ECC

ENVIRONMENTAL
COMPLIANCE CONSULTANCY






ECC-99-353-REP-05-D

ENVIRONMENTAL CLEARANCE AMENDEMENT APPLICATION

AMENDMENT TO THE NAMZINC REFINERY TO INCREASE OUTPUT PRODUCTION TO 300 000 TONNES PER ANNUM OF REFINED ZINC METAL,

!KARAS REGION, NAMIBIA

PREPARED FOR

skorpion zinc

October 2021

TITLE AND APPROVAL PAGE

Project Name:	Amendment to the Namzinc Refinery to increase output production to 300 000 tonnes per annum of refined zinc metal, !Karas Region, Namibia
Client Name:	Skorpion Zinc (Namzinc) (Pty) Ltd
Ministry Reference:	Amend - APP-001598
Authors:	Laina Wilhelm, Jessica Bezuidenhout and Lester Harker
Status of Report:	Final for Government submission
Date of issue:	October 2021
Review Period	NA

Environmental Compliance Consultancy Contact Details:

We welcome any enquiries regarding this document and its content. Please contact:

Stephan Bezuidenhout
Environmental Consultant & Practitioner
Tel: +264 81 669 7608
Email: stephan@eccenvironmental.com
www.eccenvironmental.com

Jessica Bezuidenhout Mooney
Environmental Consultant & Practitioner
Tel: +264 81 669 7608
Email: jessica@eccenvironmental.com
www.eccenvironmental.com

Please note, at ECC we care about lessening our footprint on the environment, therefore all documents are printed double-sided.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

ABBREVIATIONS	DESCRIPTION
AQIA	Air Quality Impact Assessment
DEA	Directorate of Environmental Affairs
ECC	Environmental Compliance Consultancy
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
ESIA	Environmental Social Impact Assessment
I&APs	Interested and Affected Parties
IFC	International Finance Corporation
Km	Kilometre
kWh	Kilowatt hour
MWh	Megawatt hour
MAWLR	Ministry of Agriculture, Water, and Land Reform
MEFT	Ministry of Environment Forestry and Tourism
MME	Ministry of Mines and Energy
NDP5	National Development Plan 5
NOx	Nitrogen Oxides
PAF	Potentially Acid Forming
pH	Unit of Measure for Acidity or Alkalinity in Water
PM	Particulate Matter
SOP	Standard Operating Procedures
SOx	Sulphur Oxides
TPA	Tonnes Per Annum
TSF	Tailings Storage Facility

1 INTRODUCTION

1.1 PROJECT OVERVIEW

Skorpion Zinc (Namzinc) (Pty) Ltd (herein referred to as the proponent or Namzinc) came into production in 2003, and was acquired from Anglo American by VZI in 2010/2011, The Skorpion Zinc Mine and Refinery is a green field development, it is the 8th largest zinc mine in the world producing Special High Grade (SHG) zinc of 99.995% purity.

Mining activities on Mining Licence (ML) 108 have a limited lifespan and thus the mine intends to expand its operation, through the processing of zinc sulphide concentrates in addition to the zinc oxides at the Namzinc Refinery. The Namzinc Refinery is located approximately 100 km north-east of Oranjemund and 20km north-west of Rosh Pinah and is within the Tsau //Khaeb (formally known as the Sperrgebiet) National Park, in the !Karas Region (refer to Figure 1 for the project location).

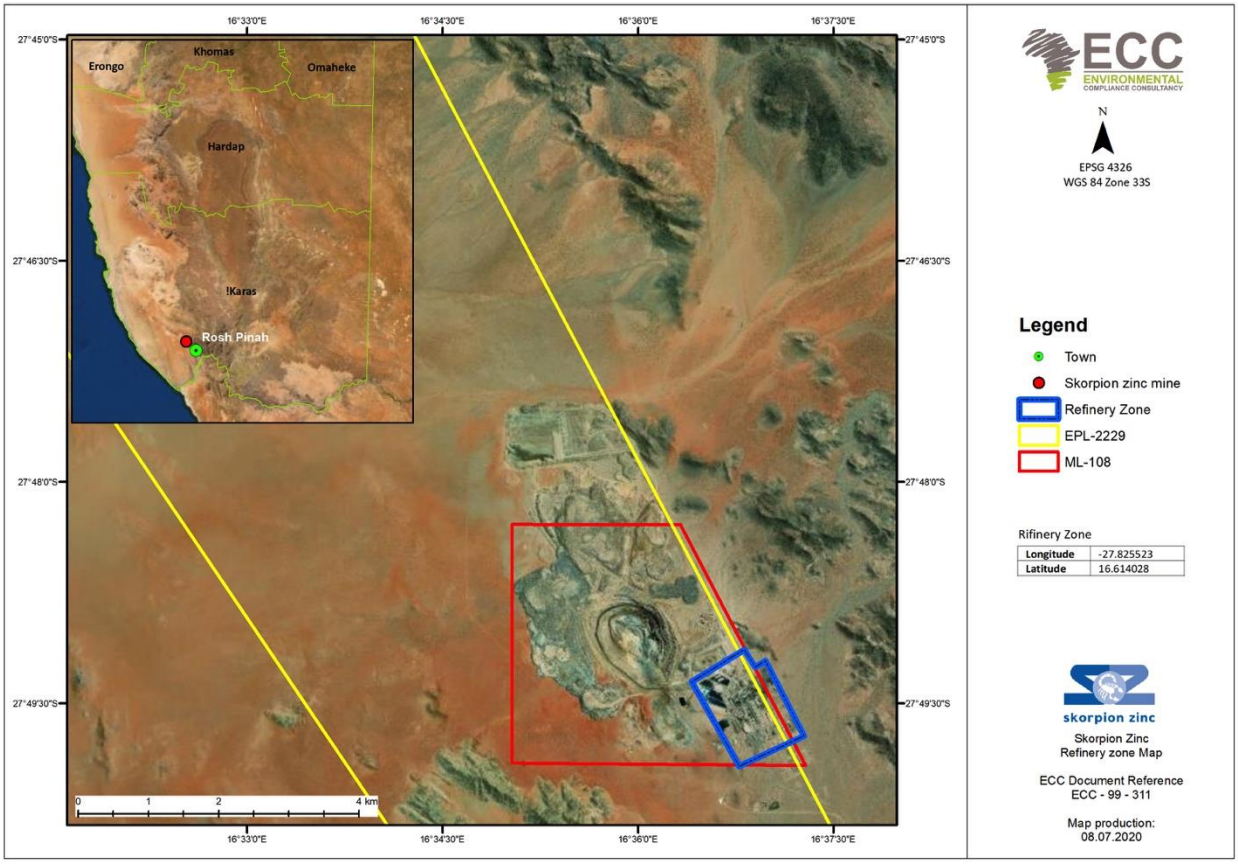


FIGURE 1 - A SATELITE IMAGE INDICATING THE LOCAL SETTING OF NAMZINC REFINERY

1.2 AMENDMENT APPLICATION SCOPE

Environmental Compliance Consultancy was engaged by Namzinc to compile an Environmental Scoping Report plus Environmental Impact Assessment (referred to as an EIA herein) for the amendment to the Namzinc Refinery to increase output production to 300 000 tonnes per annum (tpa) of refined zinc metal.

This proposed "Amendment to the Namzinc Refinery to increase output production to 300 000 tonnes per annum of refined zinc metal, in the !Karas Region, Namibia", follows on the original clearance certificate titled "Conversion of the Namzinc Refinery to process zinc sulphide concentrates in addition to zinc oxide ores, in the !Karas region, Namibia" issued in 2015.

The Skorpion Zinc mine and Refinery was placed under Care and Maintenance in May 2020 following slope failures in the open pit. This was deemed to have an economic impact on both the Rosh Pinah community and the Namibian economy as a whole. To prolong the life of the Skorpion Zinc facilities and to reduce the economic and social impacts of full-scale closure of the site, the Company is working on a project to convert the existing facility into a zinc sulphide concentrate treatment plant. The conversion and modification to the Skorpion Zinc (Namzinc) Refinery will enable the treatment of zinc sulphide (ZnS) concentrate that will be transported from their sister company Black Mountain Mining (Pty) Ltd, Gamsberg Mine, Northern Cape, South Africa.

Namzinc intends to expand the Skorpion refinery's capacity to produce 300 000 tpa of refined zinc metal at the approved Namzinc Refinery as part of the conversion project. The request for the amendment is to enable the processing of 620 000 tpa of zinc sulphide concentrates that will produce 300 000 tpa. This is an increase in production from the 150 000 tpa of refined zinc metal, as previously granted and approved under the 2015 environmental clearance certificate. The proposed infrastructure modifications on the refinery will remain within the mine's accessory works permit area.

The existing and valid Namzinc environmental clearance certificate for the conversion of the Namzinc Refinery facility to process zinc sulphide concentrate in addition to zinc oxide ores, in the !Karas Region, was granted by the MEFT on the 31 August 2020 to 31 August 2023.

ECC has undertaken a revision of the proposed project and has considered the potential effects on the environment, society, and the implementation of industry best practice mitigation measures and has determined that this project could be assessed by means of an amendment and relevant impact assessment, in accordance with Section 39 of the Environmental Management Act (EMA), 2007.

1.3 THE PROPONENT OF THE PROPOSED PROJECT

The details of the proponent are set out in Table 1 below.

TABLE 1 - PROPONENTS DETAILS

CONTACT	POSTAL ADDRESS	EMAIL ADDRESS	TELEPHONE
Namzinc (Pty) Ltd Mr. Tshiningayamwe Eliakim	Private Bag 2003, Rosh Pinah Namibia	ETshiningayamwe@vedantaresources.co.na	063 2712381

1.4 ENVIRONMENTAL COMPLIANCE CONSULTANCY

Environmental Compliance Consultancy (ECC), a Namibian consultancy (registration number Close Corporation 2013/11401), has prepared this report and impact assessment on behalf of the proponent. ECC operates exclusively in the environmental, social, health and safety fields for clients across Southern Africa, in both the public and private sectors. ECC is independent of the proponent and has no vested or financial interest in the proposed project, except for fair remuneration for professional services rendered.

All compliance and regulatory requirements regarding this report should be forwarded by email or posted to the following address:

Environmental Compliance Consultancy
PO BOX 91193
Klein Windhoek, Namibia
Tel: +264 81 669 7608
Email: info@eccenvironmental.com

Namzinc (Pty) Ltd
Private Bag 2003,
Rosh Pinah
Tel: +264 63 271 2381
Email: ETshiningayamwe@vedantaresources.co.na

2 APPROACH TO THE IMPACT ASSESSMENT

2.1 PURPOSE AND SCOPE OF THE ASSESSMENT

The aim of this assessment is to determine which impacts are likely to be significant (the main focus of the assessment); scope the available data and any gaps which need to be filled; determine the spatial and temporal scope; and identify the assessment methodology.

Subsequently, scoping of the EIA was undertaken by the EIA team. The scope of the assessment was determined through undertaking a preliminary assessment of the proposed project against the receiving environment obtained through a desk-top review, available site-specific literature, monitoring data and site reports.

2.2 THE ASSESSMENT PROCESS

The EIA methodology applied to this EIA has been developed using the International Finance Corporation (IFC) standards and models, in particular Performance Standard 1, 'Assessment and management of environmental and social risks and impacts' (International Finance Corporation, 2017) (International Finance Corporation, 2012); Namibian Draft Procedures and Guidance for EIA and EMP (Republic of Namibia, 2008); international and national best practice; and over 25 years of combined EIA experience.

ECCs methodology for environmental impact assessments is adopted and based on models for environmental and social impact assessments set out by the International Finance Corporation (IFC) Performance Standard 1 'Assessment and management of environmental and social risks and impacts. Furthermore, this impact assessment was undertaken for Namzinc in accordance with Namibian legal requirements.

This impact assessment is a formal process in which the potential effects of the project on the biophysical, social and economic environments are identified, assessed and reported, so that the significance of potential impacts can be taken into account when considering whether to grant approval, consent or support for the proposed project.

Final mitigation measures and recommendations are based on the cumulative experience of the consulting team and the client, taking into consideration the potential environmental and social impacts. The process followed through the basic assessment is illustrated in figure 2 and detailed further in the following sections.

