.2.4.1.2. Metallurgical routes

##### 5.2.4.1.2.1. *Electric Arc Furnace (EAF) — dominant for secondary steel*

Scrap melted with ferroalloys, oxygen or basic oxygen if blended; precise alloy control through additions; slag-forming agents remove sulphur and phosphorus.

##### 5.2.4.1.2.2. *Induction furnaces*

This is suitable at small-scale for specialist alloys and this will not be handling the large tonnage as planned.

#### 5.2.4.1.3. Refining/clean-up

Slag refining, oxygen lancing, ladle metallurgy (decarburization, desulfurization, inclusion removal), vacuum degassing for cleaner steels.

#### 5.2.4.1.4. Downstream processing

Continuous casting → rolling, forging, stamping; re-melt for tool / structural steels or automotive grades; powder metallurgy from turnings via briquetting.

#### 5.2.4.1.5. Key issues to consider

Tramp elements (Cu, Sn) limit use in high-strength or weldable steels. This necessitates segregation/blending strategies or use in lower-grade products (rebar, sections). Coated steels require de-coating to avoid contamination.

#### 5.2.4.2. Aluminium

##### 5.2.4.2.1. Scrap types

Wrought alloys (cast vs wrought), castings, beverage cans, extrusion scrap, coated/painted, mixed alloy chips.

##### 5.2.4.2.2. Primary processing

Collection → sorting (optical, XRF alloy ID, eddy current) → shearing/compacting → degreasing.

##### 5.2.4.2.3. Metallurgical routes

Direct melting in reverberatory, gas-fired, or rotary furnaces with fluxing to remove oxides; rotary/tilting furnaces for contaminated scrap.

###### 5.2.4.2.3.1. *Advanced route*

Inert-atmosphere or flux-assisted melting for high-quality alloys.

###### 5.2.4.2.3.2. *Secondary refining*

This involves fluxing, degassing (argon), chloride/fluoride fluxes for dross removal; filtration and settling to remove inclusions.

###### 5.2.4.2.3.3. *Alloy management*

This is a critical stage which involves alloy sorting and dilution, selective remelting and alloying additions to achieve target wrought or casting alloys.

#### 5.2.4.2.4. Downstream processing

It involves ingot casting, extrusion billets, rolling for sheet, die-casting alloys for automotive and consumer products, remelt to produce secondary foundry alloys.

#### 5.2.4.2.5. Key issues to consider

It is important to note that coatings/paint, plastics, and polyvinylidene fluoride (PVDF), a thermoplastic fluoropolymer with high chemical resistance, UV/weather resistance, and good adhesion to metals can cause contamination and degrade product quality. Dross management and chloride flux residues require environmental control and can generate fluoride gases with corrosive properties that can damage equipment and atmospheric pollution.

#### 5.2.4.3. Zinc

##### 5.2.4.3.1. Scrap types

Galvanizing residues (oxides), die-cast zinc alloys (ZA, Zamak), zinc ash from galvanizing, end-of-life galvanized steel (needs separation).

##### 5.2.4.3.2. Primary processing

Collection → separation (mechanical, eddy current, hand sorting) → shredding and segregation of zinc-containing streams.

##### 5.2.4.3.3. Metallurgical routes

###### 5.2.4.3.3.1. *Pyrometallurgical*

Retorting or smelting of zinc-bearing residues and dross to produce crude zinc (often followed by distillation).

###### 5.2.4.3.3.2. *Hydrometallurgical*

- Leaching of secondary materials (e.g., ash, oxide-bearing residues) followed by purification and electrowinning to produce high-purity zinc.
- Recasting of remelted die-cast alloys for die-casting feedstock with limited refining.
- Refining/clean-up

- Distillation (to remove lead/other volatiles), leach purification (cementation, solvent extraction), electrorefining/electrowinning for high purity.

#### 5.2.4.3.4. Downstream products

Galvanizing baths (after purification), die-cast components, alloys, zinc oxide production.

#### 5.2.4.3.5. Key issues to consider

Lead contamination, organic residues (from oils), and chloride content affect process choice; emissions control for volatile zinc species required in pyrometallurgy.

#### 5.2.4.4. Lead

##### 5.2.4.4.1. Scrap types

Spent lead-acid batteries (largest stream), lead sheet, solder, cable sheathing, contaminated scrap.

##### 5.2.4.4.2. Primary processing

Battery recycling involves battery breaking, separation (electrolyte neutralization, polypropylene separators), smelting of lead paste and grids.

#### 5.2.4.5. Metallurgical routes

##### 5.2.4.5.1. Pyrometallurgical

Smelting/refining in reverberatory or rotary furnaces to produce crude lead (drossing, slagging, slag-metal separation).

##### 5.2.4.5.2. Secondary refining

Cupellation/pyrorefining, electrolytic refining less common; refining to remove Ag, Cu, Sn, Sb by selective oxidation/slagging and subsequent anode processes for precious metals.

##### 5.2.4.5.3. Downstream products

Refined lead for new batteries, lead alloys (antimonial, calcium-tin) for battery grids, radiation shielding, solder, cable sheathing.

#### 5.2.4.5.4. Key issues to consider

Strict controls on emissions (Pb, Sb, As), worker/environmental health; separation of plastics and acid from batteries; recycling loop for battery-grade lead requires high purity and control over alloying elements.

#### 5.2.4.5.5. Cross-cutting considerations

Sorting & pre-treatment: XRF, optical sorting, eddy-current, sensor-based approaches and manual picking dramatically improve product yield and reduce refining costs.

#### 5.2.4.5.6. Contamination management

Tramp elements (Cu in steel, Fe in Al, Pb in Zn) often determine final application or necessitate additional refining.

#### 5.2.4.5.7. Energy & environmental controls

Electric melting (EAF, induction) reduces CO<sub>2</sub> versus primary routes; dross and slag management, dust and off-gas capture, wastewater treatment, and safe handling of hazardous materials (radiation not applicable here) are mandatory.

#### 5.2.4.5.8. Process selection depends on:

Desired product quality (e.g., battery-grade Pb vs construction-grade steel).

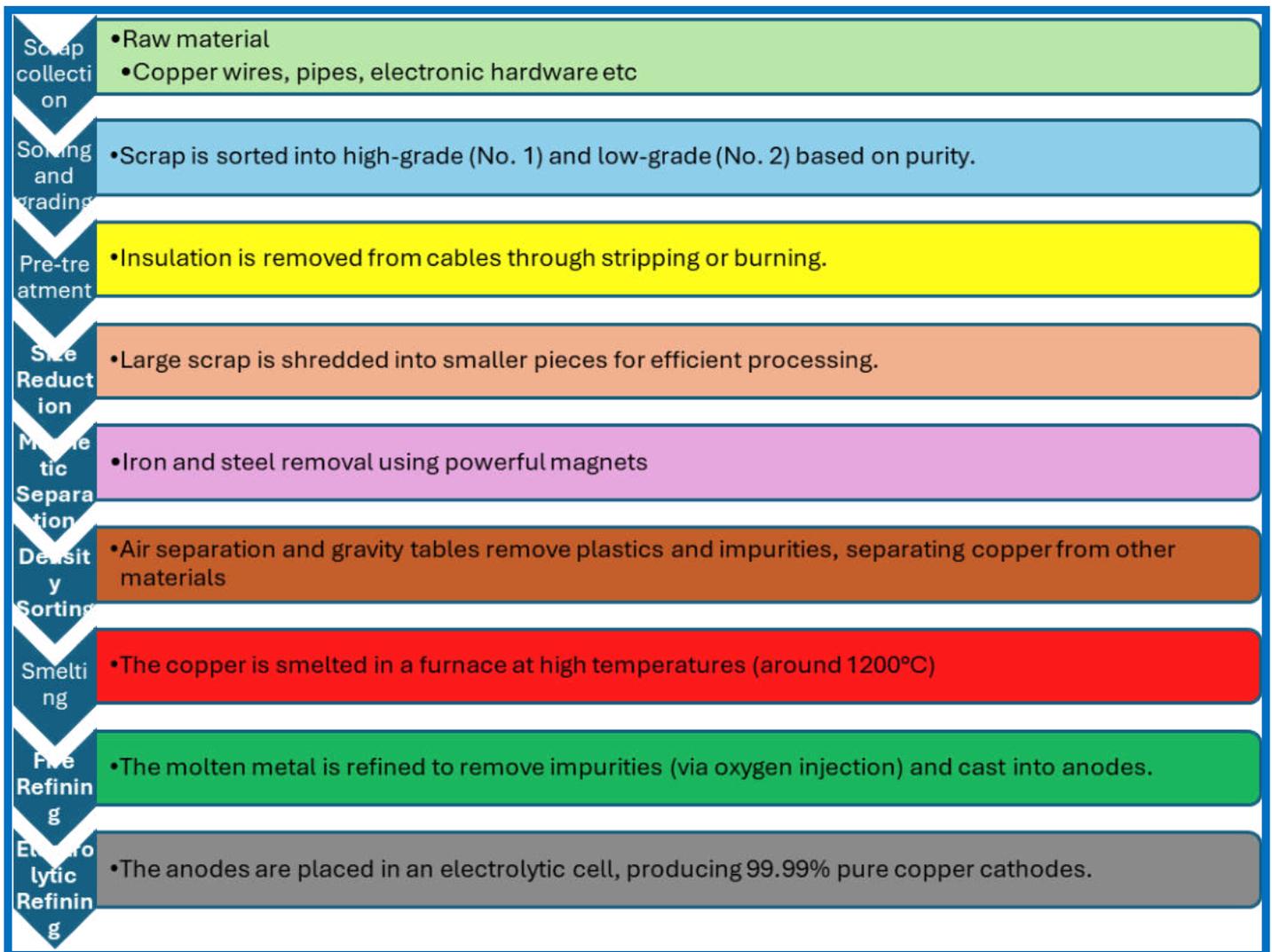
Scrap composition and level of contamination.

Scale and capital:

- Small re-melters vs centralized smelters/electrowinning plants.
- Regulatory/emissions constraints and economics.

#### 5.2.4.6. Copper

The schematic flow of copper smelting logically starts with scrap collection, sorting and grading, pretreatment, size reduction, magnetic separation, density sorting, smelting, refining and electrolytic refining.



**Figure 14: Scrap copper recycling schematic flow diagram.**

It is reported that copper smelting routes are more environmentally friendly compared to lead smelters that generate toxic fumes. Copper smelting facilities near populations will minimize the cost of e-waste transportation and therefore the recycling economy will be improved. These advantages allow copper smelters to be installed near cities where e-waste is generated. In these processes, platinum group of metals (PGMs) are recovered via a conventional electrorefining process where they are segregated in slimes.

Commonly, copper smelting routes including matte and black copper are used for e-waste recycling. In the sulfur-based route (primary copper smelting), copper matte (40%) and blister copper (98.5%) are produced. Finally, blister copper is refined by fire refining to produce pure copper. In the black copper route (secondary copper smelting), crude copper is produced during a reduction process and is refined by oxidation in a converter. The black copper is an attractive route because it can receive high levels of impurities including Fe, Zn, Pb and Sn. These impurities are removed by oxidation. The black copper smelting process consists of reduction and oxidation cycles, (Abdul Khaliq, 2014). Impurities are mostly segregated into the vapor phase and

are discharged in the off gas. As a result, it is paramount that the chimney be fitted with cleaning scrubbers and precipitators to clean emissions.

#### 5.2.4.6.1. Limitations of Hydrometallurgy Route

- Hydrometallurgical routes have been successfully used to recover PGMs from e-waste. However, these processes are associated with certain disadvantages that limit their application on the industrial scale.
- Overall, hydrometallurgical routes are slow and time consuming and impact recycling economy. There are concerns regarding the economy of hydrometallurgical routes compared to pyrometallurgical processes for the extraction of PGMs from e-waste.
- Mechanical processing of e-waste takes longer to reduce size for efficient dissolution. It is reported that 20% PGM is lost by mechanical force during the liberation process that contributes to a significant loss in the overall revenue.
- Cyanide is a dangerous leachant and should therefore be used with high safety standards. It can cause contamination of rivers and seawater, which poses serious health risks to the inhabitants.
- Halide leaching is difficult to implement due to strong corrosive acids and oxidizing conditions. Specialized equipment made of stainless steel and rubbers is required for leaching of gold using halide agents from e-waste.
- The use of thiourea leachants is limited in gold extraction due to its high cost and consumption. Moreover, further developments are required to improve the current technology of thiourea-based gold leaching.
- The consumption of thiosulfate is comparatively higher, and the overall process is slower, which limits its application for gold extraction from ores as well as from e-waste.
- There are risks of PGM loss during dissolution and subsequent steps, therefore the overall recovery of metals will be affected, (Abdul Khaliq, 2014).

#### 5.2.4.6.2. Pyrometallurgical Processes

Pyrometallurgical processes for recovering metals involve smelting in furnaces, incineration, combustion and are typical e-waste recycling processes. Such recycling facilities can close the loop of valuable metals and reduce environmental impact arising from large quantities of e-waste. Currently, e-waste recycling is dominated by pyrometallurgical routes, (Antrekowitsch, Potesser, Spruzina, & Prior, 2006), whereas the steel industry embraces the ferrous fractions for the

recovery of iron, and the secondary aluminium industry takes the aluminium fractions. Pyrometallurgical processes work with the steps of liberation, separation/upgrading and purification that are fundamentally similar to those of mechanical or hydrometallurgical routes. However, the liberation of valuable metals is not achieved by leaching, crushing or grinding but by smelting in furnaces at high temperatures. In these processes, metals are sorted by exploiting their chemical and metallurgical properties, e.g., PGMs are segregated into a solvent metal phase (copper or lead). The metal fractions separated during the preprocessing of e-waste are composed of Fe, Al, Cu, Pb and PMs. After Fe and Al, Cu and Pb are the main constituents of a typical e-waste. Therefore, it is logical to construct e-waste smelters that can handle copper/lead scrap. Currently, copper and lead smelters work as e-waste recyclers for the recovery of Pb, Cu and PGMs. In these pyrometallurgical processes, e-waste/copper/lead scrap is fed into a furnace, whereby metals are collected in a molten bath, and oxides form a slag phase. Details about the lead and copper smelting routes were explained earlier in the chapter, (Abdul Khaliq, 2014).

#### 5.2.4.7. Plastics

Plastics are synthetic or semi-synthetic, lightweight, and durable materials made from polymerized chemical units, primarily derived from petroleum and natural gas e.g. Polyethylene Terephthalate (PET), High-Density Polyethylene (HDPE), Polyvinyl Chloride (PVC), Low-Density Polyethylene (LDPE), Polypropylene (PP) & Polystyrene (PS). They are recyclable and below are some of the common or day to day items made from these plastics. The choice of processes mainly depends on polymer type and contamination level.

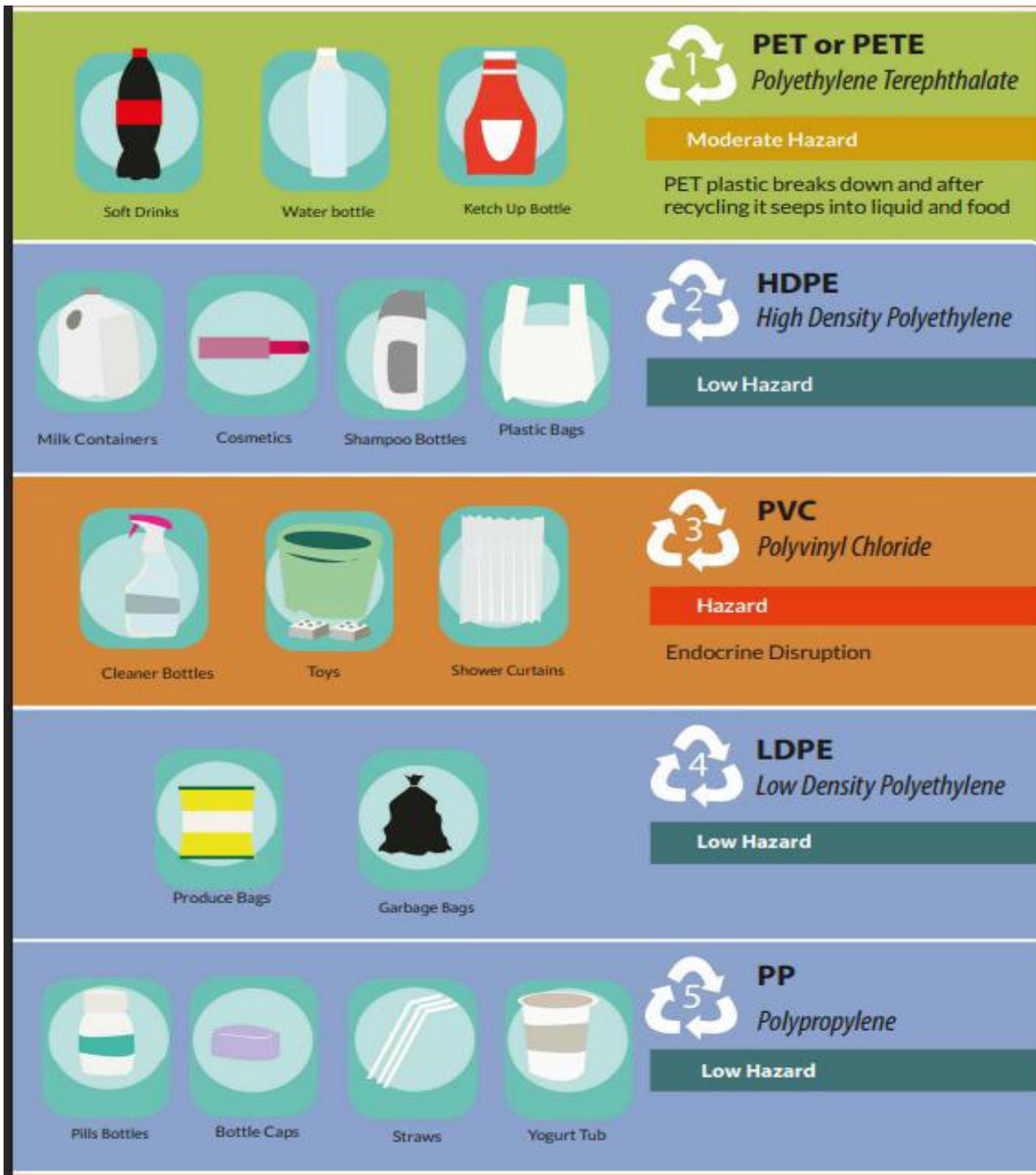


Figure 15: Some of the common containers made from plastic.

#### 5.2.4.7.1. Process flow

##### 5.2.4.7.1.1. Collection and sorting

- Collection.
- Manual and automated sorting:

- material recovery facilities (MRFs) use conveyors, trommels, near-infrared (NIR) sorters, optical sorters, and density/float baths to separate polymer types and remove contaminants.

#### 5.2.4.7.1.2. Pre-processing / cleaning

- Shredding / milling: plastics shredded into flakes or pellets.
- Washing:
  - hot or cold wash lines remove labels, adhesives, dirt, organics, and residual liquids, friction washers, float sinks.
- Drying:
  - centrifuges or thermal dryers to remove moisture.

#### 5.2.4.7.1.3. Separation and grading

- Density separation (float/sink) to separate PVC from PET/PE.
- Electrostatic or triboelectric separation for similar densities.
- Near-infrared and colour sorting to improve homogeneity.

#### 5.2.4.7.1.4. Reprocessing

- Mechanical recycling:
  - Extrusion and pelletizing: flakes melted and extruded into pellets for reuse in manufacturing. Requires control of shear and temperature to avoid polymer degradation.
  - Injection molding / blown film directly from regrind for certain applications.
- Chemical recycling (for mixed/contaminated streams or higher-value recovery):
  - Depolymerization (e.g., PET glycolysis), pyrolysis (to oils/waxes), solvolysis, or gasification. Produces monomers, feedstock oils, or syngas for further refining.
  - Emerging technologies for mixed plastics and hard-to-recycle polymers.
- Energy recovery
  - As last resort some establishments incorporate energy capture to optimize the operations.
- controls and regulatory limits.

#### 5.2.4.7.1.5. Additives and quality restoration

- Stabilizers, compatibilizers, virgin polymer blending, and filtration to restore properties.
- Pellet blending to meet specifications.

#### 5.2.4.7.1.6. Quality control & off-take

- Testing for melt flow index, mechanical properties, contamination levels, and color.
- Packaging pellets or finished goods for sale to manufacturers.

#### 5.2.4.7.2. Key considerations for recycling plastics

- Feedstock quality drives technology choice and economics:
  - higher-quality, well-sorted input reduces processing cost and increases recovery.
  - Regulatory compliance for emissions, effluent, waste handling, and product standards also determine choice of technology for compliance purposes.
- Energy source and operational footprint:
  - Choice of electrification vs. fossil fuel affects emissions profile and operating costs and is also important when choosing technology to comply with emission standards.
- Integration opportunities:
  - Combining material recycling with recovery of metals from plastics (e.g., cable insulation) or use waste heat and energy recovery systems is generally beneficial both economically and environmentally.

## 6. DESCRIPTION OF THE RECEIVING ENVIRONMENT – FARM 38 IN WALVIS BAY AREA.

### 6.1. Baseline Studies

This chapter provides a description of the environmental context within which the scoping exercise was conducted. It captures the baseline social and biophysical environmental conditions which the proposed project will interact. This information was sourced from literature review and observations made during a site visit to the project area. Weather data was obtained from the nearest weather station, the **Coastal Met Station** maintained by SASSCAL WEATHERNET, (<http://www.sasscalweather.net/>).

The baseline is important to detect where changes that occur because of the proposed project in the future. The study area covers the entire footprint of the project components followed by a brief overview of the possible ways or way the environment features may be affected (positively or negatively) by the proposed mineral exploration activities.

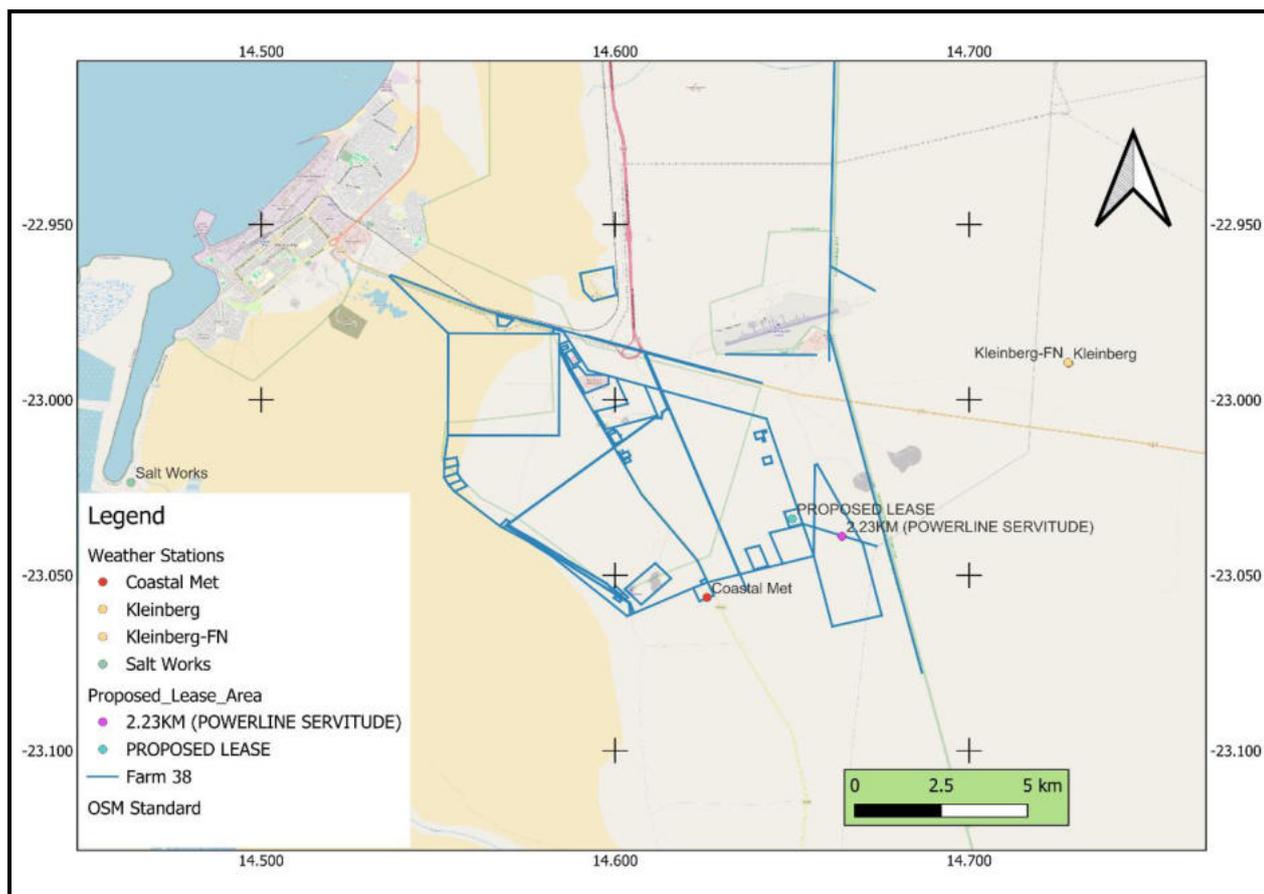


Figure 16: The location of the nearest SASCALL Weather station (Coastal Met) used for climatic description. Source: Own map.