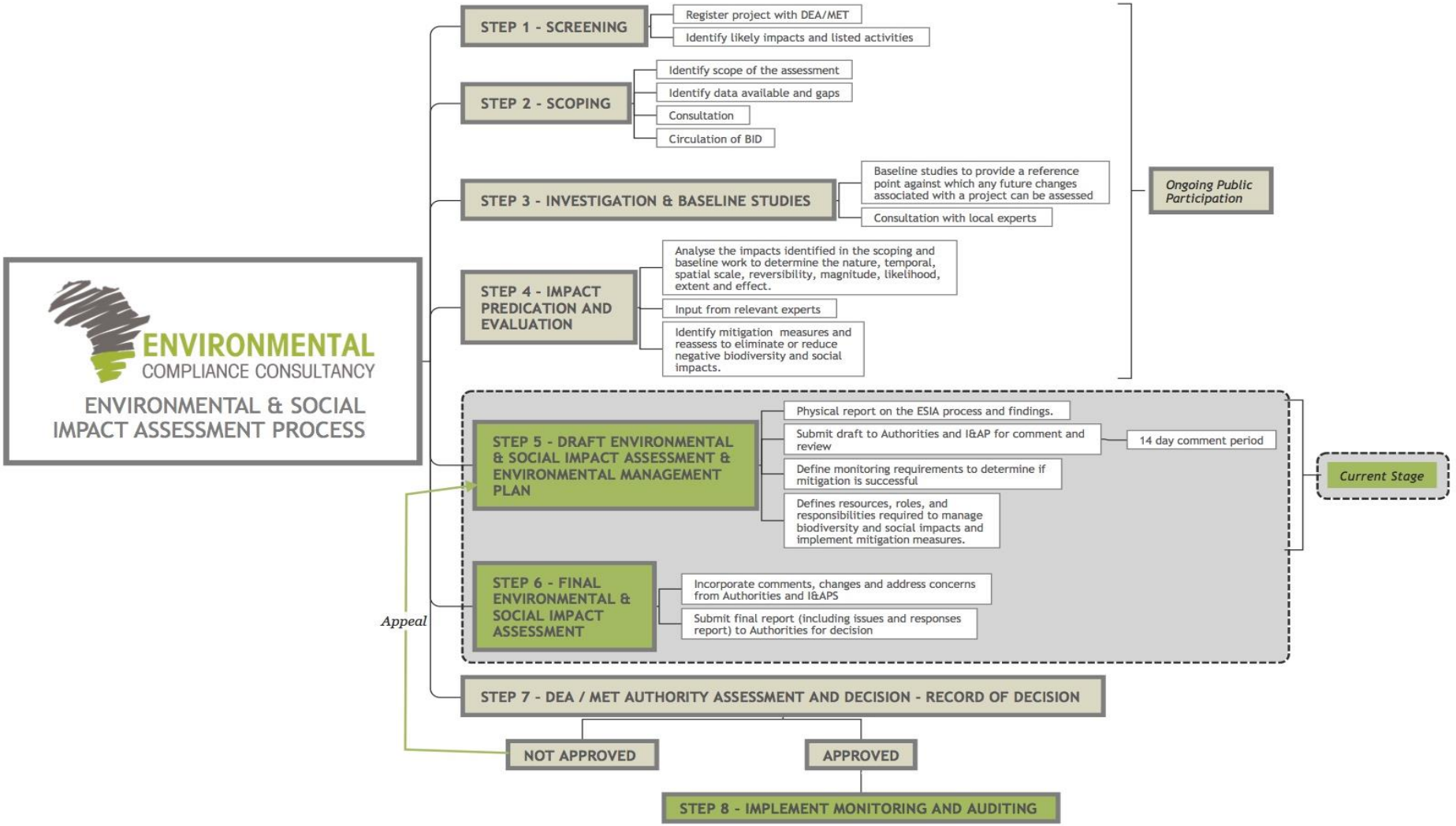


FIGURE 2 – ECC EIA METHOD

2.2.1 STEP 1 - SCREENING OF THE PROJECT

STATUS: COMPLETE

The first stages in the EIA process is to undertake a screening exercise to determine whether the changes to the project triggers any new or additional listed activity under the Environmental Management Act, 2007 and associated Regulations and if any potentially significant impacts could arise from the project changes that they are assessed. The location, scale and duration of project activities will be considered against the receiving environment.

The screening phase of the project is a preliminary analysis to determine ways which the project may interact with the biophysical, social, and economic environment. Impacts that are identified as potentially significant during the screening and scoping phase are taken forward for further assessment in the EIA process. The details and outcome of the screening process are discussed further in sections 6 and 7.

2.2.2 STEP 2 – SCOPING

STATUS: COMPLETE

SCOPE OF ASSESSMENT

Where an EIA is required, the second stage is to scope the assessment. The main aims of this stage are to determine which impacts are likely to be significant (the main focus of the assessment); scope the available data and any gaps which need to be filled; determine the spatial and temporal scope; and identify the assessment methodology.

In response to the request from Namzinc and in terms of the Environmental Management Act of 2007, an application for an amendment to the facility's current and approved environmental clearance certificate is to be applied for by means of an assessment and amendment application (this report).

Subsequently, the scoping of the EIA was undertaken by the EIA team from ECC. The scope of the assessment was determined through undertaking a preliminary assessment of the proposed project against the receiving environment obtained through a high-level desktop review. Feedback from consultation with the client and stakeholders also informed this process. The following environmental and social topics and subtopics were scoped into the assessment, as there was potential for significant impacts to occur:

SOCIO-ECONOMIC ENVIRONMENT

- Employment
- Local businesses

BIOPHYSICAL ENVIRONMENT

- Air quality
- Dust emissions

- Aerial pollution (air emissions e.g. oxides of nitrogen; nitrogen dioxide, particulate matter; sulphur dioxide and carbon monoxide)
- Groundwater

The following topics were scoped out of the EIA, as no likely significant impacts are predicted as the proposed project poses little to no change from the current baseline, therefore are not discussed further in this report.

- **Soil and geology:** the surrounding soils and geology are common and have no significant value. The proposed project amendment will not generate new or additional impacts to surface soil or geology.
- **Terrestrial ecology:** The amendment proposed will not have any new or additional impacts on terrestrial ecology aside from the already existing Namzinc operations. The proposed amendment will remain within the Accessory Works Permit footprint.

An assessment of high-level potential impacts or risks associated with the proposed amendment has been included in chapter 7 in this report.

2.2.3 STUDY AREA

This ESIA study area has been defined according to the geographic scope of the receiving environment and potential impacts that could arise as a result of the proposed project. The study area indicating the refinery zone, where new modification to the plant will be made is presented in figure 3.

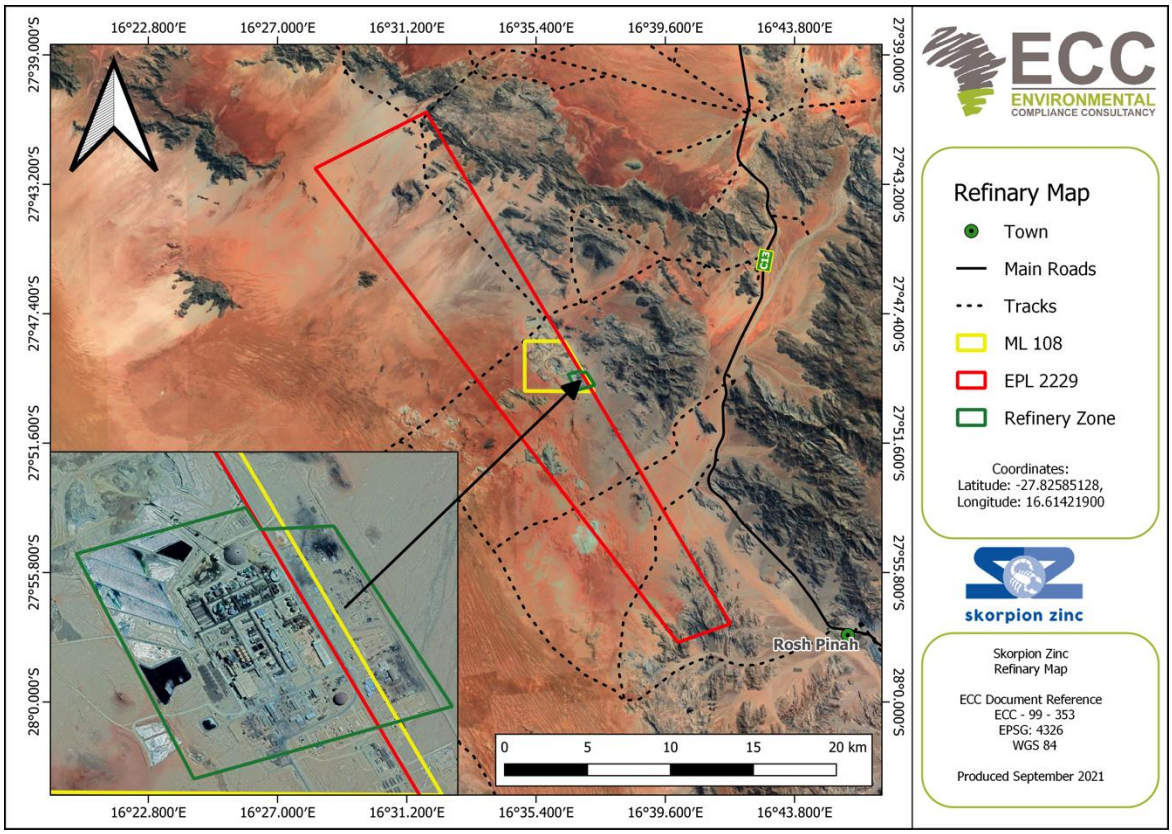


FIGURE 3 - STUDY AREA OF THE PROPOSED PROJECT INDICATING THE REFINERY ZONE

2.2.4 CONSULTATION

STATUS: COMPLETE AND ONGOING

Public participation and consultation are requirements stipulated in Section 21 of the Environmental Management Act, 2007 and associated regulations for a project that needs an environmental clearance certificate. Consultation is a compulsory and critical component in the EIA process in achieving transparent decision-making and can provide many benefits.

The objectives of the stakeholder engagement process are to:

- Provide information on the project, introduce the overall concept and plan;
- Clarify responsibility and regulating authorities;
- Listen and understand community issues, concerns and questions;
- Explain the process of the EIA and timeframes; and
- Establish a platform for ongoing consultation.

2.2.5 INTERESTED AND AFFECTED PARTIES

Appendix B provides a list of interested and affected parties (I&APs), and evidence of newspaper consultation for the amendment application. Namzinc advertised the amendment in three national newspapers namely in the 'Republikein, the Namibian Sun, and Allgemeine Zeitung' newspapers on the 05th and 12th of July 2021.

2.2.6 SUMMARY OF ISSUES RAISED

During the compilation of this assessment several stakeholders were engaged to seek potential issues or concerns regarding the amendment to the Namzinc Refinery.

In order to ensure all potential I&APs have the opportunity to comment and provide feedback on this assessment, the completed report will be circulated to all potential stakeholders even though they may not have registered as an I&APs for the project. Should stakeholders have comments or questions, or areas that require further assessment that concern them, ECC will address these through an addendum report that is to be submitted to MME and MEFT.

2.2.7 STEP 3 - BASELINE STUDIES

STATUS: COMPLETE

A robust baseline is required in order to provide a reference point against which any future changes associated with a project can be assessed and allow suitable mitigation and monitoring to be identified. The site has been extensively studied in previous EIAs and site-specific scientific studies and reports compiled over the mine life. This information has been referenced throughout this report. The environmental and social baseline is provided in Chapter 5, focussing on the topics that have been scoped into the EIA, as listed in 2.2.2.

2.2.8 Step 4 - Impact Identification And Evaluation

STATUS: COMPLETE

The key stage of the EIA process is the impact identification and evaluation stage. This stage is the process of bringing together project characteristics with the baseline environmental characteristics and ensuring all potentially significant environmental and social impacts are identified and assessed. It is an iterative process that commences at project inception to the final design and project implementation. The impact identification and evaluation stage were undertaken in July 2021.

The final design of the proposed project has been assessed, as well as alternatives considered during the design process in accordance with the Environmental Management Act, 2007. Refer to chapter 7 for the findings of the assessment.

Chapter 6 in this report sets out the assessment methodology used to assess the project against the environmental and social baseline that would be affected. Chapter 7 presents the findings of the assessment, focussing on the significant impacts or those considered sensitive to the community.

2.2.9 Step 5 - Draft EIA Report And EMP

STATUS: COMPLETE

This report and EMP for the Namzinc Refinery environmental clearance amendment includes an assessment of the biophysical and social environment which satisfies the requirements of Step 5.

The EIA report documents the findings of the assessment process, provides stakeholders with opportunity to comment and continued consultation and forms part of the environmental clearance amendment application. The EMP provides measures to manage the environmental and social impacts of the proposed project and outlines specific roles and responsibilities to fulfil the plan.

This EIA report focuses on the significant impacts that may arise from the proposed project as described in Step 4. These impacts are discussed in Chapter 7.

This EIA report will be issued to stakeholders and I&APs for consultation for a period of 14 days, meeting the mandatory requirement of 7 days as set out in the Environmental Management Act and associated Regulations. The aim of this stage was to ensure all stakeholders and I&APs have the opportunity to provide final comments on the assessment process and findings and register their concerns.

2.2.10 Step 6 – Final Environmental impact assessment report and Environmental Management Plan

STATUS: COMPLETE AND ONGOING

All comments received during the public review period will be collated in an addendum report which will accompany this ESIA report when submitted to the DEA. All comments will be responded to either through providing an explanation or further information in the response table, or sign posting where information exists, or new information has been included in the EIA

report or appendices. Comments will be considered and where they are deemed to be material to the decision making or enhanced the EIA will be incorporated.

The final ESIA report and associated appendices will be available to all stakeholders on the ECC website www.eccenvironmental.com and the proponent's website https://www.vedanta-zincinternational.com/sustainability/emprs. All I&APs are informed via email.

The EIA report, appendices and addendum will be formally submitted to the Office of the Environmental Commissioner, DEA as part of the application to amend the current environmental clearance certificate.

2.2.11 Step 7 – Authority Assessment and Decision Making

STATUS: FUTURE STAGE

The Environmental Commissioner in consultation with other relevant authorities will assess if the findings of the ESIA presented in the ESIA report and addendum report are acceptable. If deemed acceptable, the Environmental Commissioner will revert to the proponent with a record of decision and any recommendations.

2.2.12 Step 8 – Monitoring and auditing

STATUS: FUTURE STAGE

In addition to the EMP being implemented by the proponent, a monitoring strategy and audit procedure will be determined by the proponent and competent authority. This will ensure key environmental receptors are monitored over time to establish any significant changes from the baseline environmental conditions caused by project activities.