The project is in Walvis Bay area which falls under the Namib Desert and is home to a variety of desert-adapted plants and animals that have evolved to survive in the harsh desert environment. Some of the notable desert-adapted plants include:

1. *Welwitschia mirabilis*: An unusual plant with just two leaves that can live for over 1,000 years.
2. Nara melon (*Acanthosicyos horridus*): A water-storing plant with spiny leaves and edible fruits.
3. *Hoodia gordonii*: A succulent plant traditionally used by the San people to suppress hunger and thirst.
4. Camelthorn tree (*Acacia erioloba*): A large, thorny tree that provides shade and food for various animals.
5. Bottle tree (*Pachypodium lealii*): A succulent tree with a swollen trunk that stores water during dry periods.
6. Devil's thorn (*Tribulus zeyheri*): A low-growing plant with sharp spines and yellow flowers.
7. Quiver tree (*Aloe dichotoma*): A striking tree species with a unique, branchless form and succulent leaves traditionally used by San people to make quivers for arrows.
8. Various species of succulents, lichens, and grasses that have adapted to survive in the arid conditions of the Namib Desert.

These plants play essential roles in the desert ecosystem of providing food and shelter for the diverse wildlife inhabiting the Dorob National Park. The stunning variety of plant life adds to the beauty and richness of this unique desert environment.

As for desert-adapted animals, some of the species found in the Dorob National Park include:

1. Oryx (Gemsbok): A large antelope with long, straight horns and a distinctive grey and white coat.
2. Springbok: A smaller antelope known for its impressive jumping ability and beautiful markings.
3. Meerkat: Small, social mammals living in family groups, well-known for their upright posture and lookout duties.
4. Namaqua chameleon: A master of camouflage, this chameleon blends into its surroundings with its ability to change color.

These are just a few examples of the fascinating plant and animal life that have adapted to thrive in the challenging Namib desert conditions.

According to (John Mendelsohn, 2002), Namibia is generally considered a hot country, but the temperatures vary a good deal, during the day, from day to day, seasonally and over much longer periods. The climate can be unpredictable, and extreme weather events like flash floods or droughts can occur. Climate change may also be influencing the region's weather patterns, potentially leading to shifts in rainfall patterns and temperatures, (Burke, 2004).

Overall, the area's climate is characterized by hot temperatures, low rainfall, and arid conditions, making it a challenging yet unique environment that supports a diverse range of desert-adapted flora and fauna.

#### 6.1.1. Environmental Implications

The project area is predominantly covered by inland gravel plains of the terrestrial characteristics, (Ministry of Environment, Forestry & Tourism, 2013). It contains lichens, invertebrates and biodiversity associated with the Tumas drainage area and the rocky terrains, (SAIEA, 2010). The area has been earmarked for industrial development and several EIAs have been done recently for the lease of various portions on Farm 38 as well e.g. Construction of the Solar Power Plant on Lease 16 of Farm 38 Walvis Bay. According to the Municipality of Walvis there are many development projects with conditional approval for leasing portions of Farm 38. Lease agreements will be signed when an EIA has been done and an ECC is issued by MEFT. There is barely any vegetation on the ground and as a result there will be no impact on vegetation. Although wildlife is observed roaming in the desert, we expect them to migrate to the much greener riverine areas. No negative impacts on wildlife are expected throughout the project cycle.

#### 6.2. Biodiversity: Fauna and Flora

Biodiversity is the diversity amongst living organisms (i.e. all animals, plants and other organisms such as lichens and fungi) as well as the ecosystems they inhabit (terrestrial, aquatic and marine ecosystems) and the ecological processes that they are part of and contribute to. In this report we consider biodiversity under four main headings, to assess how it can potentially be affected by the proposed smelter plant planned on Farm 38:

##### 6.2.1. Fauna

The fauna occurring in the desert area of Namibia is rich and diverse, with a variety of wildlife species adapted to the region's arid climate, rugged terrain, and unique ecosystems. Here is an overview of the fauna expected to occur in the project area:

- **Antelope Species:** The project area lies adjacent to the Dorob National Park Area area which is home to several antelope species, including gemsbok (oryx), kudu, springbok, and klipspringer. These graceful herbivores are well-adapted to the arid conditions and rocky terrain of the region.
  
- **Predators:** Carnivores such as leopards, baboons, black-backed jackals, bat-eared foxes, cheetahs, and hyenas are expected to inhabit the area, preying on the abundant antelope

and other small mammals found in the region. These predators play a crucial role in maintaining the ecosystem's balance.

- **Small Mammals:** Various small mammal species, including rodents, hares, and mongoose, also form part of the project area's fauna. These animals contribute to the region's biodiversity and serve as prey to larger carnivores.

Table 10: List of mammals likely to occur in the project area.

| Common Name               | Scientific Name                    |
|---------------------------|------------------------------------|
| Caracal                   | <i>Caracal caracal</i>             |
| African wildcat           | <i>Felis silvestris</i>            |
| Slender Mongoose          | <i>Galerella sanguinea</i>         |
| Striped Polecat           | <i>Ictonyx striatus</i>            |
| Black-backed jackal       | <i>Canis mesomelas</i>             |
| Springbok                 | <i>Antidorcas marsupialis</i>      |
| Spotted hyena             | <i>Crocuta crocuta</i>             |
| Small spotted Genet       | <i>Genetta genetta</i>             |
| Cape Hare Secure          | <i>Lepus capensis</i>              |
| Southern African Hedgehog | <i>Atelerix frontalis angolae</i>  |
| Cheetah                   | <i>Acinonyx jubatus</i>            |
| Black-footed Cat          | <i>Felis nigripes</i>              |
| Yellow Mongoose           | <i>Cynictis penicillata</i>        |
| Leopard                   | <i>Panthera pardus</i>             |
| Brown Hyena               | <i>Parahyaena (Hyaena) brunnea</i> |

|                        |                                     |
|------------------------|-------------------------------------|
| Phacochoerus africanus | <i>Common Warthog</i>               |
| Aardwolf               | <i>Proteles cristatus</i>           |
| Scrub Hare             | <i>Lepus saxatilis</i>              |
| Ground Pangolin        | <i>Manis temminckii</i>             |
| Honey Badger / Ratel   | <i>Mellivora capensis</i>           |
| Oryx gazella           | <i>Gemsbok</i>                      |
| Bat-eared Fox          | <i>Otocyon megalotis</i>            |
| Klipspringer           | <i>Oreotragus oreotragus</i>        |
| Cape Fox               | <i>Vulpes chama</i>                 |
| Suricate               | <i>Suricata suricatta marjoriae</i> |
| Greater Kudu           | <i>Tragelaphus strepsiceros</i>     |
| Common Duiker          | <i>Sylvicapra grimmia</i>           |
| Steenbok               | <i>Raphicerus campestris</i>        |

Most of the mammals will not be expected to be found within the project area due to the limitations set by the predominantly gravel plains habitat of the project area, which does not include key intersections with major ephemeral runoff courses that would typically support seasonal activity for these species.

- **Birdlife:** This area boasts a diverse bird population, with species adapted to desert environments, rocky cliffs, and mountain habitats. Eagles, vultures, buzzards, and various other bird species can be observed soaring above the landscape. A total of 650 bird species have been recorded in Namibia and 14 of them are endemic or near endemic. Most of these species occur in central Namibia and not in the proximity of the project area.

Table 11: Bird species likely to occur in the project area.

| Common Name         | Scientific Name               |
|---------------------|-------------------------------|
| Violet Wood-Hoopoe  | <i>Phoeniculus damaransis</i> |
| Rüppell's Parrot    | <i>Poicephalus rueppellii</i> |
| Hartlaub's Spurfowl | <i>Pternistis hartlaubi</i>   |
| Damara Hornbil      | <i>Tockus damarensis</i>      |
| Monteiro's Hornbill | <i>Tockus monteiri</i>        |
| Carp's Tit          | <i>Parus carpi</i>            |
| White-tailed Shrike | <i>Lanioturdus torquatus</i>  |
| Rüppell's Korhaan   | <i>Eupodotis rueppellii</i>   |
| Rosy-faced Lovebird | <i>Agapornis roseicollis</i>  |

- **Reptiles:** The Namib desert is home to a variety of reptiles, including lizards, snakes, and geckos. Some of the reptile species found in the Namib desert are adapted to the arid climate and rocky outcrops, blending seamlessly into their surroundings. According to Griffin (1998) Namibia has 261 reptile species constituting 30% of Africa' reptile species. Of these 60% are protected by the conservation Ordinance.

Table 12: List of reptiles expected to occur in the Namib desert area and their conservation status.

| Name                              | Conservation Status |
|-----------------------------------|---------------------|
| Coastal Namib Day Gecko           | Endemic & Secure    |
| Bradfield's Namib day Gecko       | Endemic & Secure    |
| Palmatogecko rangei               | Endemic & Secure    |
| Pachydactylus capensis            | Secure              |
| Pachydactylus scherzi             | Endemic & Secure    |
| Ptenopus carpi                    | Endemic and secure  |
| Ptenopus kochi                    | Endemic and secure  |
| Typhlosarus braini                | Endemic and secure  |
| Typhlosarus meyeri                | Endemic and secure  |
| Typhlacontias brevipes            | Endemic and secure  |
| Mabuya spilogaster                | Endemic and secure  |
| Mabuya hoeschi                    | Endemic and secure  |
| Meroles sp.                       | Endemic and secure  |
| Pedioplanis breviceps             | Endemic and secure  |
| Pedioplanis lineocellata puchella | Secure              |

|                                |                                  |
|--------------------------------|----------------------------------|
| Pedioplanis undata             | Endemic and secure               |
| Pedioplanis husabensis         | Endemic and secure               |
| Coroylosaurus subtessellatus   | Endemic and secure               |
| Gerrhosaurus Validus maltzahni | Secure                           |
| Zyaspis quadrifrons            | Secure                           |
| Psammophis trigrammus          | Endemic and secure               |
| Psammophis namibensis          | Secure                           |
| Telescopus sp.                 | Endemic and insufficiently known |
| Plythonodipsas carinata        | Endemic and secure               |
| Ptosymna bivitta               | Secure                           |
| Aspidelaps lubricus cowlesi    | Secure                           |
| Naja woodi                     | Secure                           |

- **Insects and Arachnids:** The area supports a myriad of insect and arachnid species, from beetles and butterflies to scorpions and spiders. These small but vital creatures play important roles in pollination, decomposition, and ecological balance.
- **Endemic Species:** The area may harbor endemic wildlife species that are found only in specific regions of Namibia. These endemic species are often adapted to the unique environmental conditions of the desert area of Namibia.

The fauna of Namibia's desert area contributes to the region's ecological diversity, serving as indicators of environmental health and playing integral roles in the desert ecosystem. Protecting and conserving the diverse wildlife species of the project area is essential for preserving the region's natural heritage and biodiversity.

#### 6.2.2. Flora

The project area is characterized by desert biome. The flora of the project area is diverse and adapted to the region's arid climate, rocky terrain, and unique geological formations.

This section presents an overview of the flora that occurs in the Namib desert gravel plains and is likely to be found in the project area:

- **Desert-Adapted Plants:** The flora in this area includes a variety of desert-adapted plants that have evolved to survive in arid conditions with limited water availability. These plants have specialized features such as succulent leaves, deep root systems, and water-storing tissues to endure the harsh desert environment.

- **Succulents:** Succulent plants like aloes, euphorbias, and lithops are common in the project area. These plants store water in their fleshy stems or leaves to withstand periods of drought and extreme heat.
- **Grasses and Grass-Like Plants:** Grasses and grass-like plants are found here too, contributing to the overall biodiversity of the area. These plants play a crucial role in stabilizing soil, preventing erosion, and providing forage for grazing animals.
- **Endemic Species:** The area may be home to endemic plant species found only in this specific region of Namibia. These species are often adapted to the local climate, geology, and ecological conditions of the desert area.
- **Wildflowers:** During the brief rainy season, the area may come alive with a variety of wildflowers, adding bursts of color to the arid landscape. These wildflowers bloom in response to seasonal rain and are an integral part of the region's ecosystem.