3 REGULATORY FRAMEWORK

An environmental clearance is required for any activity listed as per Government Notice No 29 of 2012 of the EMA. The proponent holds several environmental clearance certificates for the project that embraces the relevant listed activities as detailed in the regulations. The proposed amendment does not trigger any new listed activities for the operations of the Namzinc Refinery.

A thorough review of relevant legal legislation has been conducted for the proposed amendment; the table below identifies relevant legal requirements specific for the project. This chapter outlines the regulatory framework applicable to the proposed project.

3.1 CURRENT PROJECT APPROVALS

- The site is fully permitted in terms of the Minerals Act 1992, the Environmental Management Act, 2007 and the Water Resource Act 1956.
- The site operates in accordance with its current and approved environmental clearance certificates issued in terms of environmental management act 2007 by the Ministry of Environment and Tourism.
- The site remains compliant with all Namibian laws and policies and relevant permits or approval are available upon request.

3.2 NATIONAL REGULATORY REGIME

TABLE 2 - LEGAL COMPLIANCE

NATIONAL REGULATORY REGIME	SUMMARY	APPLICABILITY TO THE PROJECT
Minerals (Prospecting and Mining) Act No 33 of 1992	Section 50 (i) requires *"an environmental impact assessment indicating the extent of any pollution of the environment before any mining operations are being carried out and an estimate of any pollution, if any, likely to be caused by such prospecting operations or mining operations".* Section 50 sets out that in addition to any term and condition contained in a mineral agreement and any term and condition contained in any mineral licence, it shall be a term and condition of any mineral licence that the holder of such mineral licence shall: Exercise any right granted to him or her in terms of the provisions of this Act	The proposed amendment to the Namzinc Refinery for the conversion of zinc sulphide concentrate in addition to zinc oxide.
Environmental Management Act,	The Environmental Management Act (EMA) (7 of 2007) has been compiled and is	The certificate holder Namzinc, requests an amendment to the

NATIONAL REGULATORY REGIME	SUMMARY	APPLICABILITY TO THE PROJECT
2007 (Act No. 7 of 2007) and associated regulations, including the Environmental Impact Assessment Regulation, 2007 (No. 30 of 2011)	regulated by the Ministry of Environment and Tourism (MET). This Act was gazetted on 27 December 2007 (Government Gazette No. 3966) and the Environmental Impact Assessment Regulations: Environmental Management Act, 2007 (Government Gazette No. 4878) were promulgated on 6 February 2012. Section 39 of the Environmental management Act, 2007 states the Environmental Commissioner may amend a condition of an environmental clearance certificate; – If the certificate holder consents to or requests amendment or – At the initiative of the Environmental Commissioner, by giving written notice to the holder of the certificate The Environmental Commissioner may require the holder of the environmental clearance certificate to make an application in the prescribed form and manner to the Environmental Commissioner for the proposed amendment. Requires that projects with significant environmental impact be subject to an environmental assessment process (Section 27). In terms of this legal framework certain identified activities may not commence without an Environmental Clearance - a certificate that is issued by MET. This environmental clearance can only be granted after consideration of an EIA.	certificate to increase the capacity of the Namzinc Refinery processing operations. The proponent makes the application for amendment in the prescribed form (this amendment report to address potential impacts) accompanied by the prescribed form (Form 2) in accordance with the Act. This Act and its regulations have informed and guided this amendment process. Impacts identified through this amendment assessment application have been addressed throughout this report (and relevant studies) and project specific EMP. Environmental Clearance has been issued for the operations on the Namzinc Refinery via the consideration of previous EIAs processes.
Water Act, 1956	The Water Resources Management Act 24 of 2004 is presently without regulations; therefore the Water Act No 54 of 1956 is still in force:	The use of water will be required for the Namzinc operations, water will be sourced from the existing pipeline connections via Namwater.

NATIONAL REGULATORY REGIME	SUMMARY	APPLICABILITY TO THE PROJECT
	A permit application in terms of Sections 21(1) and 21(2) of the Water Act is required for the disposal of industrial or domestic wastewater and effluent.	
National Heritage Act, No. 27 of 2004.	The Act provides for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. It also makes provision for archaeological 'impact assessments. If applicable, the relevant permits must be obtained before disturbing or destroying a heritage site as set out in the Act.	Any heritage resources discovered would require a permit from the NHC for relocation. The site has conducted previous and extensive heritage assessments therefore sites are already known for the project area and non are located within the proposed project footprint therefore impacts not likely to occur.

TABLE 3 – NATIONAL POLICIES

NATIONAL REGULATORY REGIME	SUMMARY	APPLICABILITY TO THE PROJECT
Vision 2030	Vision 2030 sets out the nation's development programmes and strategies to achieve its national objectives. It sets out eight themes to realise the country's long-term vision. Vision 2030 states that the overall goal of the vision is to improve the quality of life of the Namibian people to a level in line with the developed world.	The planned project shall meet the objectives of Vision 2030 and shall contribute to the overall development of the country through continued employment opportunities.
Fifth National Development Plan (NDP5)	The NDP5 is the fifth in the series of seven five-year national development plans that outline the objectives and aspiration of Namibia's long-term vision as expressed in Vision 2030. The NDP5 is structure on five pillars: economic progression, social transformation, environmental sustainability and good governance. Under the social transformation pillar is the goal of improved	The planned project supports meeting the objectives of the NDP5 through creating opportunities for continued employment by extending the Skorpion Zinc Mine's operation.

NATIONAL REGULATORY REGIME	SUMMARY	APPLICABILITY TO THE PROJECT
	education.	
Minerals Policy	The Minerals Policy was adopted in 2002 and sets guiding principles and direction for the development of the Namibian mining sector while communicating the values of the Namibian people. It sets out to achieve several objectives in line with the sustainable development of Namibia's natural resources. The policy strives to create an enabling environment for local and foreign investments in the mining sector and seeks to maximise the benefits for the Namibian people from the mining sector while encouraging local participation, amongst others. The objectives of the Minerals Policy are in line with the objectives of the Fifth National Development Plan that include reduction of poverty, employment creation and economic empowerment in Namibia.	The proposed project conforms with the Policy, which has been considered through the EIA process and the production of this report. Namzinc supports local spending and procurement.
Draft Pollution Control; and Waste Management Bill (1999)	The Bill amalgamates a variety of legislative frameworks in Namibia, regulating pollution in different sectors of the economy. The Bill promotes sustainable development, to provide for the prevention and regulation of the discharges of pollution.	Although not enacted, the Bill has been applied to the ESIA to ensure any activities potentially giving rise to pollution are minimized as far as reasonably practicable and obligations are adhered to.
Road Traffic and Transport Act No. 22 of 1999	To provide for the establishment of the Transportation Commission of Namibia; for the control of traffic on public roads, the licensing of drivers, the registration and licensing of vehicles, the control and regulation of road transport across Namibia's borders; and for matters incidental thereto.	The proposed project will consist of transportation activities. The employees and business partners shall have to adhere to national road regulations. In addition, drivers are required to be fit for work and tankers should be marked as per the requirements of standard goods classification transportation.
Hazardous Substances Ordinance No. 14	Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and	The proposed project involves the handling of sulphuric acid, which is classified as a hazardous substance.

NATIONAL REGULATORY REGIME	SUMMARY	APPLICABILITY TO THE PROJECT
of 1974	export. Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings	The project will ensure employees in charge of and working with hazardous substances are aware of the specific hazardous substances in order not to compromise worker and environment safety. Due to the refinery's operation, noxious emissions are likely to be emitted by the plant into the environment, emissions may include gases such as sulphur dioxide (SO_2) as well as, nitrogen dioxide (NO_2) and particulate matter (PM_{10}) emissions. For this purpose, ambient air quality guidelines, as contained within the International Finance Corporation (IFC) Environmental, Health and Safety (EHS) Guidelines of 2007, are applied to assess the potential impact of the proposed acid plant on the receiving environment.
Labour Act, No. 11 of 2007	The Labour Act, No. 11 of 2007 (Regulations relating to the Occupational Health & Safety provisions of Employees at Work promulgated in terms of Section 101 of the Labour Act, No. 6 of 1992 - GN156, GG 1617 of 1 August 1997)	The proposed project will comply to stringent health and safety policies, including the compulsory use of specific PPE in designated areas to ensure adequate protection against health and safety risks. Proper storage and labelling of hazardous substances are required. The project will ensure employees in charge of and working with hazardous substances need to be aware of the specific hazardous substances in order not to compromise worker and environmental safety.

3.3 PERMITS AND LICENCES

Namzinc holds the mining licence for the project on (ML 108). The mining licence was granted by the Ministry of Mines and Energy valid till the 30/07/2025; beyond the expected life of mine for the current Skorpion Zinc operation. ML 108 is granted for mining for base and rare metals and precious metals on an area of approximately 951 ha. It is envisioned that the proposed Namzinc operation will run till 2032.

3.4 WORLD BANK STANDARDS

The International Finance Corporation (IFC) is a member of the World Bank Group and is the largest global development institution focusing on the private sector in developing countries. Its standards have become a global benchmark for environmental and social performance. They form the basis for the Equator Principles (IFC, 2013), a voluntary environmental and social risk-management framework used by 77 financial institutions worldwide. The Equator Principles are a framework and set of guidelines for evaluating social and environmental risks in project finance activities and apply to all new projects with a total capital cost of US$10 million or more, no matter what industry sectors, without geographic requirement. The Equator Principles are applicable to this specific project.

TABLE 4 - APPLICABLE IFC PERFORMANCE STANDARDS

IFC STANDARDS	RELEVANCE
Performance Standard 1 Assessment and management of environmental and social risks and impacts	An environmental and social management system helps companies integrate plans and standards into their core operations—so they can anticipate environmental and social risks posed by their business activities and avoid, minimize, and compensate for such impacts as necessary. A good management system provides for consultation with stakeholders and a means for complaints from workers and local communities to be addressed.
Performance Standard 2 Labour and Working Conditions Performance Standard	This standard asks that companies treat their workers fairly, provide safe and healthy working conditions, avoid the use of child or forced labor, and identify risks in their primary supply chain.
Performance Standard 3 Resource Efficiency and Pollution Prevention Performance	This standard guides companies to integrate practices and technologies that promote energy efficiency, use resources—including energy and water—sustainably, and reduce greenhouse gas emissions.
Performance Standard 4	Activities and infrastructure may expose local communities to increased risks and adverse impacts related to worksite accidents, hazardous materials and spread of diseases. This

Community Health, Safety, and Security	standard helps companies adopt responsible practices to reduce such risks including through emergency preparedness and response, security force management, and design safety measures.
Performance Standard 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources	This standard recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and managing living natural resources adequately are fundamental to sustainable development.
Performance Standard 8 Cultural Heritage	This standard aims to guide companies in protecting cultural heritage from adverse impacts of project activities and supporting its preservation. It also promotes the equitable sharing of benefits from the use of cultural heritage.

4 PROJECT DESCRIPTION AND PROPOSED PROJECT CHANGES

4.1 NEED FOR THE PROJECT

In the year 2010, Namzinc commenced a new study evaluating the potential of expanding the Skorpion Zinc operations. The study investigated the possibility to convert the existing Skorpion Zinc Refinery. The modification will involve the construction of a sulphide roaster, an acid plant and tank leaching facilities to prepare the sulphide ore for refining in the existing plant. The construction of the new facilities will take place in an area of approximately 200m x 200m east of the existing plant in the accessory works area. For the purpose of this amendment, the Namzinc Refinery will incur additional costs to finance the new modifications and revised technical parameters.

The construction of the additional processing plant will necessitate the employment of approximately 2500 staff members. In essence the project is needed in order to validate the possible increase in the production capacity to produce refined zinc metal at Namzinc.

4.2 PROCEDURES AND PLANNING

The proponent shall ensure that all required permits from the various ministries, local authorities and any other bodies that govern the construction and operation activities are obtained and remain valid throughout the project's development and operation. Ensure all business partners and employees enter into an agreement, which includes the need to adhere to the stipulations within the EMP. The most suitable procedures and methods shall be identified to ensure the impacts on the environment and society from these activities are minimised.

TABLE 5 - LIST OF ACTIVITIES PLANNED PER PHASE

PHASE	DATE	ACTIVITY DESCRIPTION
Phase 1: 2015	Field inspection commencement date unknown, 2020 - Completed	- Planning and design modelling of facility - Feasibility studies - Environmental studies and Impact assessment, 2015
Phase 2: 2021	Field inspection commencement date unknown, July 2021 - In progress	- Planning and design modelling of facility - Environmental studies and Impact assessment amendment, 2021
Phase 3: 2021	Construction commencement date unknown: September 2021.	- Namzinc plans to commence with construction phase in September 2021. - The construction activities are envisioned to take approximately 18 – 24 months. - It is envisioned that the refinery's components and infrastructure will be

PHASE	DATE	ACTIVITY DESCRIPTION
		transported via trucks and assembled on site. Alternatively, the most feasible variant may be employed, depending on logistics i.e. shipping, port capacities, skills availability.

4.3 CURRENT OPERATIONS

The existing Skorpion refinery circuit was commissioned in early 2003 and was the first 'mine-to-metal' operation to commercially apply a purely hydrometallurgical process route (comprising of atmospheric leaching, solvent extraction, electrowinning and final casting of the metal into sizable ingots) to exploit a zinc oxide ore-body. Currently the plant produces 150 000 tpa of refined zinc metal.

Water supply to the mine is from a NamWater supply via pipelines, approximately 5000 m^3/day to 7 800 m^3/day is currently required by the Mine. Power is provided to the site via an off-take transformer system connected to the NamPower grid, with standby generators as backup power supply for the mine. The modified refinery will be powered through the current operating power. The current operating power is (70 – 90) megawatt hour (MWh). Detailed descriptions of the current operations can be found in the initial EIAs and EMPs for the refinery's facility.

In order to obtain regulatory approval, Skorpion Zinc had to amend its EMP to take into consideration the proposed modifications to the existing processing plant and the disposal of additional waste. Specific specialist input have been proposed (air quality assessment) and will be undertaken to ensure that the amendment to the EMP takes into account and mitigates potential environmental impacts associated with the modification. Moreover, Namzinc and its business partners will carry out the planning and research of best practise methods to inform appropriate implementation.

4.4 PROPOSED PROJECT CHANGES

The proposed amendment to the Namzinc Refinery will enable the processing of 620 000 tpa of zinc sulphide concentrate to produce 300 000 tpa of refined zinc metal from 150 000 tpa, as previously granted.

The proposed structural modifications will include an additional roaster, which will be constructed within the plant, amongst other improvements, to double the output volume of the refined zinc metal per annum. The proposed modification will remain within the accessory works permit area B footprint, while the new limestone milling plant will be expanded inside the existing processing plant along with the new electrowinning and melting-casting section.

Figure 4 indicates the accessory works area B, limestone milling plant area and existing (refinery) plant where the proposed modification will be constructed.

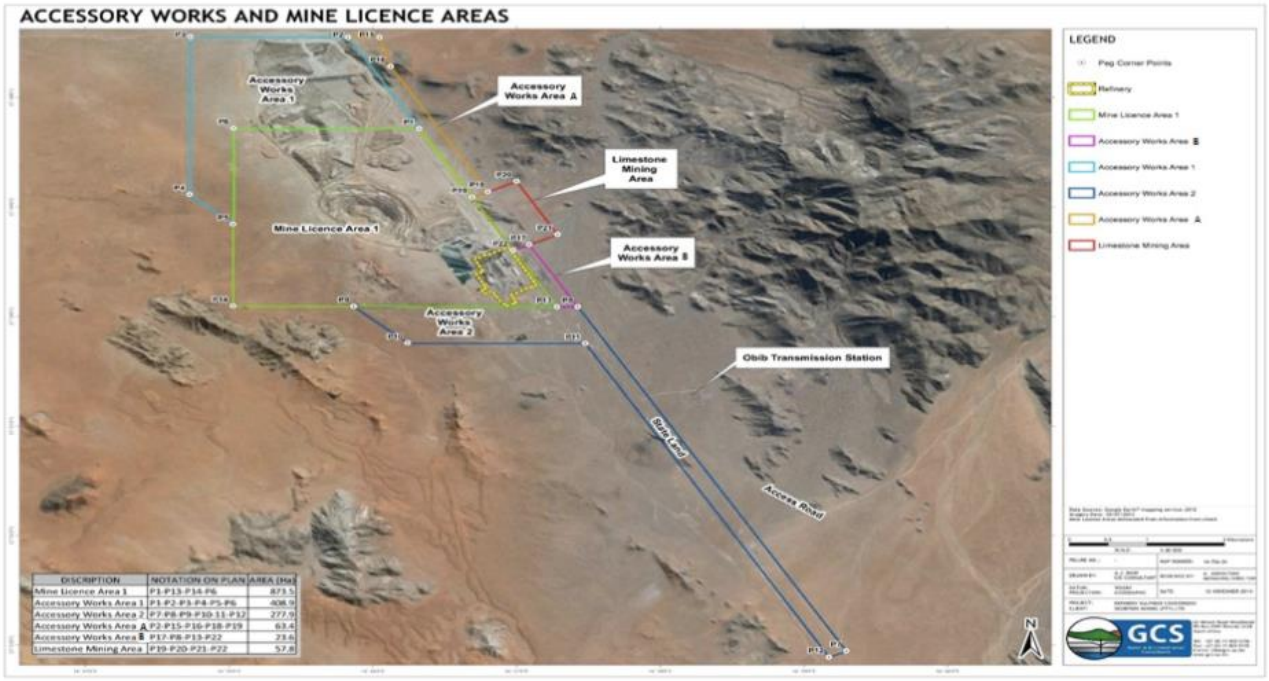


FIGURE 4 – SKORPION ZINC MINE AREA AND ACCESSORY WORKS AREAS (GCS – EIA, 2015)

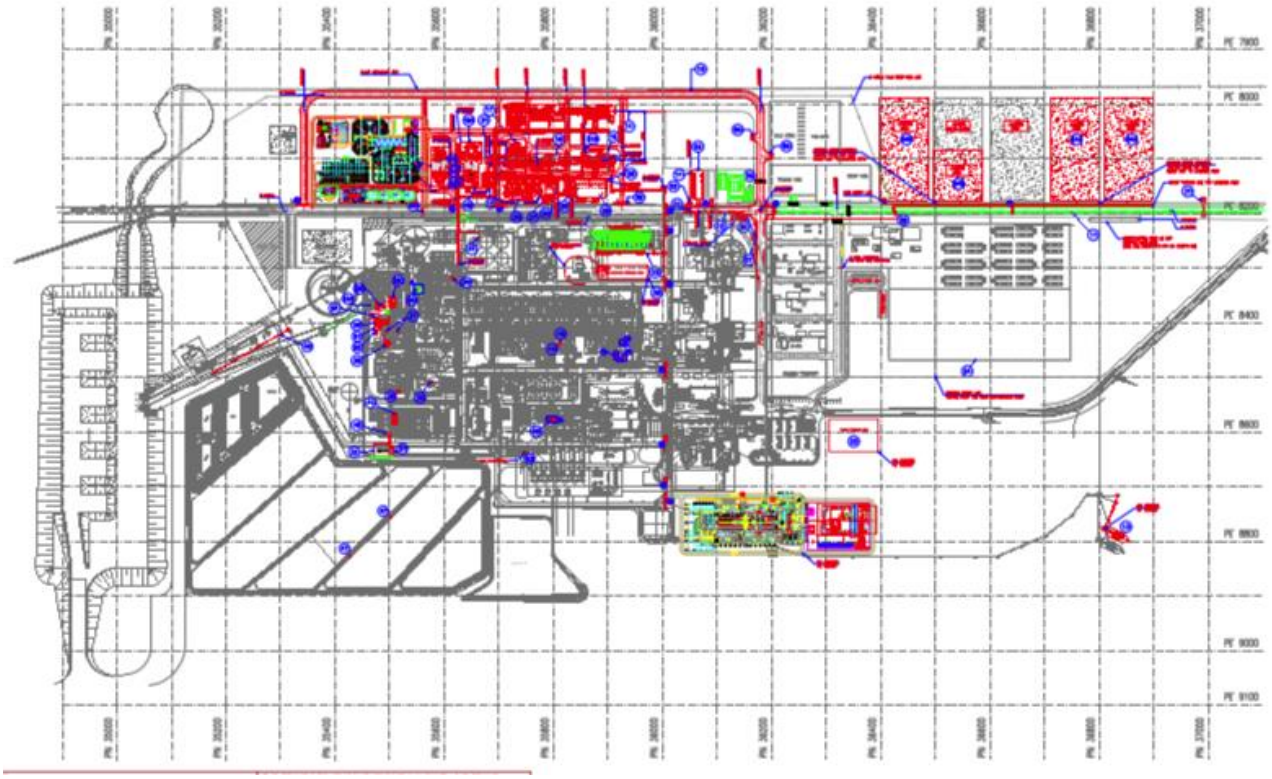


FIGURE 5 – LAYOUT OF THE NEW PLANT SET UP AREA, PROPOSED MODIFICATION ARE INDICATED IN RED (REFER TO APPENDIX D FOR THE DETAILED LAYOUT)

In order to facilitate the sulphide conversion, additional modification to the current plant will be required, which will include bulk handling and storage of zinc sulphide concentrates, the construction of a roasting circuit with a gas cleaning and recovery acid plant, and the installation and integration of a new calcine leach circuit (refer to Appendix C for the circuits flow diagrams - detailed descriptions of the proposed operation can be found in the initial EIAs and EMPs for the refinery's facility).

The benefits of this zinc roasting process include, the steam or power generation without CO_2 emissions and recovery of the valuable metal. Sulphuric acid will also be produced in the refinery as a saleable by-product (excess volumes only). Additionally, the bulk of the sulphuric acid will be used in the process to produce refined zinc metal sheets.

The proposed plant modifications of the sulphide circuit will comprises of the following major section:

- Concentrate handling system;
- Roaster;
- Waste heat recovery boiler and turbo generator;
- Wet Gas cleaning Plant (WGP);
- Acid Plant; and
- Calcine handling system.

To get to 300 000 tpa production, an additional roaster, solvent extraction, electrowinning cell house and final metal casting will be constructed for this project. Below is the processing flow diagram of the sulphide circuit, indicating the existing circuit, new circuit and the additional 150 000 tpa circuit proposed for amendment in Figure 6.

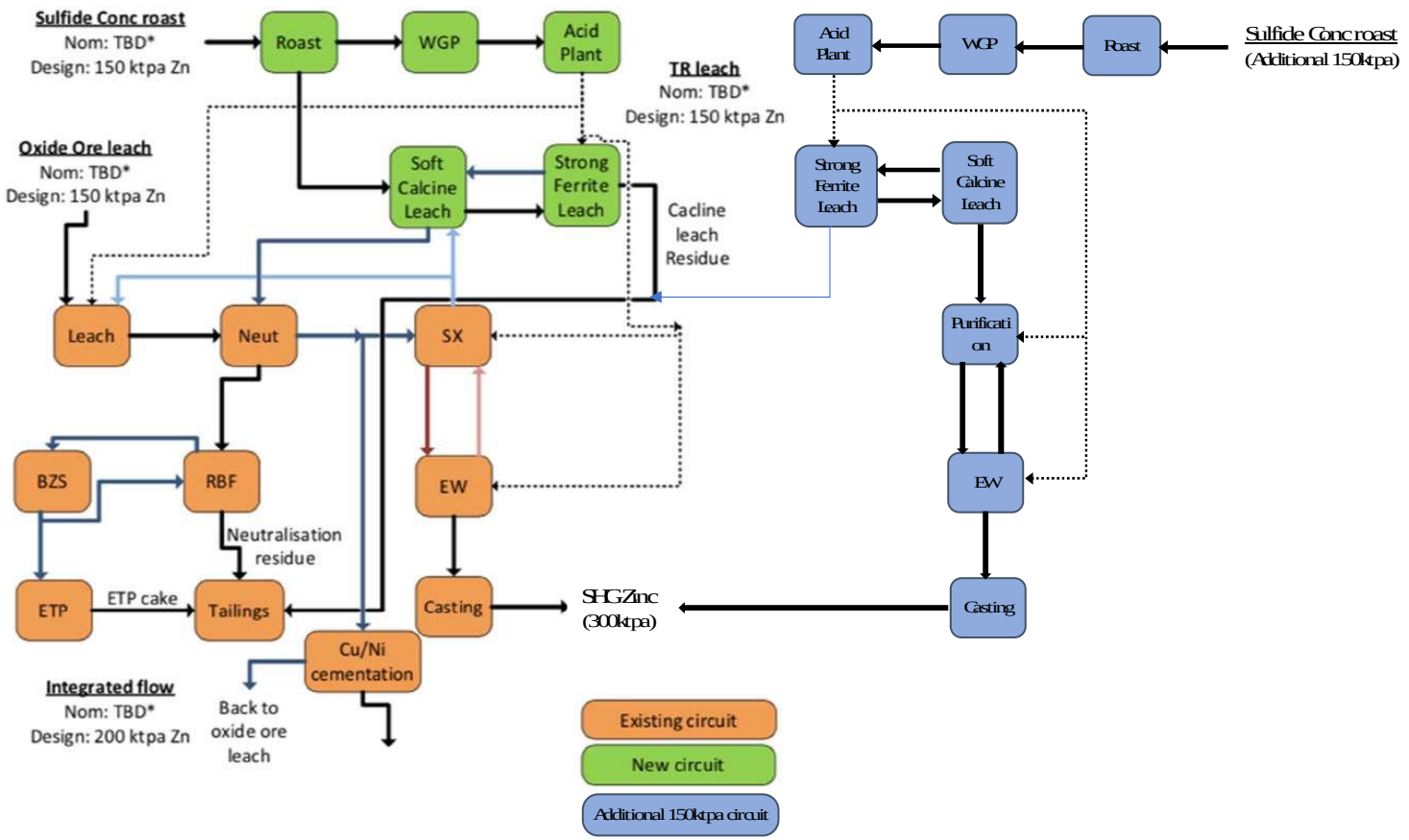


FIGURE 6 – PROCESS FLOW DIAGRAM

5 INFRASTRUCTURE AND SERVICES

5.1 PROCESS DESCRIPTION

The modification of the existing refinery will involve the construction of an additional roaster, gas cleaning, acid plant and leaching facilities. The Roasters convert the zinc sulphide concentrate into zinc oxide, under high temperature which would then be leached in the proposed tank leaching facility before being integrated with the existing refinery. During the roasting process sulphur combines with oxygen to produce sulphur dioxide, which in turn is processed to produce sulphuric acid as a by-product to the roasting process.

To accommodate the processing of oxides and sulphide concentrates, Namzinc will construct the new metallurgical processing plant for the production and process of refined zinc metal by using the electrolytic method. Zinc is extracted from the purified zinc sulphate solution by electrowinning, which is a specialized form of electrolysis. The sulphide zinc concentrate is roasted to remove the sulphur from the concentrate and produce impure zinc oxide referred to as roasted concentrate or calcine. Thereafter, the calcine is put through electrolytic zinc processing, and digested with sulphuric acid to form a zinc sulphide solution, from which zinc is deposited through electrolytic refining. The end result through the purification and solidifying process is called zinc cathodes or zinc metal sheets.