**Conservation Significance Environmental Implications:** The flora of the area holds both ecological and conservation significance, providing habitat for wildlife, contributing to ecosystem resilience, and supporting the delicate balance of the region's biodiversity.

By understanding and appreciating the diverse flora of the area, one can gain insight into the remarkable adaptations of plants to thrive in challenging desert conditions and contribute to the beauty and ecological richness of the region. No vegetation was observed on the entire project area. On the same note one of the major environmental challenges is illegal collection of plants. In this context the proponent should consider putting anti-plants collection measures in place. There should be zero tolerance to illegal plant collection.

Table 13: List of plants expected to occur in the project area and their conservation status.

| Common Name           | Scientific Name               | Conservation Status |
|-----------------------|-------------------------------|---------------------|
| Shepherd's tree       | <i>Boscia albitrunca</i>      | Protected           |
| Worm-bark false-thorn | <i>Albizia anthelmintica</i>  | Protected           |
| Buffalo-thorn         | <i>Ziziphus mucronata</i>     | Protected           |
| Trumpet thorn         | <i>Catophractes alexandri</i> | Secure              |
| Red bush willow       | <i>Combretum apiculatum</i>   | Secure              |

|                       |                                     |                    |
|-----------------------|-------------------------------------|--------------------|
| Commiphora dinteri    | <i>Namib corkwood</i>               | Endemic            |
| Wolfdoring            | <i>Lycium bosciifolium</i>          | Secure             |
| River honey-thorn     | <i>Lycium hirsutum</i>              | Secure             |
| Ringwood tree         | <i>Maerua schinzii</i>              | Protected          |
| Dinter's bush         | <i>Manuleopsis dinteri</i>          | Endemic            |
| Bitterbusch           | <i>Pechuel-Loeschea leubnitziae</i> | Secure             |
| African star-chestnut | <i>Sterculia africana</i>           | Protected          |
| Camel thorn           | <i>Acacia erioloba</i>              | Protected          |
| Black thorn           | <i>Acacia mellifera</i>             | Secure             |
| False umbrella thorn  | <i>Acacia reficiens</i>             | Secure             |
| Grey camel thorn      | <i>Acacia haematoxylon</i>          | Protected          |
| Sweet thorn           | <i>Acacia karroo</i>                | Secure             |
| Blue thorn            | <i>Acacia erubescens</i>            | Secure             |
| Umbrella thorn        | <i>Acacia tortolis</i>              | Secure             |
| False hook-thorn      | <i>Acacia hereroensis</i>           | Secure             |
| White-stem corkwood   | <i>Commiphora tenuipetiolata</i>    | Secure             |
| African tree grape    | <i>Cyphostemma bainesii</i>         | Endemic, protected |
| Croton gratissimus    | <i>Lavender fever-berry</i>         | Secure             |
| Blue-leaved corkwood  | <i>Commiphora glaucescens</i>       | Nearendemic        |

|                           |                                     |           |
|---------------------------|-------------------------------------|-----------|
| Tall common corkwood      | <i>Commiphora glandulosa</i>        | Secure    |
| Sickle bush               | <i>Dichrostachys cinerea</i>        | Secure    |
| Blue bush                 | <i>Diospyros lycioides</i>          | Secure    |
| Common wild pear          | <i>Dombeya rotundifolia</i>         | Endemic   |
| White puzzle bush         | <i>Ehretia alba</i>                 | Secure    |
| Skew leaved Elephant Root | <i>Elephantorrhiza suffruticosa</i> | Secure    |
| Common guarri             | <i>Euclea undulata</i>              | Secure    |
| Western woody milk bush   | <i>Euphorbia guerichiana</i>        | Secure    |
| Ebony tree                | <i>Euclea pseudebenus</i>           | Protected |
| Milk bush                 | <i>Euphorbia virosa</i>             | Secure    |
| Namaqua fig               | <i>Ficus cordata</i>                | Protected |
| Laurel fig                | <i>Ficus ilicina</i>                | Secure    |
| Common cluster fig        | <i>Ficus sycomorus</i>              | Protected |
| White raisin              | <i>Grewia bicolor</i>               | Secure    |
| Velvet raisin             | <i>Grewia flava</i>                 | Secure    |
| Trumpet flower            | <i>Ipomoea adenioides</i>           | Secure    |
| Sandpaper raisin          | <i>Grewia flavescens</i>            | Secure    |
| Red spike-thorn           | <i>Gymnosporia senegalensis</i>     | Secure    |

However, most of the plants that are likely to occur in the **Namib Desert area** will not be found within the project area due to the limitations set by the predominantly gravel plains and inland shallow soils of the project area, which does not include key intersections with major ephemeral runoff courses that would typically support establishment of these species.

### 6.3. Temperature

- The project area is characterised by a hot climate with daytime temperatures often exceeding 30°C (86°F) to as high as 38°C during the summer months, November to April. Nights can be very cold, with temperatures dropping significantly, especially in the winter months of May to October, (John Mendelsohn, 2002).

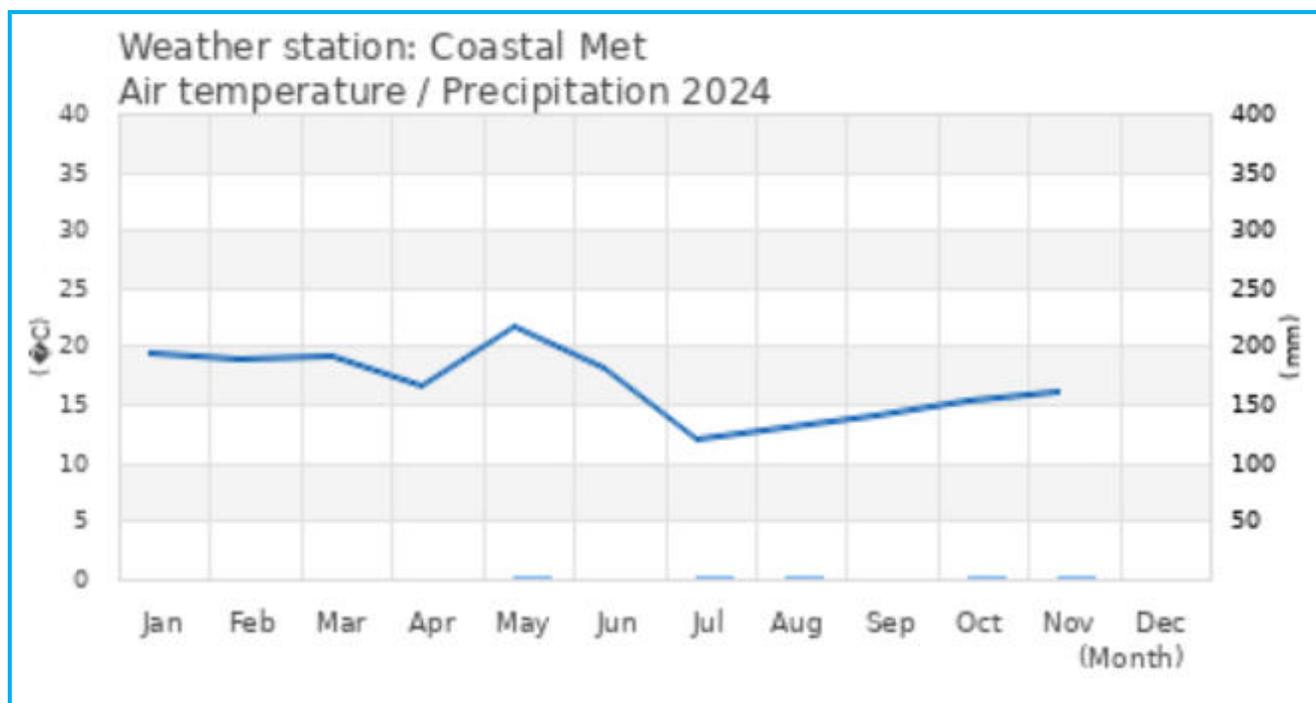


Figure 17: Air temperature and precipitation received in the project area.

### 6.4. Precipitation

- The project area receives low and erratic rainfall, with very little rainfall mostly occurring during the summer months between November and March. Rainfall amounts can vary greatly from year to year and across different areas within and around the project area, (John Mendelsohn, 2002). The area experiences very low rainfall, with an annual average rainfall of 1.02mm. According to the Coastal met station, 12.2 mm of rainfall was received in 2024.

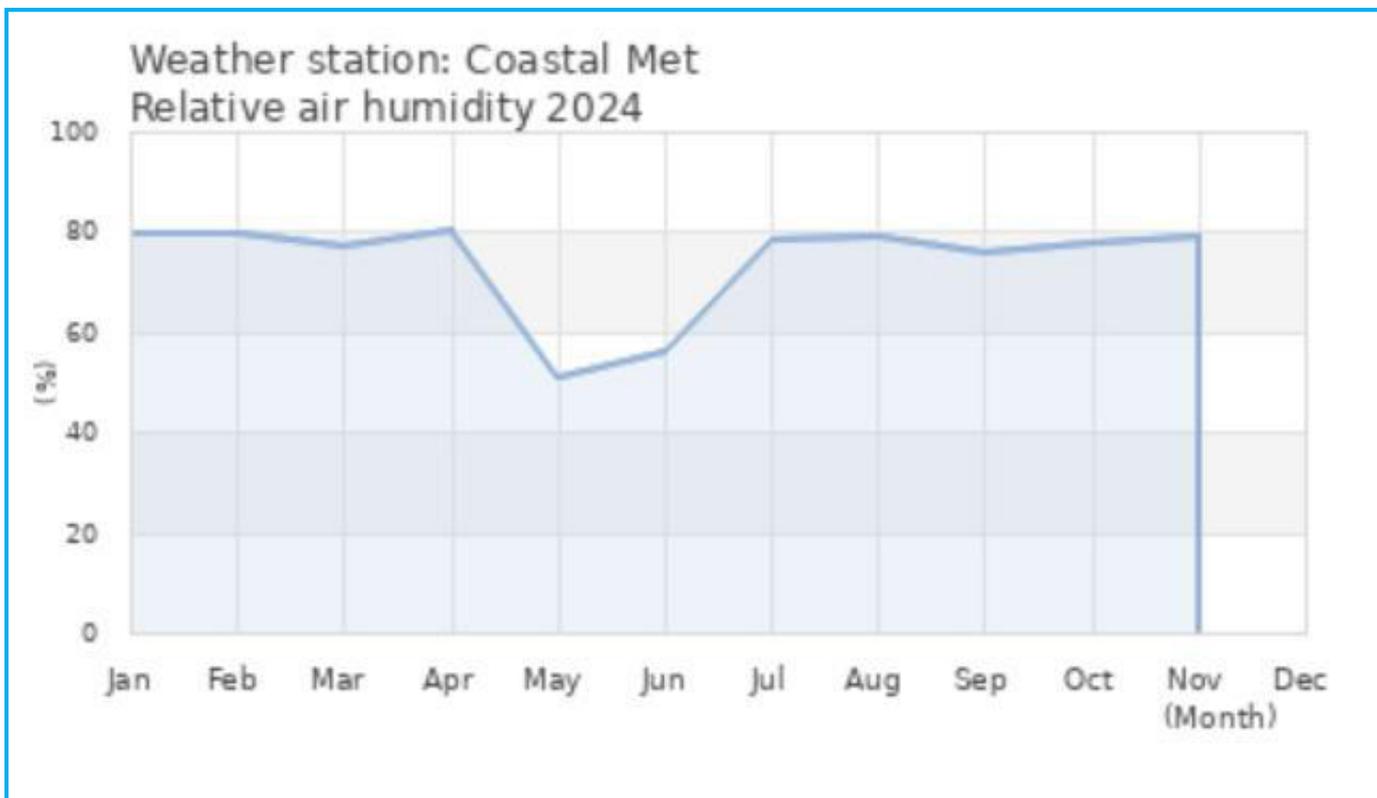


Figure 18: Relative humidity characteristic of the project area, Farm 38 in Walvis Bay.

### 6.5. Seasons

- Summer: Summers in the project area are typically hot, dry, and dusty. Daytime temperatures can be very high, but night-time temperatures are relatively cooler.
- Winter: Winter months (May to August) are milder with warmer days and cooler nights and can drop to below 0°C. It is the dry season with little to no rainfall.

### 6.6. Wind and Air quality.

- Windy conditions are common in the project area, especially during the dry season.
- Strong winds can contribute to high evaporation rates and dry out the already arid landscape.
- Strong winds also determine direction of smoke plume and dispersion from the smoke stack / chimney.