5.1.1 POWER SUPPLY

Energy demand is expected to increase from the current supply rates. For the proposed Namzinc power requirement there will be an increase approximately up to 160 MWh. Electricity to the plant will be supplied from Nampower grid. Diesel will be used to start up the acid plant, ones off.

5.1.2 WATER SUPPLY

Water will be supplied from the existing Namwater pipeline connections on the mine. The water consumption rates may increase up to approximately 100 00m^3 per day.

5.2 WASTE MANAGEMENT

5.2.1 SOLID WASTE MANAGEMENT

During construction and operation, solid waste will be managed in line with the principles of the waste hierarchy for waste prevention, re-use, recycle or compost, energy recovery, and disposal. Waste minimisation and recycling is preferred to waste treatment and disposal (National Solid Waste Management Strategy, MET 2019).

Non-hazardous waste

A waste management system has been installed on site that includes a pilot waste separation project aimed at the collection baling and sale of cans, paper, glass and plastic to recycling companies. General waste is currently being disposed of at a temporary landfill in the footprint of the waste rock dump and will be disposed of at the new landfill site in Rosh Pinah once this has been constructed. The same waste management system applies to the Skorpion Zinc site and

homes in Rosh Pinah. The waste system will be managed according to Skorpion Zinc's EMP and EMS requirements.

Hazardous waste

The refinery activities will generate hazardous waste as part of the operations. The proponent is committed to minimise and where possible eliminate hazardous waste. But regardless of all efforts, there is hazardous waste which requires safe disposal. Other hazardous waste (as per classification in the - GSC EIA, 2015) is disposed of at the tailings dam. Hazardous materials/ containers will be returned to the supplier where it is practical and within the conditions of the Basel Convention.

Sewage Effluent

All the ablution facilities at Skorpion Zinc are linked to the sewage treatment plant situated at the southern side of site. The sewage plant is a compact system and comprises a combined primary settlement tank and anaerobic digester (septic tank) that flows into a secondary aerobic process consisting of bio-filter fixed film discs that rotate at 5 rpm. The effluent then flows into a humus settlement and disinfection tank where chlorine can be added to purify the water to a standard acceptable for use on sports fields and gardens if required, or to be discharged into a natural waterway. The effluent water that is not recycled is discharged into the nearby streambed. Three sewage plants have been installed in Rosh Pinah to accommodate the sewage from the Skorpion homes. The sewage faculties, at both Skorpion Zinc and Rosh Pinah, are permitted by the Department of Water Affairs under the Ministry of Agriculture Water and Land Reform (MAWLR).

The primary tanks require de-sludging periodically (once to twice a year) and the sludge that is removed will be disposed of in trenches located at the foot of the advancing waste rock face, as per the conditions of the MAWLR permits.

5.2.2 TAILINGS

Two distinct leaching processes are expected, with the refinery conversion producing two types of tailings namely:

- The neutralization residue (current tailings type) is expected to remain the same and will be disposed onto the current dry, unlined tailings storage facility; and
- The calcine leach residue which has a high acid drainage potential but will be neutralised with limestone. Both the precipitate and residual solid waste are then removed by filtration and dewatered on a filter belt. The resulting oxide filter cake is disposed of along with the neutralisation residue on an unlined TSF approximately 2 km north of the mine's processing plant complex.

The disposal of the tailings will be done according to the Waste Regulations under the Environmental Management Act and in line with IFC guidelines, and World Bank Standards. The

current dry unlined tailings disposal facility has been approved under the previous EIA clearance certificate (GSC – EIA, 2015).

The tailings size and designs are expected to remain the same (Figure 7), with a total holding capacity of 40 000 000 tonnes of tailings. The annual tailings output for the proposed 300 000 tpa of refined zinc will be less than 1 000 000 tonnes.

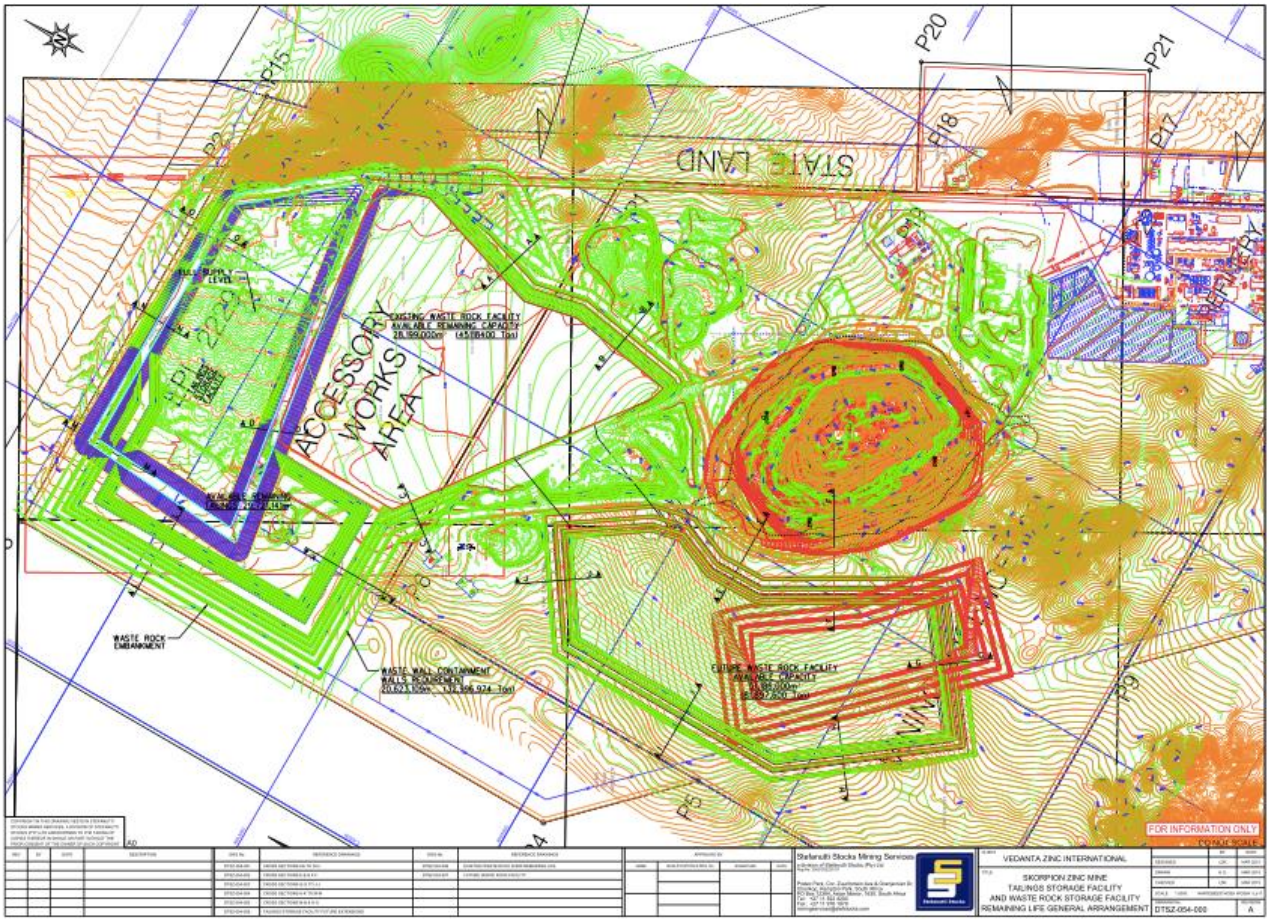


FIGURE 7 – DESIGN OF WASTE ROCK DUMP AND TAILINGS STORGAE FACILITY

5.2.3 WASTEWATER

Wastewater will be generated during operations. Process wastewater and plant runoff will be collected in two large, clay-lined surface impoundments and are pumped to the wastewater treatment plant for neutralization.

It is recommended that during operations regular water samples shall be taken to ensure that the treated effluent complies with the prescribed general water standards. Where water quality does not meet prescribed standards, effluent should be contained and pumped into the existing wastewater treatment plant for further management. Wastewater that is discharged into the environment must comply with wastewater discharge specifications.

5.3 AIR QUALITY

5.3.1 AIR QUALITY IMPACT ASSESSMENT FOR THE INITIAL 150 000 TPA REFINERY PRODUCTION

During the initial EIA of 2015, an Air Quality Impact Assessment (AQIA) study was conducted by IMA Trader 20 cc in 2015. The study assessed the air quality impacts from the proposed metallurgical process plant on the ambient receiving environment, especially in respect of the sulphur dioxide (So_2) emissions. The source of the noxious gases emission is likely to be from the electrowinning, acid plant and solvent extraction.

It is planned that the existing acid plant will be decommissioned. The impact before the decommissioning period was predicted to be of low potential and unlikely to have a significant impact on the receiving environment (GSC - EIA, 2015). Additional to the assessment of the new plant emissions, emissions from the roaster plant, pre-heater and calcine handling unit were assessed, with key fugitive emissions from these sources, such as during material handling and emissions not released through a vent or stack being particulate matter with a diameter of less than 10 microns (PM10) and nitrogen dioxide (NO_2).

The pre-heater only operates for 100 hours per annum; as such, only short-term impacts from these sources were assessed. The following key pollutants, and their source, were assessed:

- SO_2, associated with the metallurgical acid plant and roaster plant;
- NO_2, associated with the roaster plant and pre-heater; and
- PM_{10}, associated with the calcine handling unit, roaster plant and pre- heater.

The proposed Namzinc operations are expected to emit the following pollutants:

- SO_2 is a colourless gas that exhibits a taste and an odour at certain levels. SO_2 is a precursor to sulphuric acid, an aerosol particulate component that contributes towards acid deposition. Health effects of high concentrations of ambient SO_2 include breathing difficulties, weakening pulmonary defences and aggravation of cardiovascular disease (USEPA, 2011). Pollutant sources include industrial processes and, to a lesser extent, vehicular emissions. SO2 is a good indicator of atmospheric pollution levels, and can also be used to infer pollutant source with high SO_2 to NO_2 ratios indicating industrial pollution sources, particularly the combustion of coal.

- Particulate matter (PM) limits visibility and poses significant health risks. PM with an aerodynamic diameter of less than 10 microns (PM10) can penetrate deep into lungs, while smaller particles with an aerodynamic diameter of less than 2.5 microns (PM2.5) can enter the bloodstream via capillaries in the lungs, with the potential to be laid down as plaques in the cardiovascular system or brain. Health effects include respiratory problems, lung tissue damage, cardiovascular problems, cancer and premature death. Acidic particles may damage buildings, vegetation and acidify water sources (USEPA, 2011).

- NO_2 is an intermediary between NO (nitric oxide) and O_3 (ozone) formation and is a precursor to nitric acid, which is a component of acid deposition. High concentrations of NO_2 can irritate the lungs and lower resistance to respiratory infections (USEPA, 2011). This secondary pollutant results from combustion of fossil fuel to produce NO, followed by exposure to ultraviolet radiation to produce NO_2. NO_2 is a good indicator of atmospheric pollution levels, and can assist with pollutant source identification since higher NO_2 to SO_2 concentrations suggest vehicular pollution sources, while higher lower SO_2 to NO_2 ratios generally indicate industrial sources.

Since Namibia does not have air quality guidelines or limits, simulated ambient ground level concentrations were assessed against the IFC ambient air quality guidelines (AQG), which references the World Health Organisation (WHO) AQG. Where none were available for specific time-averaging periods, reference was made to the South African National Ambient Air Quality Standards (NAAQS).

The ambient air quality guidelines, as contained within the IFC, Environmental, Health and Safety (EHS) Guidelines of 2007, are applied to assess the potential impact of the proposed acid plant on the receiving environment. The ambient air quality guidelines applicable to this assessment are presented in Table 6.

TABLE 6 - WHO AMBIENT AIR QUALITY GUIDELINES (2005); EXTRACTED FROM THE IFC EHS GUIDELINES (2007)

	Averaging Period	Guideline (µg/m^3)
Sulphur Dioxide (SO_2)	24 hours*	20
	10 minute	500
Nitrogen Dioxide (NO_2)	Annual	40
	1 hour	200
Particulate Matter (PM_{10})	Annual*	20
	24 hours*	50
*Interim targets stipulated, although for the purposes of this study the most stringent guidelines are applied.		

The prevailing wind field, based on on-site weather data for the period 2012, was reported to be from the southeast (26% of the time), with wind speeds occasionally exceeding 6 m/s, and a high percentage of calm conditions (31%). The main findings from the 2015 AQIA (IMA Trader 20, 2015) were:

- Long-term SO_2 concentrations remain low with no exceedances predicted within the modelling domain for all stack heights.

- Exceedances of the SO_2 24-hour IFC guideline are predicted close to source with the lowest stack height, although by increasing the stack height, ground level concentrations improve significantly, with no exceedances predicted within the modelling domain.

- SO_2 P100 10-minute concentrations remain low, with no exceedances predicted in the modelling domain for all stack heights.

- Short-term (P100 1-hourly) NO_2 concentrations are predicted to exceed the IFC guideline at times, although these concentrations were assessed using a full year of data (8784 hours). In reality, the roaster plant and pre-heater only operate 100 hours/annum. It is, therefore, unlikely that NO_2 concentrations will exceed the guideline for a significant number of hours if assessed proportionately.

- Short-term (P100 24-hour) PM10 concentrations remain low, with no exceedances predicted within the modelling domain.

- SO_3 emission rates for the new metallurgical acid plant and roaster plant are reported as <1.25 g/s. Since there are no ambient standards provided by the IFC for this pollutant, the ratio of this emission rate to better known SO_2 is compared. At less than seven percent (< 7%), it is considered to be of negligible impact given the ambient predictions for SO_2. The IFC (2007) also suggests conversion efficiency of > 99.7% for greater than 5% off-gas which can be applied to SO_3 emission tests once the plant is commissioned. 'As-built' measurements will ensure alignment with latest guidelines / best international practice.

Recommendations summary by IMA Trader 20, 2015:

The proposed metallurgical process plant at Skorpion Zinc should be authorised, however, ensuring that the minimal ground level SO_2 concentrations, the stack should be built to a minimum height of 70 m (not 50 m). Whilst a stack height of 100 m is ideal for dispersion, the 70 m stack height is considered the best practicable option given that at this height, impacts are already confined within the plant boundary. The occurrence of such sporadic elevated concentrations in an occupational zone is not considered significant in terms of the occupational health and safety guidelines, which are vastly more lenient than the IFC ambient air quality guidelines against which these results are benchmarked."

"As with all new processes, isokinetic stack tests are recommended to ensure that the 'as-built' design complies with the emission rates as used in this assessment, and to meet evolving requirements for best international practice. Latest IFC and WHO documents should be referenced in this regard whenever stack tests are conducted (typical completed post-commissioning and annually thereafter).

In conclusion, the overall findings of the 2015 AQIA indicated that the impact on the receiving environment from the proposed project were negligible, particularly considering the uninhabited project site area (refer to Appendix E for the 2015 AQIA report).

5.3.2 AIR QUALITY IMPACT ASSESSMENT FOR THE ADDITIONAL 150 000 TPA REFINERY PRODUCTION

For the purpose of this amendment, further consultation for an air quality assessment were deemed necessary, to determine the potential impacts of atmospheric pollution to air quality due to the additional modification to the Namzinc Refinery. The AQIA is conducted to assess the potential for impacts from the proposed project on the surrounding environment and human health. An AQIA technical memo was issued on the 15 September 2021 by Airshed Planning Professionals (Pty) Ltd, after a review of the 2015 AQIA to determine whether the mitigation measures and monitoring requirements for the 150 000 tpa Refinery would be sufficient for doubling the plant production to 300 000 tpa. Doubling the plant would require an additional roaster, leaching facility, solvent extraction, limestone milling, impurity removal, electrowinning and melting-casting facilities along with associated utilities and auxiliaries. Figure 8 indicates the location of the Namzinc Refinery, the potential receptors to the site and double the sources of emission that were considered in the AQIA.

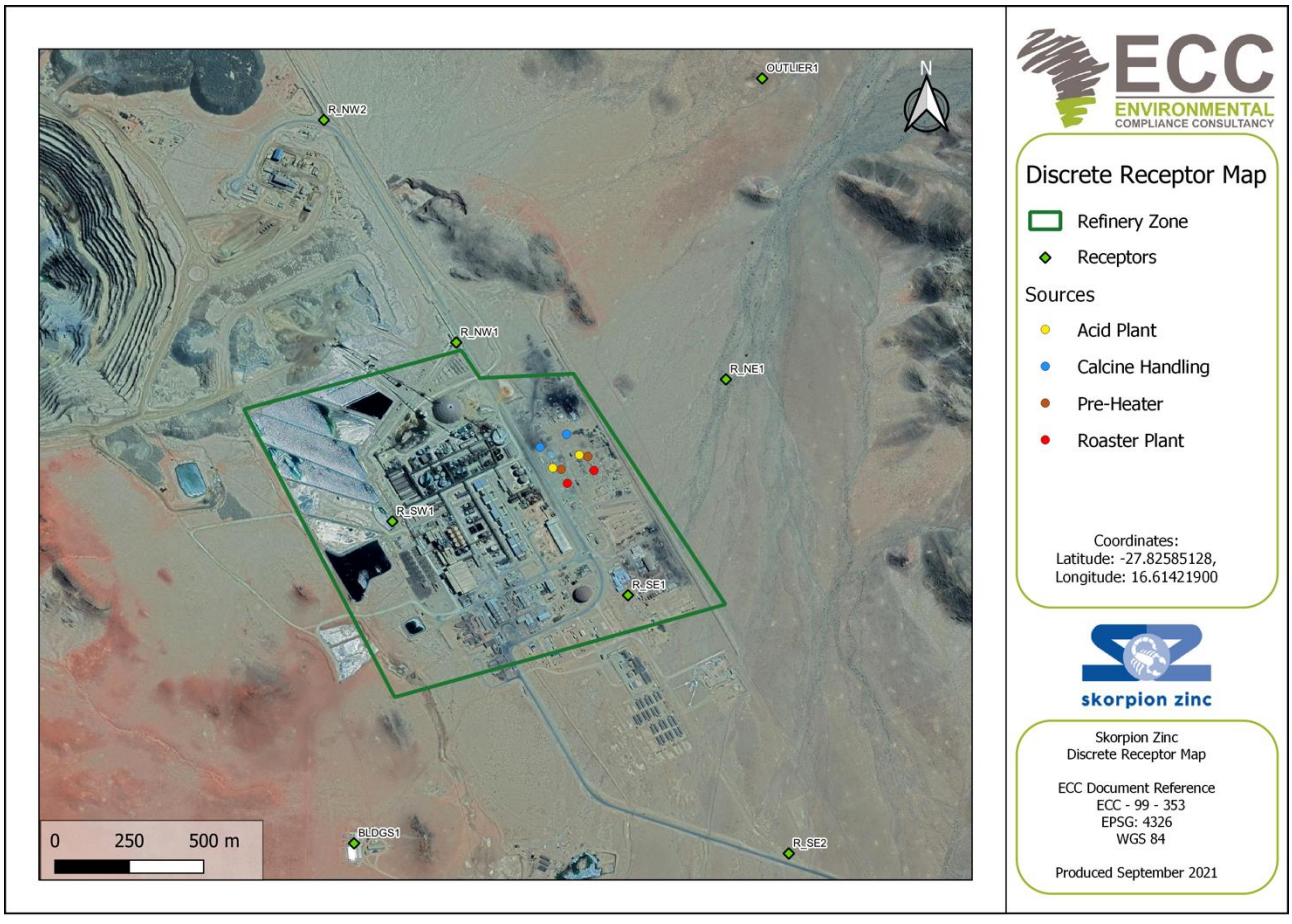


FIGURE 8 – MAP INDICATING THE NAMZINC REFINERY, SENSITIVE RECEPTORS AND SOURCES OF EMISSIONS

The 2015 AQIA covered all criteria pollutants emitted from the proposed Refinery sources, but not the non-criteria pollutants – these pollutants and IFC emission limits are listed in Table 7. The IFC guideline values for process emissions and effluents are indicative of good international industry

practice and are assumed to be achievable under normal operating conditions in appropriately designed and operated facilities through the application of pollution prevention and control techniques. These control techniques (provided in Table 7) should be achieved, without dilution, at least 95% of the time the plant or unit is operating, to be calculated as a proportion of annual operating hours.

TABLE 7 - IFC AIR EMISSIONS FOR LEAD AND ZINC SMELTING & REFINING (IFC, 2017)

Pollutant	Emission Source (by metal type / smelting process)	Guideline Value (mg/Nm³)	Control techniques
SO2	Primary smelting, roasting and sintering	>99.1% conversion efficiency (for ~ 1 – 4% SO2 off gas) >99.7% conversion efficiency (for >5% SO2 off gas)	
	Materials pre-treatment, secondary smelting, thermal refining, melting, slag fuming, and Waelz kiln operation	<50 – 200	• Alkali scrubber (semi -dry and fabric filter, wet scrubber or double alkali using lime, magnesium hydroxide, sodium hydroxide). • Combinations of sodium or alumina/aluminum sulphate in combination with lime.
NOx	Melting of clean material, alloying, and zinc dust production; From materials pre-treatment, secondary smelting, thermal refining, melting, slag fuming, and Waelz kiln operation	100 – 300	• Low NOx burner. • Oxy-fuel burner. • Oxidizing scrubber.
Acid Mists/ Gasses	Chemical refining, electro-winning, and solvent extraction	50	• Alkali scrubber (semi -dry and fabric filter, wet scrubber or double alkali using lime, magnesium hydroxide, sodium hydroxide) • De-mister
VOC/ solvents	Chemical refining, electro-winning, and solvent extraction	5 – 15	Containment, condenser, carbon and bio -filter
Dust (PM) (a)	Melting of clean material, alloying, and zinc dust production; From materials pre-treatment, secondary smelting, thermal refining, melting, slag fuming, and Waelz kiln operation	1 – 5	• Fabric filter • Temperature control
TOC	Melting of clean material, alloying, and zinc dust production; From materials pre-treatment, secondary smelting, thermal refining, melting, slag fuming, and Waelz kiln operation	5 – 50	Afterburner or Optimized combustion.
Dioxins	Melting of clean material, alloying, and zinc dust production; From materials pre-treatment, secondary smelting, thermal refining, melting, slag fuming, and Waelz kiln operation	0.1 – 0.5	• Fabric filter, or Afterburner followed by quenching, or Adsorption by activate. • Oxidation catalyst
Arsine	Chemical refining, electro-winning, and solvent extraction	0.5	Oxidizing scrubber
Mercury	All types of metals / smelting processes	0.02	

Notes: (a) Emissions of metals are dependent on the composition of the dust produced by the processes. The composition varies and is influenced by the process source of dust and by the raw materials that are being.

Compared to the emission guidelines, the additional acid plant exceeds the SO_2 limit, the pre-heater exceeds the NO_x and PM limits, and the calcine handling unit exceeds the PM limit (Table 8). With doubling the refinery to process 300 000 tpa of refined zinc metal, it is assumed that the sources – calcine handling unit, roaster plant, pre-heater, and acid plant, would be duplicated. Thus, the emission limits would apply to each individual source.

TABLE 8 - AIR EMISSION CONCENTRATIONS FOR THE PROPOSED SKORPION ZINC REFINERY UPGRADE (ALL HIGHLIGHTED EXCEED THE IFC LIMITS)

Source ID	150 000 tpa Refinery Emissions (mg/Nm³)			
	Calcine Handling Unit	Roaster Plant	Pre-Heater	Acid Plant
Initial 150 000 tpa Refinery Upgrade				
SO_2	N.A.	5.55	11.03	930.04
NOx	N.A.	377.36	860.56	N.D.
Dust (Modelled as PM_{10})	109.19	299.67	55.16	N.A.
SO_3	N.A.	N.A	N.A	0.06
Additional 150 000 tpa Refinery Upgrade				
SO_2	N.A.	5.55	11.03	930.04
NOx	N.A.	377.36	860.56	N.D.
Dust (Modelled as PM_{10})	109.19	299.67	55.16	N.A.
SO_3	N.A.	N.A	N.A	0.06

Recommendations summary by Airshed, 2021:

- Remain in agreement that the acid plant stacks be built to a minimum height of 70 m;
- Isokinetic stack tests are recommended to ensure that the 'as-built' design complies with the emission rates, and to meet requirements for best international practice. Latest IFC and WHO documents should be referenced in this regard whenever stack tests are conducted (typical completed post-commissioning and annually thereafter;
- The IFC emission limits as set out in Table 7 should be used as guidance during the plant design; and
- Additional recommendation is around the fugitive sources associated with the proposed Refinery and expansion which includes the handling, transport, and storage of ores and concentrates. These could be significant sources of dust (PM) emissions.

The following are recommended as per the Australian National Pollutant Inventory (NPI, 2012):

- Water sprays are the most widely applied method to mitigate emissions from unpaved roads and can reduce PM emissions by 50% for level 1 watering (2 litres/m²/hour) and 75% for level 2 watering (> 2 litres/m²/hour).

- Water sprays during unloading of trucks could reduce PM emissions by 70%, and by 50% when loading and unloading stockpiles. Water sprays would also have a 50% control efficiency on the potential for windblown dust from stockpiles.
- However, given the arid environment and likely limited water supply, wind breaks around the bulk storage area would be effective (30% control efficiency) and are recommend.

Based on the findings from the AQIA review and the qualitative evaluation of increasing the Skorpion Zinc Refinery production from 150 000 tpa to 300 000 tpa of refined zinc metal, the potential for air quality impacts is likely to remain low and within the relevant AQG, with the exception of NO_2 which has a potential for short-term exceedances at nearby receptors. With the Refinery expansion towards the east of the existing plant, the area of impact remains to be towards the north-west, which is away from the town of Rosh Pinah (refer to Appendix E for the 2021 AQIA technical memo).

6 CURRENT ENVIRONMENT

The construction of the additional refinery infrastructure will be limited to the existing accessory work permit area B. This is an already disturbed area, and therefore the impacts associated with the construction activities are expected to be limited. Initial baseline specialist studies of relevance to the Namzinc Project were conducted between 2003 to 2019 and site monitoring data since this time has continued to build on the dataset from these baseline studies.

6.1.1 CLIMATE

The town of Rosh Pinah has a prevailing desert climate. The average annual temperature for Rosh Pinah is 23°C, with an average rainfall of approximately 47 mm per annum. The wind conditions in the region are controlled by the interaction of the south Atlantic anticyclone, the northward-flowing and cold Benguela Current (with associated upwelling), eastward moving mid latitude cyclones and the atmosphere pressure field over the subcontinent (Kamstra, 1985). This generally leads to strong zonal pressure gradients at the coast and the resultant fresh to strong equatorward winds. These strong equator wards winds are interrupted by the passing of coastal lows with which are associated periods of calm or NW wind conditions. Fog occurs, on average, on more than 100 days per year at Oranjemund. It forms as moist cold air from the ocean and meets the hot dry air of the desert.