The project area is characterised by windy conditions and has a 13.24 % chance of being calm as portrayed by the wind roses in figure 7 below. Prevailing winds blow from the Southwest and from the Northeast with an equal frequency of at least 20 %. Average wind speed range from 4.2m/s, 5.8m/s to as high as 6m/s blowing from the SE, NE and SW respectively. The air quality in the

Walvis Bay area is generally considered good to moderate, often ranging between 30 and 60 AQI (US EPA index). While typically healthy, the area experiences periodic, localized pollution, primarily caused by fishmeal factory emissions and dust. Concentrations of PM<sub>2.5</sub> and PM<sub>10</sub> are often well below World Health Organization (WHO) guidelines, though can occasionally be elevated due to environmental conditions.

- *Main Pollutants:*

PM<sub>10</sub> (dust) and periodic odor / particulates from industrial fish processing.

- *Health Impact*

The air is usually fresh and safe for outdoor activities, but sensitive groups (those with respiratory issues) should monitor air quality, particularly during times of reported odors.

- *Atmospheric Conditions*

Air quality can fluctuate based on wind and dispersion, especially given the coastal desert environment.

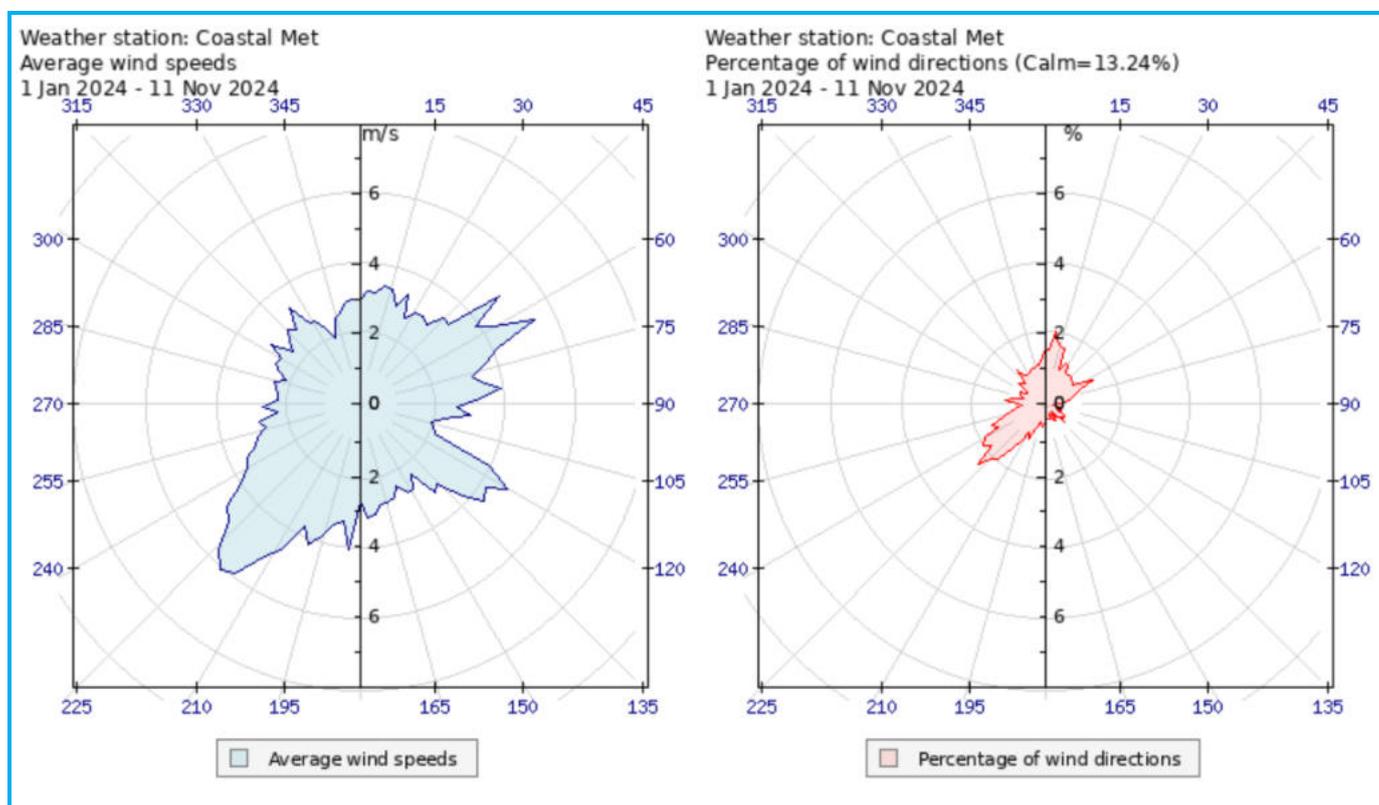


Figure 19: Average wind speeds and directions experienced in the project area.

## 6.7. Environmental Implications

Based on the above the important factors to consider at the various project phases relate to the following:

The quality of emissions from the smelter stacks / chimneys.

- Refers to the constituent elements and gases found in the smoke emissions.

The quantity of emissions from the smelter stacks / chimneys.

- The amount of smoke being emitted from the chimneys which directly translates to the quantity of the various constituent elements and / or gases.

The height of the smokestacks / chimneys.

Proximity or distance of potential emission receptors from the project location.

- The height and distance of potential emission receptors including the weather patterns aid in modelling potential exposure and assess the health risks.
- It is important to incorporate wet scrubbers in the chimneys at the design stage to prevent air pollution.
- The design should incorporate lined wastewater ponds to evaporate the scrubber effluent.

## 6.8. Geology

The geology of the project area in Namibia is characterized by ancient rocks and diverse geological formations that provide insights into the region's geological history. The geological description of the project area follows:

### 6.8.1. Formation and Age of Rocks:

- The project area is part of the Naukluft Mountain Range, which consists of Precambrian rocks, some dating back over 700 million years.
- These ancient rocks include metamorphic and igneous rocks, as well as sedimentary formations that have been subjected to significant tectonic forces over time.

### 6.8.2. Geological Structures:

- The Walvis Bay area exhibits various geological structures such as folds, faults, and fractures, which are a result of past tectonic activity and mountain-building processes.

### 6.8.3. Rock Types:

- The geology of the Walvis Bay area is predominantly granite and includes a range of schist and dolomite in the North West and sands and calcrete covering the South western areas.
- These rocks have undergone extensive geological processes like metamorphism, sedimentation, and volcanic activity, shaping the diverse geological features of the Walvis Bay area.

#### 6.8.4. Mineral Resources:

- The region is known for its mineral deposits, including gemstones like tourmaline, topaz, and quartz, as well as minerals like mica and feldspar.
- These mineral resources have attracted mineral exploration and mining activities, contributing to the region's geological significance. There many different types of mineral licences covering and surrounding the proposed project lease area. This gives an indication of the potential mineral development that is likely to take place in the project area.

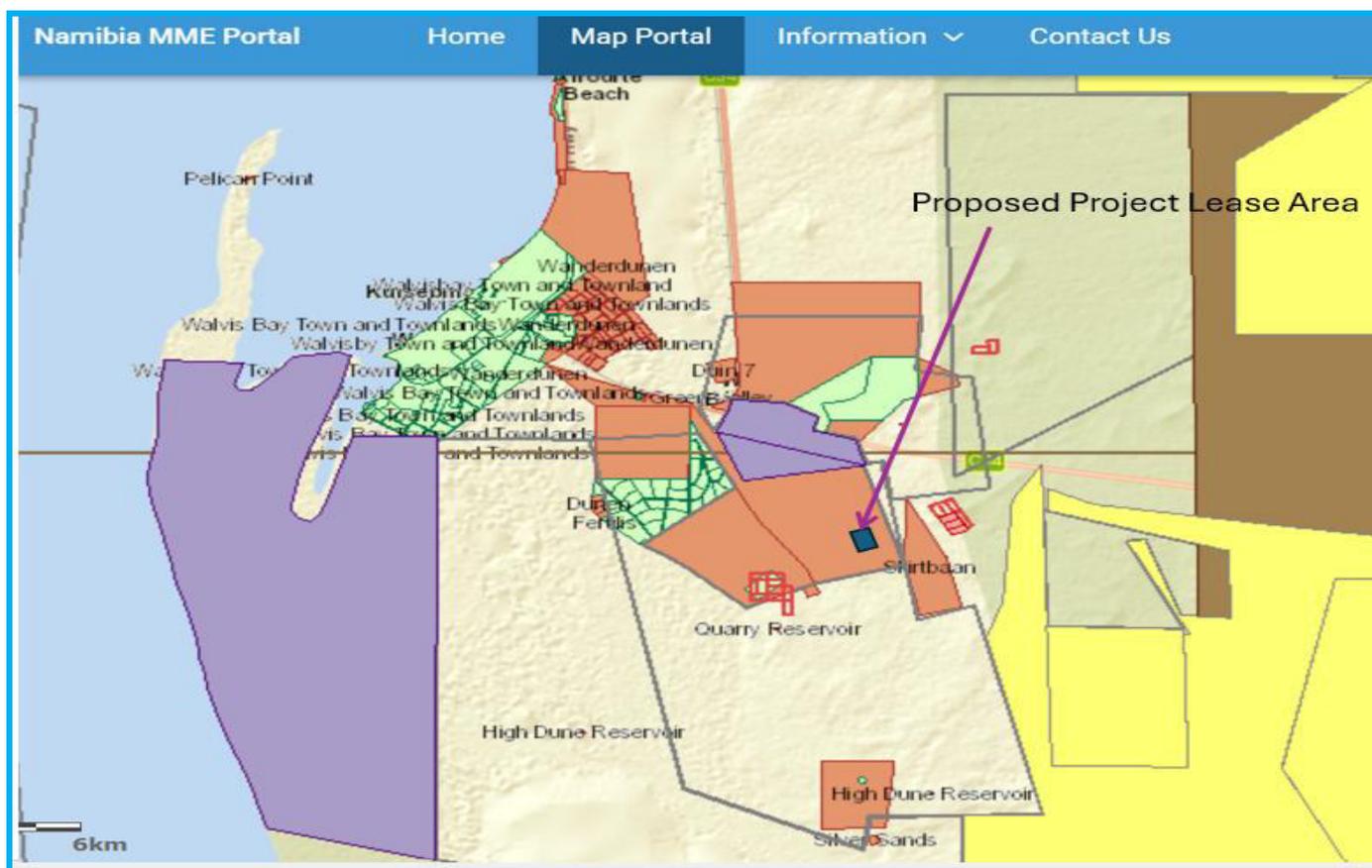


Figure 20: Many mineral licences cover and surround the proposed project lease area.

#### 6.8.5. Geological Significance:

- The project area's geology is of significant interest to geologists, researchers, and nature enthusiasts due to its ancient rock formations, diverse mineral resources, and unique geological features.

The geological diversity and ancient rock formations of the project area make it a fascinating region for geological studies and exploration, offering a glimpse into the Earth's geological past and processes that have shaped the landscape over millennia.

## 6.9. Soils of the project area

The project area is predominantly characterised by alluvium, sand and gravels. Some of the areas are constituted by regosols as shown in the soils map below. Regosols are soils in unconsolidated mineral material of some depth, excluding coarse textured materials and materials with fluvic properties, and have no diagnostic horizons other than an ochric horizon, ([https://www.isric.org/sites/default/files/major\\_soils\\_of\\_the\\_world/set7/gy/gypsisol.pdf](https://www.isric.org/sites/default/files/major_soils_of_the_world/set7/gy/gypsisol.pdf)).

## 6.10. Noise

Noise generated in the project area primarily comes from vehicles driving on the road along the D1983 and ambient noise levels can be low. No sensitive noise receptors were identified in the project area.

## 6.11. Land-use

Residents and tourists to the coastal zone define their quality of life as being enhanced by opportunities for sport, exploring the desert by vehicle, relaxing on the beach, angling or adventure activities. Tourism products in the central Namib include adventure tourism (e.g. parachuting and quad biking), business tourism (e.g. workshops and conferences), consumptive tourism (e.g. hunting and fishing) and ecotourism (excursions into the desert).

There is also the use of the desert landscapes for filming of documentaries, adverts and feature films. In the context of public recreation and tourism, the main impacts likely to result from the mineral exploration activities are visual impacts, leading to compromised natural beauty and deteriorating sense of place; and loss of access to recreation and tourism destinations. The natural beauty and ambience of the desert will be compromised by the scrap metal smelting activities, because even with the best environmental management plans in place, prospecting and mining will result in visually intrusive infrastructure, dust and noise, and will scar the Namib for decades or longer.

At present, the largely undisturbed desert with its dramatic landscapes, interesting biodiversity and sense of place and space attracts numerous tourists very year. The tourism sector is of considerable importance to the Namibian economy, providing over 18,000 direct jobs (5% of total employment), and N\$1,600 million pa in revenue (3.7% of GDP). The sector has seen significant

growth over the past fifteen years, with tourist arrivals increasing more than threefold between 1993 and 2006 (NTB 2007).

The proliferation of mining related infrastructure (e.g. powerlines, pipelines, roads and railways), added to the alienation of land for mining of areas previously used for public recreation and tourism, effectively means that mining may displace tourism if not properly managed, resulting in significant losses for the whole tourism industry. In addition to the erosion of aesthetics and sense of place, the existence of EPLs and mines, and their right to exclude locals and visitors from their areas, limits the places available for tourism and recreation.

#### 6.12. Threats to the conservation efforts in Namib Desert area.

Major threats to conservation efforts in the Namib Desert area include tourism itself because of off-road driving. The impact of this activity is greatest on the gravel plains where depression left by vehicles remain for more than 40 years. Lichens are particularly sensitive to mechanical damage as they grow extremely slowly and cannot quickly repair damaged thalli.

Illegal collection of plants is also a major threat to conservation efforts, and the Proponent will make sure neither employees nor Subcontractor's employees harvest or collect plants illegally. Another more modest threat to the Namib Desert is by the Topnaar pastoralists who graze large herds of goats and small groups of donkeys. The livestock have overgrazed the understory plant growth and fallen seedpods of the riverbeds and are competing for food with wild animals, such as gemsbok. In line with the proposed project, industrial activities also contribute a lot to degradation if not done properly and alter the landscape, contaminating soil & water as well as destroying critical habitats.

## 7. ENVIRONMENTAL IMPACTS ASSESSMENT

### 7.1. Impact Assessment Methodology

This section describes the preliminary identification and consideration of issues and concerns that may impact (positively and/or negatively) the biophysical and socio-economic environments. The issues that were identified as potentially significant during the Scoping Phase form the basis on which further studies, if necessary, will be conducted during the EIA Phase. The identified potential impacts are assessed following a recognized methodology to determine the magnitude of impact and whether the impact was considered significant and thus warrants further investigation. The assessment considered all stages of the project's life cycle (project inception, design, construction, operation, and decommissioning).

### 7.2. Evaluation of identified Potential Impacts

The evaluation of the significance of the impacts was determined using the standard criteria presented below and was guided by Namibia's legal requirements, international best practice and International Finance Corporation (IFC) Performance Standard 1 'Assessment and management of environmental and social risks and impacts as well as Operational Safeguards 1 (OS1).

### 7.3. Description of Potential Impacts

The potential impacts on environmental and social resources arising from the proposed development include direct and indirect impacts. The table below presents the overview of likely aspects arising from each of the key project activities and considers their likely interaction with socio-economic and environmental resources and receptors.

#### 7.3.1. Identified potential positive impacts

##### 7.3.1.1. Employment creation and skills development

Both skilled and unskilled labour will be required during the construction and operational phases of the project. Construction job opportunities are generally temporary and will include ad hoc activities such as digging trenches, loading and off-loading materials and equipment. Anticipated indirect jobs may include provision of services to construction employees e.g. temporary stalls selling food and drinks or any other convenient goods. Most unskilled temporary jobs will be created during the construction phase, 50 to 100 jobs while about 50 additional permanent jobs are expected for the operation of the Smelter Plant as direct jobs (operators, technicians, engineers, administration) and indirect jobs (transport, suppliers, services). There is potentially significant upgrading of local skills through vocational training, upskilling and creation of a local

metallurgical workforce. Potential for local hiring, apprenticeships, and community investment (CSR), reducing poverty and supporting livelihoods. The Proponent is advised to prioritise community members from the neighbouring Farm 37.

#### 7.3.1.2. Local value addition and industrialization

The establishment of the proposed scrap metal smelter plant will contribute towards value addition as it moves the scrap metal up the value chain domestically (from raw scrap to ingots, alloys, finished feedstock and / or products). This also stimulates downstream manufacturing encompassing fabrication, production of various metal components and construction materials.

#### 7.3.1.3. Import substitute and balance-of-payments gains

The establishment of a scrap metal smelter reduces need to import primary or refined metals and semi-finished products which in turn saves foreign exchange. It will also retain value locally as opposed to exporting low-value scrap.

#### 7.3.1.4. Revenue generation and fiscal benefits

Fiscus will significantly gain from the proposed establishment through corporate taxes, payroll taxes, local rates, and royalties where applicable. There will also be significant increase in municipal revenues from business rates and services.

#### 7.3.1.5. SMEs and supply-chain development

Other businesses also tend to benefit from the establishment of such a facility, and this includes but not limited to the growth of small businesses: scrap collection, transport, equipment maintenance, waste handling, catering and security etc. The smelter furnaces consume a lot of electricity energy and that on its own presents opportunities for local suppliers of energy, consumables, and spare parts.

#### 7.3.1.6. Environmental and public health benefits

Environmental and public health co-benefit emanate from the following:

- Reduced landfill and informal burning of scrap (lower air, soil and water pollution).
- Lower primary mining pressure and associated environmental impacts via material circularity.
- Safer handling of hazardous scrap streams (batteries, painted/coated items).

It is important for the Proponent and the design team to optimize the project based on the potentially positive impacts to realize maximum benefits.

- Energy and resource efficiency

Recycling of scrap metal is regarded as secondary production and typically consumes less energy and emits fewer CO<sub>2</sub> per tonne of metal than primary production. This scenario aligns well with low-carbon emissions development goals.

Other benefits include:

- Technology transfer and innovation

The project is likely to introduce metallurgical technologies, pollution control and process management. It also fosters Research & Development and potential local adaptations pyro and hydrometallurgy.

- Rural and urban economic diversification

Creates and improves economic activity in the Walvis Bay port and its industrial and supports economic diversification away from sole reliance on mining or export commodities.

- Strategic metal security and manufacturing competitiveness

Secures supply of secondary metals for local industries (construction, transport, appliances) and improves resilience against global supply shocks.

- Export opportunities and foreign investment attraction

The project creates an opportunity for production of standardized secondary metal products (e.g., aluminium billets, scrap-derived zinc/lead ingots) for regional export. Such a scenario may positively attract downstream investors which is good the economy of the country.

### 7.3.2. Identified potential negative impacts

As aforementioned potential negative impacts emanating from planned project activities at each project phase were identified and are presented in the following table below:

Table 14: Identified potential negative and / or positive impacts emanating from the proposed project.

| <b>Inception</b>   |                             |   |   |  |
|--|-----------------------------|---|---|--|
| <b>Project activity</b>  | <b>Environmental aspect</b> | <b>Identified impact</b>                    | <b>Nature of impact<br/>(Positive /<br/>Negative)</b> | <b>Assessment finding (s)</b>  |
| Poor communication / misinterpretation of project requirements / Client's needs  | Economic                    | Rework / time loss                          | Negative  | If the project requirements are misunderstood, there will be rework and loss of time which impacts negatively on project costs. This phase was successfully completed and the Inception report approved to pave way into the next phases (Design development and Preliminary design phases). |
| <b>Design phase (Design development, Preliminary and detailed design phases)</b> |                             |   |   |  |
| <b>Project activity</b>  | <b>Environmental aspect</b> | <b>Identified impact</b>                    | <b>Nature of impact<br/>(Positive /<br/>Negative)</b> | <b>Assessment finding (s)</b>  |
| Design of required infrastructure  | Occupational health         | Hazardous chemicals, equipment or materials | Negative  | The choice of technology dictates the nature of associated chemicals and materials some of which may be hazardous to health.   |



| <b>Project activity</b>               | <b>Environmental aspect</b> | <b>Identified impact</b>              | <b>Nature of impact (Positive / Negative)</b> | <b>Assessment finding (s)</b>   |
|---------------------------------------|-----------------------------|---------------------------------------|---|---|
| Design of the required infrastructure | Socio-economic              | Inadequate / Insufficient electricity | Negative                                      | Poor design due to inadequate capacity of substations and evacuation lines. |

**Construction phase**

| <b>Project activity</b>     | <b>Environmental aspect</b> | <b>Identified impact</b>                                      | <b>Nature of impact (Positive / Negative)</b> | <b>Assessment finding (s)</b>  |
|-----------------------------|-----------------------------|---|---|--|
| Mobilization and camp setup | Biophysical                 | Loss of protected plants due to collection                    | Negative                                      | Construction workers should stay in Walvis Bay away from site and collection of protected plants should not be tolerated at all. Domestic waste will be generated at the campsite. There is potential to spill petroleum products from the storage facilities or from the workshop area during maintenance of construction machinery or equipment which can cause soil and ground water contamination. Further to that petroleum products are highly inflammable making them hazardous to the workers and nearby homesteads. |
|                             | Waste management            | Indiscriminate dumping of solid and discharge of liquid waste | Negative                                      |  |
|                             | Occupational                | Storage of  | Negative                                      |  |

|  |                             |                                     |   |  |
|--|-----------------------------|-------------------------------------|---|--|
|  | hazard                      | hazardous substances or materials   |   |  |
|  | Biophysical                 | Soil and ground water contamination | Negative                                      |  |
| <b>Project activity</b>                            | <b>Environmental aspect</b> | <b>Identified impact</b>            | <b>Nature of impact (Positive / Negative)</b> | <b>Assessment finding (s)</b>  |
| Recruitment of workers or employees by contractors | Socio-economic              | Influx of people looking for jobs   | Negative                                      | High influx of people looking for jobs is usually driven by recruitment of workers onsite and as a result people are motivated to visit in the morning to try their luck. Influx from communities further away from project area disrupts normal social set up of communities living in the project area causing possible decay of morality, increase in school drop-outs due to available unskilled labour, possible child labour and increased HIV/AIDS incidence and communicable diseases. Reference is made to Farm 37 neighbouring residential area. |
|  | Gender                      | Sexual exploitation and abuse (SEA) | Negative                                      | This refers to sexual abuse of local community members by project employees especially when there is lack awareness of prohibition of sexual abuse. SEA should not be tolerated neither at work nor in the community.  |
| Sourcing of  | Socio-economic              | Increased cash                      | Positive                                      | It is convenient for contractors to source their materials locally   |

|                        |                |                          |          |   |
|------------------------|----------------|--------------------------|----------|---|
| construction materials |                | flow to local businesses |          | whenever possible leading to increased sales for the local businesses.  |
|                        | Socio-economic | Increased traffic flow   | Negative | There will be specialised equipment and materials that contractors will need to import from major cities and towns or from outside the country. This will lead to increase in traffic flow and sometimes abnormal loads depending on nature of the equipment. |
| Earthworks             | Air quality    | Dust emissions           | Negative | Excavation activities during the construction phase results in dust emissions when soil is dry.   |
|                        | Biophysical    | Noise and vibrations     | Negative | Heavy machinery, generators and other equipment and machinery used onsite will generate localised noise and vibrations at the area of work.   |

### Operation phase

|   |                                |          |          |  |
|---|--------------------------------|----------|----------|--|
| Smelter plant, Leaching plants, Electrowinning plants and Sludge drying ponds | Occupational health and safety | Injuries | Negative | Operators may be injured if they lack knowledge and skills to operate water infrastructure equipment. Lack of appropriate personal protective equipment may result in injury to work personnel. Experiences with ponds have shown that people become curious and want to see what happens there resulting in injuries or drowning and / or loss of life. |
|---|--------------------------------|----------|----------|--|

### Decommissioning phase

The development of a smelter plant for recycling scrap metal is a medium to long term project, and it is not anticipated that the developed infrastructure will be decommissioned in the short-term. As a result, no decommissioning was considered under this ESIA study but should be

done at the time of decommissioning in the future. The future environmental conditions under which decommissioning may take place will be different and will only be justifiable to develop a decommissioning plan then. However, a generic decommissioning procedure or guideline was developed and forms part of the ESMP for this particular project.

Table 15: Impact Assessment Criteria (IFC, 2012)

| <b>Duration – What is the length of the negative impact?</b>   |  |
|--|--|
| None   | No Effect  |
| Short  | Less than one year   |
| Moderate   | One to ten years   |
| Permanent  | Irreversible   |
| <b>Magnitude – What is the effect on the resource within the study area?</b>   |  |
| None   | No Effect  |
| Small  | Affecting less than 1% of the resource                                   |
| Moderate   | Affecting 1-10% of the resource  |
| Great  | Affecting greater than 10% of the resource                               |
| <b>Spatial Extent – what is the scale of the impact in terms of area, considering cumulative impacts and international importance?</b> |  |
| Local  | In the immediate area of the impact                                      |
| Regional / National  | Having large-scale impacts   |
| International  | Having international importance  |
| <b>Type – What is the impact</b>   |  |
| Direct   | Caused by the project and occur simultaneously with project activities   |
| Indirect   | Associated with the project and may occur at a later time or wider area  |
| Cumulative   | Combined effects of the project with other existing / planned activities |
| <b>Probability</b>   |  |
| Low  | <25%   |
| Medium   | 25-75%   |
| High   | >75%   |

### 7.3.2.1. Impact Significance

Impact significance is determined through a synthesis of the above impact characteristics. The significance of the impact “without mitigation” is the main determinant of the nature and degree of mitigation required. Once the above factors (in **Table 15**) have been ranked for each potential impact, the impact significance of each is assessed using the criteria in **Table 16**. The impact significance will then be rated according to the significance classes (also presented in **Table 16**).