The entire ecosystem is driven by wind, which redistributes sand, seed, and leaf litter through the ecosystem. The wind in the study area predominantly originates from the southeast (26% of the time), south (16% of the time) and southwest (13% of the time). The highest wind speeds are experienced in winter. Calm conditions occur 32% during winter. The most of winter is characterised by short-lived, high wind speed events. Summer experiences the lowest wind speeds, with a high frequency of calm conditions in summer (GSC – EIA, 2015).

6.1.2 GEOHYDROLOGY

The proposed project overlays two groundwater basins, namely the Namib and Orange River (Figure 9). Very limited volumes of groundwater are available in the basement rocks of the !Karas Region, since there are no productive aquifers. Lack of recharge and poor ground- water quality in most areas further aggravates the situation.

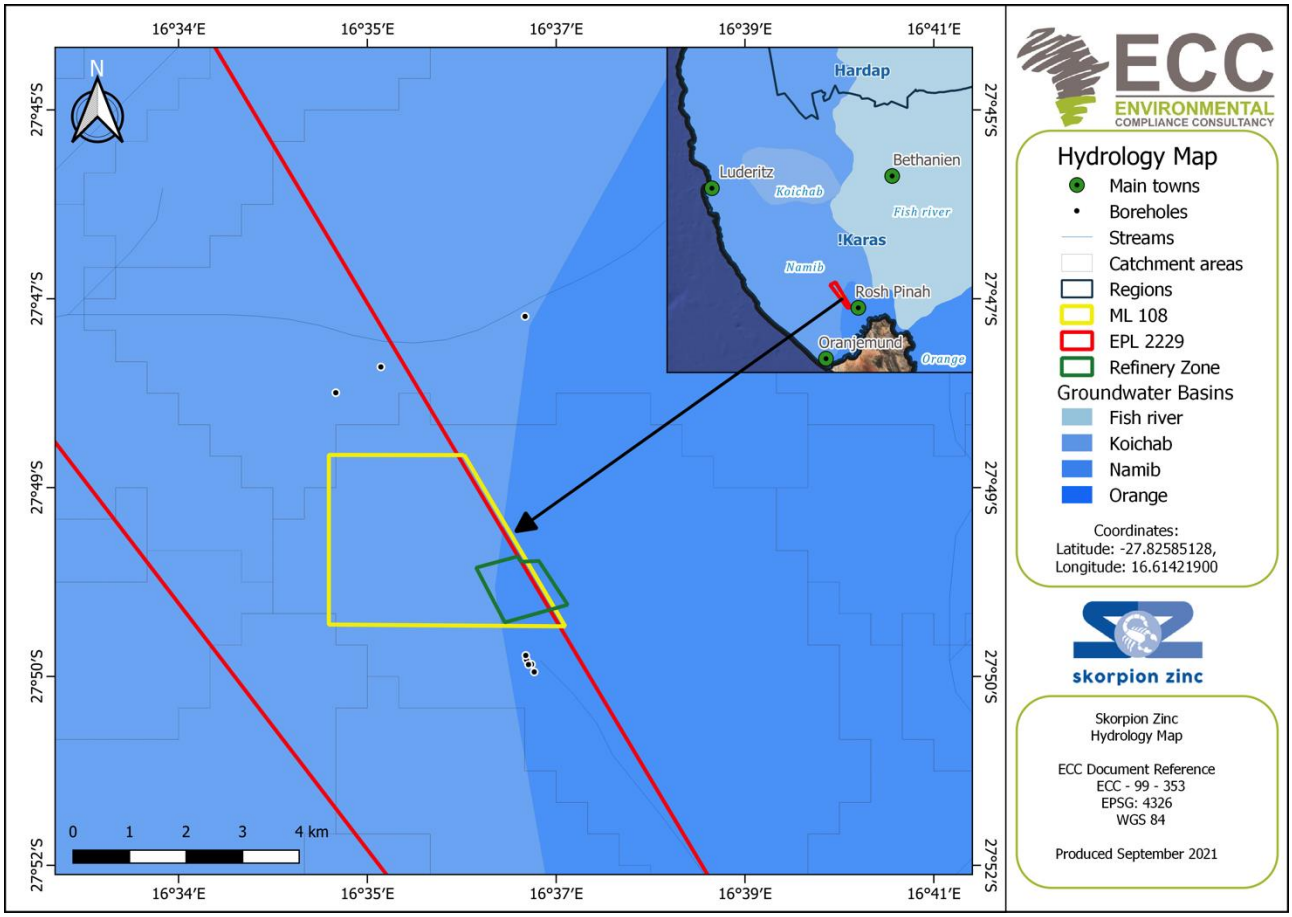


FIGURE 9 – REGIONAL AND LOCAL HYDROLOGY OF THE REFINERY

The Zebrafontein Drainage network has incised itself along the Zebrafontein Valley Fault, representing a prominent north-east trending lineament. This fault zone plays an important role in the groundwater dynamics of the area as it transects the north-west trending faults (and associated aquifers) over a distance of some 18km. As the Zebrafontein Drainage falls some 500m over this distance, the potential of this fault as a conduit (pipe-like structure or channel that transports water) for down-gradient loss of groundwater is apparent (GSC – EIA, 2015).

Groundwater resources in fractured bedrock aquifers of the Namib and the Sperrgebiet are very limited and, if exploited, extraction easily exceeds recharge. Drainage is normally dendritic from the north towards the Orange River. The dominant ephemeral river is the Fish River with its deep canyon in the Ai-Ais Nature Reserve (Christelis, G. & Struckmeier, W. (Eds.), 2001). The only permanent water in this region is the Orange River, which supplies water to towns and mines (Oranjemund, Rosh Pinah) as well as agricultural and tourism projects. The proposed project will not be abstracting groundwater during operation. Water will be required for various uses including human consumption, for construction and operational activities. Potable water will be supplied and sourced from existing onsite pipeline connections.

6.1.3 SOILS, TOPOGRAPHY AND GEOLOGY

The proposed project area overlays the Dune sand, Leptosol and Regosol soil types. 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. While Leptosols are coarse-textured, underlain by solid rock within 30 cm from the surface. The topography of Rosh Pinah can be described as generally flat with low elevated hills and mountain ranges.

The distribution of the soils is linked to the topography and wind direction in and around the study area, with a common transition point along the major natural watercourse that runs from the north-west to the south-east. The soils of the area are calcic, typical of arid environments. The soil is shallow and poorly developed with little differentiation between horizons. Organic matter and clay content is low and sodicity and salinity are high. Calcretes and calcretised gravel movement is common in this area. Shallow movement of groundwater is reflected through the occurrence of calcretes and calcretised gravels. The greater portion of the project's operational area or route is an erosion plain sloping south towards the Orange River where it becomes highly dissected. In the east, and to a lesser degree in the north, an escarpment formed by overlying Nama sediments defines the borders of the area. The western and south-western areas are mountainous (GSC – EIA, 2015).

The proposed project site is located on the south-eastern periphery of the mine site, on a gently sloping plain. The Koivib (Trekpoort) mountains are to the east of the site and rise to 1146m amsl from the surrounding flat plains (Figure 10). These mountains trend in a northwesterly direction and the northern foothills form a low natural barrier between the site and the farm Trekpoort.

The mining area is underlain by rock of Precambrian formations known as the Gariep Complex. These formations consist mainly of shale, sandstone and limestone as part of the Schwarzrand Subgroup. They are overlaid by sandstones, black limestone, shale, and conglomerates of the Kuibis Subgroup. The sedimentary units overlie the unconformable crystalline and metamorphic rocks of the Vioolsdrif Suite and the Orange River Group. A blanket of unmineralized overburden consisting of calcrete, boulder beds and recent sand dunes overlies the Sedimentary layer (GSC – EIA, 2015).

FIGURE 10 – KOIVIB MOUNTAINS TO THE EAST OF THE SITE

6.1.4 VEGETATION

The proposed project overlays three vegetation types namely the Succulent Steppe, Southern Desert and Desert/Dwarf shrub transition (Figure 11). The landscape extends across two biomes, the Nama Karoo and the Succulent Karoo, and the transition zone between them. The succulent Karoo ecosystem is the most diverse desert system in the world. The vegetation between Aus and Rosh Pinah can be described as a composition of bushes and shrubs with grasses evident almost throughout the landscape. The Rosh Pinah landscape is in the hyper-arid zone. The high mountains, deep valleys, perennial Orange River and effects of coastal fog (in the extreme west) contribute to adding further habitat diversity to the area.

Environmentally sensitive sites include, but are not limited to: areas with high conservation value due to the presence of important plant specimens, pristine habitats and high biodiversity. To minimise impacts on vegetation during transportation, only existing tracks and designated resting points must be utilised.

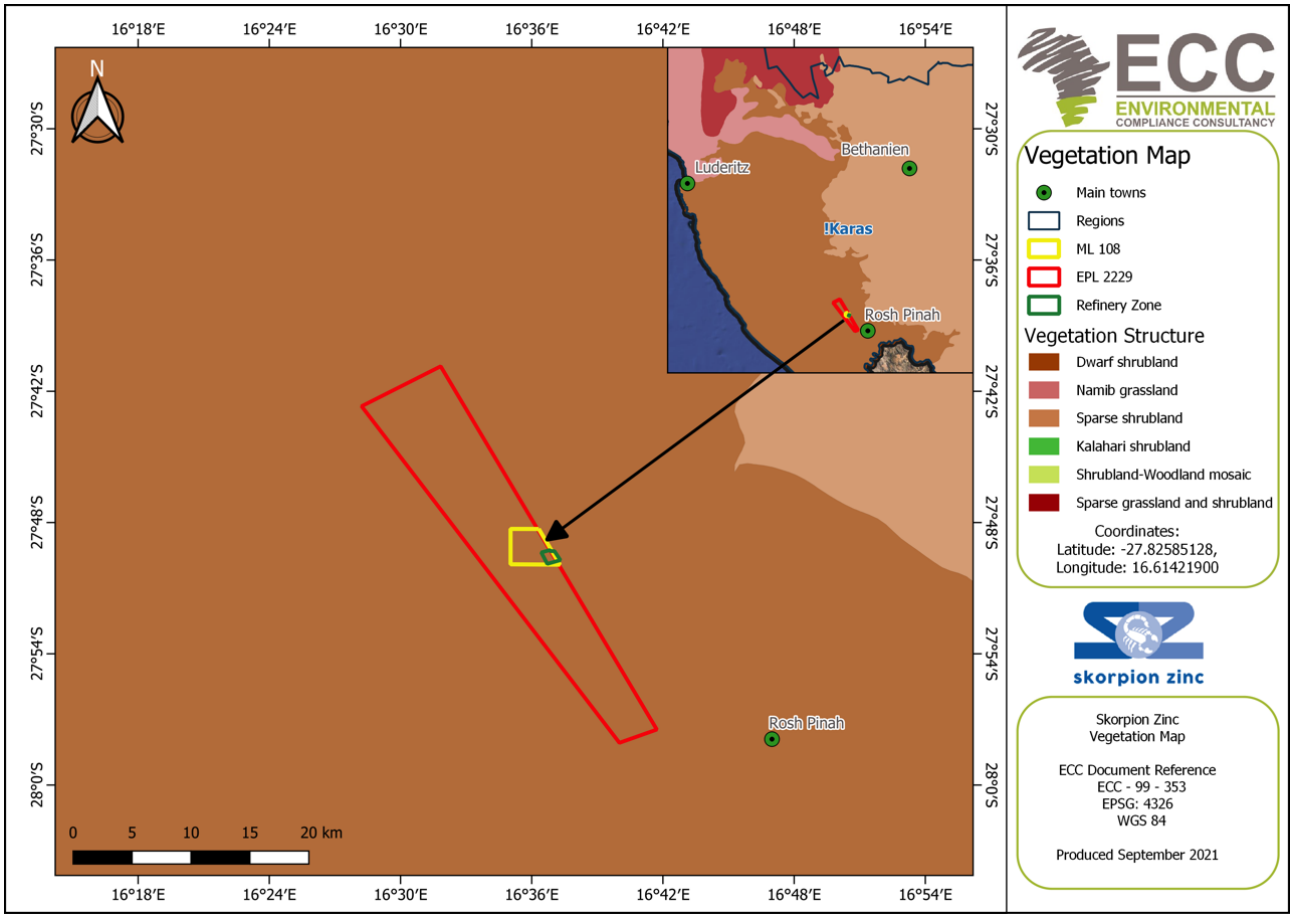


FIGURE 11 – REGIONAL AND LOCAL VEGETATION STRUCTURE OF THE REFINERY

6.2 SOCIO-ECONOMIC ENVIRONMENT

The !Karas Region is the southernmost and least densely populated of the 14 regions of Namibia. The region showed a population increase of 1.1%. This is less than the Namibian intercensal growth rate of 1.4%.

The !Karas Region consists of the municipality of Keetmanshoop, the towns of Karasburg, Lüderitz and Oranjemund, and the self-governed villages of Aroab, Berseba, Bethanie, Koës and Tses. The region has a well developed energy and water network and an advanced post and telecommunications system that links villages and towns with the rest of the country and the world at large. Oranjemund has a well-developed water and electricity reticulation system. Water is obtained from the Orange River and electricity directly from Eskom. Water for irrigation is obtained from the Naute Dam and the Orange River.