Table 16: Impact significance (IFC, 2012)

| Class | Significance    | Descriptions  |
|-------|-----------------|---|
| 1     | Major Impact    | Impacts are expected to be permanent and non-reversible on a national scale and/or have international significance or result in legislative non-compliance. |
| 2     | Moderate Impact | Impacts are long-term, but reversible and/or have regional significance.  |
| 3     | Minor           | Impacts are considered short-term, reversible, and/or localized in extent.  |
| 4     | Insignificant   | No impact is expected.  |
| 5     | Unknown         | There are insufficient data on which to assess significance.  |
| 6     | Positive        | Impacts are beneficial  |

The impacts assessment will also be done in conjunction with the IFC’s key environmental policies triggered and these are presented in **Table 13** below.

Table 17: International Finance Corporation (IFC) Key Environmental Policies Triggered

| No. | IFC's Key Environmental issues triggered                     | Key    | Yes   | No    |
|-----|--|--------|-------|-------|
| 1.  | Reversing Land Degradation and Desertification (RLDD)        | RLDD   | [√]   | [...] |
| 2.  | Protecting the Coastal Zone (PCZ) etc                        | PCZ    | [...] | [√]   |
| 3.  | Protecting Global Public Goods                               | PGPG   | [√]   | [..]  |
| 4.  | Improving Public Health                                      | IPH    | [√]   | [..]  |
| 5.  | Enhancing Disaster Management Capabilities                   | EDMC   | [√]   | [..]  |
| 6.  | Promoting Sustainable Industry, Mining, and Energy Resources | PSIMER | [√]   | [..]  |
| 7.  | Improving Urban Environmental Management                     | IUME   | [..]  | [√]   |
| 8.  | Environmental Governance                                     | EG     | [√]   | [..]  |
| 9.  | Institution and Capacity Building                            | ICB    | [√]   | [..]  |
| 10. | Increasing Awareness   | IA     | [√]   | [..]  |
| 11. | Stakeholder Participation                                    | SP     | [√]   | [..]  |

The potential impacts stemming from the proposed project activities are assessed per project component/type of activities.

Table 18: Environmental Impacts Identification and Evaluation.

| IMPACT / ACTIVITY                         | AFFECTED ENVIRONMENTAL AND SOCIAL COMPONENTS |       |       |          |          |        |             |       |        |                |             |             |        |           | Project phase | Duration  | Magnitude with project | Extent / Spatial scale | Type   | Probability        | Significance without mitigation |
|---|--|-------|-------|----------|----------|--------|-------------|-------|--------|----------------|-------------|-------------|--------|-----------|---------------|-----------|------------------------|------------------------|--------|--------------------|---------------------------------|
|   | FAUNA AND                                    | WATER | WATER | LAND USE | SOIL AND | VISUAL | AIR QUALITY | HUMAN | PUBLIC | INFRASTRUCTURE | AGRICULTURE | ARCHAEOLOGY | PUBLIC | SOURCE OF |               |           |                        |                        |        |                    |                                 |
| Vegetation Clearing                       | √  | √     | √     | √        | √        | √      | √           |       | √      |                | √           |             | √      | √         | CO            | Short     | Small                  | Local                  | Direct | Medium<br>25 - 75% | Minor (-)                       |
| Air pollution                             | √  | √     | √     | √        |          | √      | √           | √     | √      |                |             |             | √      | √         | CO            | Short     | Moderate               | Local                  | Direct | Medium<br>25 - 75% | Major (-)                       |
| Soil pollution                            | √  | √     | √     | √        | √        | √      |             | √     | √      | √              |             |             |        | √         | CO            | Short     | Small                  | Local                  | Direct | Medium<br>25 - 75% | Moderate (-)                    |
| Soil erosion                              | √  | √     | √     | √        | √        | √      |             | √     | √      | √              |             |             |        | √         | CO            | Short     | Small                  | Local                  | Direct | Medium<br>25 - 75% | Minor (-)                       |
| Solid waste Generation                    | √  | √     | √     | √        |          | √      | √           | √     | √      | √              |             |             | √      | √         | CO            | Short     | Moderate               | Local                  | Direct | Medium<br>25 - 75% | Moderate (-)                    |
| Vehicular Movements                       | √  |       |       | √        | √        |        | √           | √     |        |                |             |             | √      |           | C             | Short     | Small                  | Local                  | Direct | Medium<br>25 - 75% | Minor (-)                       |
| Hazardous Substances storage and handling | √  | √     |       |          | √        |        | √           |       |        |                |             |             | √      |           | CO            | Permanent | Moderate               | Local                  | Direct | Medium<br>25 - 75% | Major (+)                       |

| IMPACT / ACTIVITY                   | AFFECTED ENVIRONMENTAL AND SOCIAL COMPONENTS |       |       |          |          |        |             |       |        |                |             |             |        |           | Project phase | Duration | Magnitude with project | Extent / Spatial scale | Type   | Probability | Significance without mitigation |                         |
|-------------------------------------|--|-------|-------|----------|----------|--------|-------------|-------|--------|----------------|-------------|-------------|--------|-----------|---------------|----------|------------------------|------------------------|--------|-------------|---------------------------------|-------------------------|
|                                     | FAUNA AND                                    | WATER | WATER | LAND USE | SOIL AND | VISUAL | AIR QUALITY | HUMAN | PUBLIC | INFRASTRUCTURE | AGRICULTURE | ARCHAEOLOGY | PUBLIC | SOURCE OF |               |          |                        |                        |        |             |                                 | CULTURE &               |
| Construction of Sludge drying Ponds | √  | √     | √     | √        | √        | √      | √           |       | √      | √              |             |             | √      | √         |               | C        | Short                  | Small                  | Local  | Direct      | Medium<br>25 - 75%              | Minor (-)               |
| Excavation of electrical trenches   | √  | √     | √     | √        | √        | √      | √           |       | √      | √              |             |             | √      | √         |               | C        | Short                  | Small                  | Local  | Direct      | Medium<br>25 - 75%              | Minor (-)               |
| Setting-up of construction camps    | √  | √     | √     | √        | √        | √      | √           |       | √      | √              |             |             | √      | √         |               | C        | Short                  | Small                  | Local  | Direct      | Medium<br>25 - 75%              | Minor (-)               |
| Sludge treatment                    | √  | √     |       | √        |          | √      |             | √     | √      |                |             |             | √      |           |               | O        | Permanent              | Small                  | Local  | Direct      | Medium<br>25 - 75%              | Moderate (-)            |
| Social Aspects Proliferation        |  |       |       |          |          | √      |             | √     | √      | √              | √           | √           | √      | √         | √             | C        | Short                  | Small                  | Local  | Direct      | Low<br><25%                     | Beneficial<br>Minor (+) |
| Boost in                            | √  | √     | √     | √        | √        | √      |             | √     |        | √              | √           |             | √      | √         | √             | O        | Permanent              | High                   | Region | Direct      | High                            | Beneficial              |

| IMPACT / ACTIVITY               | AFFECTED ENVIRONMENTAL AND SOCIAL COMPONENTS |       |       |          |          |        |             |       |        |                |             |             |        |           | Project phase | Duration | Magnitude with project | Extent / Spatial scale | Type     | Probability | Significance without mitigation |                      |
|---------------------------------|--|-------|-------|----------|----------|--------|-------------|-------|--------|----------------|-------------|-------------|--------|-----------|---------------|----------|------------------------|------------------------|----------|-------------|---------------------------------|----------------------|
|                                 | FAUNA AND                                    | WATER | WATER | LAND USE | SOIL AND | VISUAL | AIR QUALITY | HUMAN | PUBLIC | INFRASTRUCTURE | AGRICULTURE | ARCHAEOLOGY | PUBLIC | SOURCE OF |               |          |                        |                        |          |             |                                 | CULTURE &            |
| water reliant activities        |  |       |       |          |          |        |             |       |        |                |             |             |        |           |               |          | ent                    |                        | al       |             | >75%                            | Minor (+)            |
| Employment Creation             | √  |       |       | √        | √        |        |             | √     |        | √              | √           |             | √      | √         | √             | CO       | Permanent              | High                   | Regional | Direct      | High >75%                       | Beneficial Major (+) |
| Livelihoods Development         |  |       |       | √        |          |        |             |       |        |                |             |             | √      |           | √             | O        | Permanent              | Moderate               | Regional | Direct      | High >75%                       | Beneficial Minor (+) |
| Climate Resilience              | √  | √     | √     | √        |          |        |             | √     |        |                | √           |             |        |           |               | O        | Permanent              | Moderate               | Regional | Direct      | Medium 25 - 75%                 | Beneficial Minor (+) |
| Inclusion of Women and Children | √  | √     | √     |          |          |        |             |       |        |                | √           |             | √      | √         | √             | CO       | Permanent              | Moderate               | Regional | Direct      | Medium 25 - 75%                 | Beneficial Minor (+) |
| Sanitation and Health Improved  |  | √     | √     |          |          |        |             |       |        | √              | √           |             | √      |           |               | O        | Permanent              | High                   | Regional | Direct      | High >75%                       | Beneficial Major (+) |
| Developed Water                 |  | √     | √     |          |          |        |             |       |        |                | √           |             | √      |           |               | O        | Permanent              | High                   | Regional | Direct      | High >75%                       | Beneficial Minor (+) |

| IMPACT / ACTIVITY                        | AFFECTED ENVIRONMENTAL AND SOCIAL COMPONENTS |       |       |          |          |        |             |       |        |                |             |             |        |           | Project phase | Duration | Magnitude with project | Extent / Spatial scale | Type  | Probability | Significance without mitigation |           |
|--|--|-------|-------|----------|----------|--------|-------------|-------|--------|----------------|-------------|-------------|--------|-----------|---------------|----------|------------------------|------------------------|-------|-------------|---------------------------------|-----------|
|  | FAUNA AND                                    | WATER | WATER | LAND USE | SOIL AND | VISUAL | AIR QUALITY | HUMAN | PUBLIC | INFRASTRUCTURE | AGRICULTURE | ARCHAEOLOGY | PUBLIC | SOURCE OF |               |          |                        |                        |       |             |                                 | CULTURE & |
| administrative system                    |  |       |       |          |          |        |             |       |        |                |             |             |        |           |               |          |                        |                        |       |             |                                 |           |
| Land Use change                          | √  | √     | √     | √        | √        | √      |             | √     | √      |                | √           | √           |        | √         | √             | CO       | Permanent              | Medium                 | Local | Direct      | Medium 25 - 75%                 | Minor (-) |
| Occupational Hazards                     |  |       |       |          |          |        |             |       |        |                |             |             | √      |           |               | C        | Short                  | Small                  | Local | Direct      | Medium 25 - 75%                 | Minor (-) |
| Pressure on local services and Resources | √  |       | √     | √        | √        |        |             | √     | √      | √              | √           |             |        | √         |               | CO       | Short                  | Medium                 | Local | Indirect    | Medium 25 - 75%                 | Minor (-) |
|  |  |       |       |          |          |        |             |       |        |                |             |             |        |           |               |          |                        |                        |       |             |                                 |           |

Key: I – Inception phase, Design phase, O – Operation phase, CO – Construction and Operation phases, C – Construction phase

#### 7.4. Summary of potential negative impacts considered insignificant

Table 19: Summary of environmental and social impacts considered insignificant.

| <b>Environmental / Social Aspect</b> | <b>Project phase</b> | <b>Nature of Impact (Positive / Negative)</b> | <b>Potential Impact</b>  | <b>Assessment findings</b>   |
|--------------------------------------|----------------------|---|--|--|
| Land use change                      | Operation            | Positive                                      | The area will now support industrial activity.   | This is a positive economic development.   |
| Cultural heritage                    | Construction         | Negative                                      | Potential to uncover heritage remains during project activities.                                 | Findings are unlikely, as no known heritage sites are mapped and protected in the project area.                  |
| Climate change adaptation            | Operation            | Negative                                      | The potential for climate change to impact the proposed project.                                 | The proposed project is unlikely to be affected by potential climate change impacts in the short to medium term. |
| Climate change cause / contribution  | Construction         | Negative                                      | The proposed project contributing to climate change through the emissions of Green House Gasses. | The proposed project is of a medium term, with construction envisioned to be completed after a few years.        |

#### 7.5. Potentially Significant Impacts to be scoped into the ESMP and proposed mitigation measures.

The following section describes potentially significant issues based on the findings from the site visit and consultations held with IAPs. Many of these impacts can be adequately addressed through the implementation of appropriate mitigation and management measures and are those inherent to the construction and operation phases of the project cycle.

Table 20: Proposed mitigation / enhancement measures.

| <b>Construction phase</b> |                             |   |   |   |  |
|---------------------------|-----------------------------|---|---|---|--|
| <b>Project activity</b>   | <b>Environmental aspect</b> | <b>Identified impact</b>                                      | <b>Nature of impact (Positive / Negative)</b> | <b>Assessment finding (s)</b>   | <b>Mitigation measure(s)</b>   |
| Construction camp setup   | Waste management            | Indiscriminate dumping of solid and discharge of liquid waste | Negative                                      | Domestic waste will be generated at the campsite.   | Dispose of domestic waste generated at a designated waste disposal site while mobile toilets can be used for sanitation purposes.                    |
|                           | Occupational hazard         | Storage of petroleum products such as diesel.                 | Negative                                      | Further to that petroleum products are highly inflammable making them hazardous to the workers.   | No naked flames or smoking and open fires should be allowed in the campsite. Fire extinguishers must be kept onsite for use in case of emergency.    |
|                           | Biophysical                 | Soil contamination  | Negative                                      | There is potential to spill petroleum products from the storage facilities or from the workshop area during maintenance of construction machinery or equipment which can cause soil | Above ground fuel storage tanks must be bund walled with concrete waterproof floors to contain and prevent seepage of spilled fuel, workshops should |

|  |  |  |  |                |                                |
|--|--|--|--|----------------|--------------------------------|
|  |  |  |  | contamination. | be fitted with oil separators. |
|--|--|--|--|----------------|--------------------------------|

| <b>Project activity</b>                                    | <b>Environmental aspect</b>      | <b>Identified impact</b>                | <b>Nature of impact (Positive / Negative)</b> | <b>Assessment finding (s)</b>   | <b>Mitigation measure(s)</b>  |
|--|----------------------------------|---|---|---|---|
| Sourcing of construction materials                         | Socio-economic<br>Socio-economic | Increased cash flow to local businesses | Positive                                      | It is convenient for contractors to source their materials locally leading to increased sales for the local businesses.   | Encourage the contractors to buy as much as they can locally to improve local cash flow and reduce the carbon footprint as well.                              |
|  |                                  | Increased traffic flow                  | Negative                                      | There will be specialised equipment and materials that contractors will need to import from major cities and towns or from outside the country. This will lead to increase in traffic flow and sometimes abnormal loads depending on nature of the equipment. | There should be good signage and lighting put along the roads in the project area to control / guide traffic flow to avoid accidents and traffic disruptions. |
| Installation of electricity equipment and supply lines etc |                                  | Disruption of electricity supply        | Negative                                      | Electricity supply will be put offline to install new equipment and supply lines, test and commission and requires shutting down existing electricity supply.   | Stakeholders should be informed earlier of planned / scheduled electricity supply cuts when there is work in progress.  |

| <b>Project activity</b>                            | <b>Environmental aspect</b> | <b>Identified impact</b>          | <b>Nature of impact (Positive / Negative)</b> | <b>Assessment finding (s)</b>  | <b>Mitigation measure(s)</b>  |
|--|-----------------------------|-----------------------------------|---|--|---|
| Recruitment of workers or employees by contractors | Socio-economic              | Influx of people looking for jobs | Negative                                      | High influx of people looking for jobs is usually driven by recruitment of workers onsite and as a result people are motivated to visit in the morning to try their luck. Influx from communities further away from project area disrupts normal social set up of communities living in the project area causing possible decay of morality, increase in school drop-outs due to available unskilled labour, possible child labour and increased HIV/AIDS incidence and communicable diseases. | Encourage recruiting workers from the locals i.e., nearby town and villages. No workers should be recruited at the work area or campsite. All Contractors should have an HIV / AIDS and gender policy in place and conduct awareness trainings and campaigns targeting their workers. |
|  | Gender                      | Sexual exploitation and abuse     | Negative                                      | This refers to sexual abuse of local community members by project employees especially when there is lack of awareness of prohibition and expected   |   |

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|  |  |  |  | conduct. |  |
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| <b>Project activity</b>                                     | <b>Environmental aspect</b>  | <b>Identified impact</b> | <b>Nature of impact (Positive / Negative)</b> | <b>Assessment finding (s)</b>  | <b>Mitigation measure(s)</b>  |
|---|------------------------------|--------------------------|---|--|---|
| Excavations during construction.e.g. laying of water pipes. | Air quality                  | Noise pollution          | Negative                                      | Noisy and vibration are an issue to the workers and public in general. Prolonged exposure to noise, especially for the workers is hazardous to health. | Ensure construction equipment and machinery is well serviced and maintained to avoid unnecessary noise and vibrations. Ensure workers are provided with adequate and appropriate personal protective equipment and awareness training on health and safety. |
|   | Occupational health & safety | Injuries                 | Negative                                      | Heavy mobile construction equipment poses safety hazards to the Operators due to mobility of equipment, moving parts or components of the equipment.   | Ensure workers are provided with adequate and appropriate personal protective equipment and that they use appropriately during work.  |
|   | Air quality                  | Dust emissions           | Negative                                      | Excavation activities during the construction phase results in dust emissions when soil is dry.  | Ensure workers are provided with adequate and appropriate personal protective equipment   |

|  |                                |          |          |  |  |
|--|--------------------------------|----------|----------|--|--|
|  |                                |          |          |  | (dust masks) and that they use appropriately during work. Encourage wetting surfaces when working on dry soil.   |
| <b>Operation</b>   |                                |          |          |  |  |
| Operation of the developed smelter infrastructural equipment, sludge drying ponds and pump stations etc. | Occupational health and safety | Injuries | Negative | Operators may be injured if they lack knowledge and skills to operate the equipment. Lack of appropriate personal protective equipment may result in injury to work personnel. | This can be mitigated through capacity building and training. Workers should also be given adequate and appropriate personal protective equipment. Infrastructure should be fenced off to avoid unwanted access. |
| Operation of smelter plant   | Waste management               | Waste    | Negative | The operation of electrowinning and leach plant will generate sludge.  | Evaporate the sludge concentrate and explore the value of the recovered material.  |

## 7.6. Mitigation Measures

Mitigation measures focus on reducing the effects of the potential environmental and social impacts identified and to ensure that an acceptable measure of mitigation can be maintained when an impact cannot be avoided completely. An ESMP has been developed, and it sets out the management plans/actions (that will ensure that all proposed mitigation measures are implemented), responsible parties for implementation, monitoring and enforcement, monitoring indicators and indicators for the respective impacts.

## 7.7. Plan of study / proposed action plan

### 7.7.1. Public Participation during ESIA Phase

The final ESR will be submitted to MEFT for review and feedback will be communicated to the Client and all registered stakeholders. The ESR and ESMP will be shared with the Client for comments before being shared with stakeholders for review. Registered stakeholders will be notified of the availability of the draft ESR and ESMP and allowed 14 days to comment. Notices will be published at the venues in the region, print media and the national radio. A series of stakeholder disclosure meetings will be conducted at the same venues used during the scoping phase to present the ESR and ESMP. Minutes of the meetings will be captured and used to generate a comments and response report. Comments will be moderated and incorporated before submission to the Client for final approval. The database containing registered I&APs will be updated as and when necessary, during the progression of the ESIA process.

## 8. CONCLUSION AND WAY FORWARD

### 8.1. Conclusion

Through the scoping process, it was found that there were no significant impacts emanating from this project that warrant conducting specialist studies nor detailed Environmental and Social Impact Assessments. This is mainly because the project footprint is on previously disturbed land containing neighbouring existing infrastructure and industries. In the absence of fauna and flora potential impacts are minimal or minor in that respect. The planned smelter plant will be accessed using existing roads. Potential negative biophysical impacts identified were temporary and moderate and can be significantly reduced through implementation of the proposed mitigation measures focused on stack emissions cleaning to remove SO<sub>x</sub>, fluoro-polymers and dust. Wastewater should be treated before disposal and slag disposed of safely.

Therefore, it is concluded that all possible environmental aspects associated with the proposed activities can be mitigated through management actions implemented during the planning, construction, operation and decommissioning phases of the project. The ESMP developed for the project must be implemented during all the project phases. It is the opinion of the EAP that the scoping process was done in an objective manner and the ESR and the EMP contain all necessary control, mitigation and monitoring measures formulated to meet statutory requirements. Therefore, it is recommended that the project be granted an Environmental Clearance, assuming the ESMP is implemented.

## 9. REFERENCES

- Angula, M. N. (2016). The changing climate and human vulnerability in north-central Namibia. *Jamba: Journal of Disaster Risk Studies*, 8(2), 1 - 7.
- Burke, A. (2004). *Wild Flowers of the Southern Namib*. Windhoek: Namibia Scientific Society.
- Carruthers, J. (2008). Conservation and Wildlife Management in South African National Parks 1930s–1960s. *Journal of the History of Biology* 41, 203-236.
- Carvalho, J. H. (2008). Decision criteria for the exploration of ornamental-stone deposits: Application to the marbles of the Portuguese Estremoz Anticline. *International Journal of Rock Mechanics and Mining Sciences*, 10 -16.
- Christelis, G, S. W. (2011). *Groundwater in Namibia: An explanation to the Hydrological Map*. Windhoek: Department of Water Affairs.
- Giess, W. (1998). A preliminary vegetation map of Namibia. *Dinteria*, 60 -65.
- Greg Christelis, F. S. (2015, September). *GEF Transboundary Water Assessment Programme*. Retrieved from GEF Transboundary Water Assessment Programme: <https://ggis.un-igrac.org/documents/1619/download>
- John Mendelsohn, A. J. (2002). Atlas of Namibia: A portrait of the Land and its People. *ResearchGate*.
- Ministry of Environment, Forestry & Tourism. (2013). *Management Plan:- Namib Naukluft Park*. Windhoek: Directorate of Regional Services & Park Management.
- Motloung, I. A. (2008). Dimension Stone: The latest trends in exploration and production technology. *Southern African Institute of Mining and Metallurgy - Surface Mining*, 50-62.
- Nakanyete, N. F. (2020). Communal land tenure security for widows in the Eenhana Constituency of the Ohangwena Region, Namibia. *Journal of International Women's Studies*, 21 (1), 131 - 147.
- Namibia, R. o. (2010, October 01). *Adaptation*. Retrieved from United Nations Development Programme Namibia: [https://www.adaptation-undp.org/sites/default/files/downloads/namibia\\_nationalclimatechangeepolicyfornamib.pdf](https://www.adaptation-undp.org/sites/default/files/downloads/namibia_nationalclimatechangeepolicyfornamib.pdf)
- Namibia, R. o. (2021, December 6). *Law and Environmental Assistance Platform*. Retrieved from United Nations Environment Programme: <https://leap.unep.org/countries/na/national-legislation/forest-act-2001-no-12-2001>
- NSA. (2011). *Namibia 2011 Population and Housing Census Main Report*. Windhoek: Republic of Namibia.
- Pohamba-Ndume, K. N. (2016). *An investigation into the poverty situation of the Hai//Om people resettled at Okongo constituency in the Ohangwena Region*. Windhoek: University of Namibia.
- Raison. (2011, June 01). *E-Library*. Retrieved from Environmental Information Service Namibia: [http://the-eis.com/elibrary/sites/default/files/downloads/literature/Cuvelai\\_poster\\_Vegetation\\_lowres.pdf](http://the-eis.com/elibrary/sites/default/files/downloads/literature/Cuvelai_poster_Vegetation_lowres.pdf)
- SAIEA. (2010). *Strategic Environmental Assessment for the Central Namib Uranium Rush Main Report*. Windhoek: Ministry of Mines and Energy.
- Sorensen, P. (2013). The massive Ohangwena II aquifer in northern Namibia. *International Journal of Environmental Studies*, 173 to 174. Retrieved from <https://www.tandfonline.com/doi/full/10.1080/00207233.2013.779149?scroll=top&needAccess=true>
- Weber, E. A. (2016, February 01). *Research*. Retrieved from Green Policy Platform: <https://www.greengrowthknowledge.org/research/equator-principles-do-they-make-banks-more-sustainable>