Rosh Pinah does not have a municipality, but is managed by RoshSkor, which is a joint venture management committee established between the two mines. This town management company is responsible for providing services with regards to waste and sewage, sanitation, and water and electricity. RoshSkor also faces several challenges which includes, amongst others, increased pressure on available housing and sanitation services brought about by an influx of job seekers. Rosh Pinah's economy is completely reliant on the presence of the mines. The small economy is fuelled either by the salaries earned by mine staff or by staff of business partners that do work for

the mines. Any fluctuation in the international Zinc Industry or performance of either one of the two mines has an immediate impact on this micro economy. Other economic activities of a minor scale surrounding the town include farming, conservation and tourism activities.

6.2.1 EMPLOYMENT

The proposed conversion holds several socio-economic benefits and will mostly maintain existing employment opportunities, on-the-job training and increase spending on consumables and economic knock-on effects, which will be felt locally in Rosh Pinah. The construction of the additional processing plant will involve 1000 casual construction staff. Only the skilled labour (staff) will be housed on site in a construction camp. After the construction phase is complete, up to 24 plant operators will be permanently employed in the processing plant (GSC – EIA, 2015).

It is estimated that up to 2500 people will be employed at the peak of construction and approx. 1300 will be permanently employed once the project is operational.

The proponent employed approximately 1400 direct employment jobs (800 permanent and 600 contracted employees) prior to going under Care and Maintenance. The proposed activities will extend operations at Namzinc, estimated to run up to 2032 and in so doing extend the period that positive impacts are incurred.

6.2.2 HEALTH

Since independence in 1990, the health status of Namibia has increased steadily with a remarkable improvement in access to primary health facilities and medical infrastructure. In 2015 the World Health Organization (WHO) recommended strategic priorities of the health system in Namibia which entail improved governance, an improved health information system, emergency preparedness, risk reduction and response, preventative health care and the combating of HIV/AIDS and TB (WHO, 2016). According to the MoHSS health facility census (MoHSS, 2009), the !Karas Region only has a recorded 19 health care facilities and have the lowest occupancy rate.

At the beginning of 2020 the coronavirus disease (COVID-19), caused illness in humans at a pandemic scale and has resulted in an increasing number of deaths worldwide. The viral outbreak is adversely affecting various socio-economic activities globally, and with reports of the increasing number of people testing positive, it is anticipated that this may have significant impacts on the operations of various economic sectors in Namibia too. The disease caused many countries to enter a state of emergency and lockdown mode, with dire economic consequences. In addition, these measures have a detrimental effect on the economy – and Namibia is in both cases no exception.

Most Namibian organisations indicated that they were not prepared to deal with extreme events like the COVID-19 outbreak. Most organisations' HR policies do not cater for extreme events like COVID-19. However, most are currently reviewing their HR policies to better prepare for the

future business operations, due to potential pandemic level impacts. Organisations are encouraged to communicate to employees the risks associated with the current COVID-19 outbreak and to implement precautionary hygiene measures, which may include but not limited to social distancing, regular sanitizing, voluntary vaccinations and practicing self-isolation when showing covid-19 symptoms. Furthermore, in an effort to alleviate the impact of the new coronavirus, the Namibian government has implemented increasingly stringent precautionary measures in public spaces.

7 IDENTIFICATION AND EVALUATION OF IMPACTS METHODOLOGY

7.1 INTRODUCTION

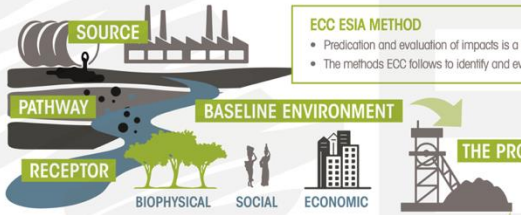
This chapter outlines ECC's method to identify and evaluate impacts arising from the proposed project. The findings of the assessment are presented in chapter 7.

The evaluation and identification of the environmental and social impacts require the assessment of the project characteristics against the baseline characteristics, ensuring all potentially significant impacts are identified and assessed. The significance of an impact is determined by taking into consideration the combination of the sensitivity and importance/value of environmental and social receptors that may be affected by the proposed project, the nature and characteristics of the impact, and the magnitude of potential change. The magnitude of change (the impact) is the identifiable changes to the existing environment which may be negligible, low, minor, moderate, high, or very high; temporary/short term, long-term or permanent; and either beneficial or adverse.

This chapter provides the following:

- Details on the assessment guidance used to assess impacts;
- Lists the limitations, uncertainties and assumptions with regards to the assessment methodology;
- Details how impacts were identified and evaluated, and how the level of significance was derived; and
- Details how mitigation was applied in the assessment and how additional mitigation was identified.

IMPACT PREDICATION AND EVALUATION



ECC ESIA METHOD

- Predication and evaluation of impacts is a key step in the EIA process.
- The methods ECC follows to identify and evaluate the impacts arising from projects is outline in this diagram.

THE FOLLOWING PRINCIPLES ARE USED BY ECC FOR ASSESSMENTS

- International Finance Corporation standards and models, in particular Performance Standard 1, 'Assessment and management of environmental and social risks and impacts' (International Finance Corporation, 2017) (International Finance Corporation, 2012);
- International Finance Corporation OA and Management Good Practice Handbook (International Finance Corporation, 2013) and,
- Namibian Draft Procedures and Guidance for EIA and EMP (Republic of Namibia, 2008).

DETERMINE THE SIGNIFICANCE OF AN IMPACT

SENSITIVITY AND VALUE OF A RECEPTOR
The sensitivity and value of a receptor is determined by identifying how sensitive and vulnerable a receptor is to change, and the importance of a receptor (internationally, nationally, locally)

NATURE AND CHARACTERISTICS OF THE IMPACT
The nature and characteristics of the impact is determined through consideration of the frequency, duration, reversibility and probability of the impact occurring.

MAGNITUDE OF CHANGE
The magnitude of change measures the scale or extent of the change from the baseline condition, irrespective of the value. The magnitude of change may alter over time, therefore temporal variation is considered (short-term, medium-term, long-term, reversible, reversible enivornmental assessment methodology.

ECC – NATURE OF IMPACT

BENEFICIAL (POSITIVE)
An impact that is considered to represent an improvement on the baseline or introduces a positive change.

ADVERSE (NEGATIVE)
An impact that is considered to represent an adverse change from the baseline or introduces a new undesirable factor.

ECC – TYPE OF IMPACT

DIRECT
Impacts causing an impact through direct interaction between a planned project activity and the receiving environment/ receptors.

INDIRECT
Impacts that result from other activities that are encouraged to happen as a result / consequence of the Project. Associated with the project and may occur at a later time or wider area

CUMULATIVE
Impacts that arise as a result of an impact and effect from the project interacting with those from another activity to create an additional impact and effect

REVERSIBILITY

REVERSIBLE
Impacts are reversible and recoverable in the future

PARTLY REVERSIBLE
Some parts of the impact can be reversed while others remain

IRREVERSIBLE
Impacts which are not reversible and are permanent

DURATION

TEMPORARY
Transient; a period of less than 1 year

SHORT TERM
Impacts that are likely to last for the duration of the activity causing the impact and are recoverable (1-5 years)

MEDIUM TERM
Impacts that are likely to continue after the activity causing the impact and are recoverable (5-15 years)

LONG TERM
Impacts that are likely to last far beyond the end of the activity causing the damage (greater than 15 years with impact ceasing after decommissioning of the project)

PERMANENT

MAGNITUDE OF CHANGE

VERY HIGH / UNKNOWN
Loss of resource, significantly affecting the long term quality and integrity of a resource; irreparable damage or loss of key characteristics, features or elements; or the magnitude is too great to quantify as it is unknown.

HIGH / MAJOR
Loss of resource, and quality and integrity of resource; severe damage to key characteristics, features or elements; or
Large scale or major improvement of resources quality; extensive restoration or enhancement; major improvement of attribute quality.

MODERATE
Loss of resource, but not adversely affecting its integrity; partial loss of/damage to key characteristics, features or elements; or
Benefit to, or addition of, key characteristics, features or elements; improvements of attribute quality.

LOW / MINOR
Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (or maybe more) key characteristic, feature or element; or
Minor benefit to, or addition of, one (or maybe more) key characteristic, feature or element; some beneficial effect on attribute quality or a reduced risk of a negative effect occurring.

NONE / NEGLIGIBLE
Very minor loss or detrimental alteration to one (or maybe more) characteristic, feature or element; or
Very minor benefit to, or positive addition of, one (or maybe more) characteristic, feature or element.

SCALE OF CHANGE - EXTENT / GEOGRAPHIC SCALE

ON-SITE
Impacts that are limited to the boundaries of the proposed project site

LOCAL
Impacts that occur in the local area of influence, including around the proposed site and within the wider community

REGIONAL
Impacts that affect a receptor that is regionally important by virtue of scale, designation, quality or rarity.

NATIONAL
Impacts that affect a receptor that is nationally important by virtue of scale, designation, quality or rarity.

INTERNATIONAL
Impacts that affect a receptor that is nationally important by virtue of scale, designation, quality or rarity.

PROBABILITY

IMPROBABLY (RARE)
The event may occur in exceptional circumstances yet, rarely occurs in the industry. The event could occur once every 100 years

LOW PROBABILITY (UNLIKELY)
The event has happened elsewhere yet, is unlikely to occur. The event could occur once every 10 years

MEDIUM PROBABILITY (POSSIBLE)
The event could occur under some circumstances. The event could occur once every 5 years.

HIGH PROBABILITY (LIKELY)
The event is expected to occur. The event could occur twice per year

DEFINITE (ALMOST CERTAIN)
The event will occur. The event could occur once per month

- To ensure the beneficial impacts are brought out in the assessment, green has been applied to ensure the different type of impact is clear.
- The significance of impacts has been derived at by applying the identified thresholds for receptor sensitivity and magnitude of change, as well as the definition of significance. Moderate and major adverse impacts are considered as significant.
- The following thresholds were therefore used to double check the assessment of significance had been applied appropriately; a significant impact would meet at least one of the following criteria:
- It exceeds widely recognized levels of acceptable change;
- It threatens or enhances the viability or integrity of a receptor or receptor group of concern; and
- It is likely to be material to the ultimate decision about whether or not the environmental clearance certificate is granted.

			SIGNIFICANCE OF IMPACT			
			Significance of Impact	Impacts are considered to be loca factors that are unlikely to be critical to decision-making	Impacts are considered to be important factors but are unlikely to be key decision-making factors. The impact will be experienced, but the impact magnitude is sufficiently small (with and without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value. Impacts are considered to be short-term, reversible and/or localized in extent.	Impacts are considered within acceptable limits and standards. Impacts are long-term, but reversible and/ or have regional significance. These are generally (but not exclusively) associated with sites and features of national importance and resources/ features that are unique and which, if lost, cannot be replaced or relocated.	Impacts are considered to be key factors in the decision-making process that may have an impact of major significance, or large magnitude impacts occur to highly valued/sensitive resource/receptors. Impacts are expected to be permanent and non-reversible on a national scale and/ or have international significance or result in a legislative non-compliance.
	Biophysical	Social		Low	Minor (2)	Moderate (3)	Major (4)
SENSITIVITY	A biophysical receptor that is protected under legislation or internation convention (CITIES) listed as rare, threatened or endangered IUCN specidies. Highly valued/ sensitive resource/ receptors.	Those affected people/ communities will not be able to adapt to changes or continue to maintain pre-impact livelihoods.	High (3)	Minor (3)	Moderate (6)	Major (9)	Major (12)
	Of value, importance/ rarity on a regional scale, and with limited potential for substitution; and/or not protected or listed (globally) but may be a rare or threatened species in the country; with little reslisence to ecosystem changes, important to ecosystem functions, or one under threat or population decline.	Able to adapt with some difficulty and maintain pre-impact status but only with a degree of support	Medium (2)	Low (2)	Minor (4)	Moderate (6)	Major (8)
	Not protected or listed as common/abundant; or not ciritcal to other ecosystems functions.	Those affected are able to adapt with relative ease and maintain pre-impact status. There is no preceptible chnage to people's livelihood.	Low (1)	Low (1)	Low (2)	Minor (3)	Moderate (4)

SENSITIVITY AND VALUE

Low
Of value, importance or rarity on a local scale; and/or not particularly sensitive to change or has considerable capacity to accommodate a change.

Medium
Of value, importance or rarity on a regional scale, and with limited potential for substitution; and/or moderate sensitivity to change, or moderate capacity to accommodate a change.

High
Of value, importance or rarity on an international and national scale, and with very limited potential for substitution; and/or very sensitive to change or has little capacity to accommodate a change.

MITIGATION

Mitigation comprises a hierarchy of measures ranging from preventative environmental impacts by avoidance, to measures that provide opportunities for environmental enhancement. The mitigation hierarchy is avoidance; reduction at source; reduction at receptor level; repairing and correcting; compensation; remediation; and enhancement.

Mitigation measures can be split into three distinct categories, broadly defined as:

Standard practices and other best practice measures for avoiding and minimizing environmental impacts. These are considered as good practice measures.

Actions undertaken by the EIA process that influence the design process, through implementing design measures that would entirely avoid or eliminate an impact or modifying the design through the inclusion of environmental features to reduce the magnitude of change. These are considered as embedded mitigation.

Specified additional measures or follow-up action to be implemented to further reduce adverse impacts that remain after the incorporation of embedded mitigation. These are considered as additional mitigation.

The EIA is an iterative process whereby the outcomes of the environmental and social assessments inform the project.

The EMP provides the good practice mitigation measures and specified additional measures or follow-up action ECC has recommended for the project.

LOW – MAJOR (BENEFICIAL)

Impacts are considered to be beneficial to the environment and society:

Low (negative) 0 - 25
Impacts are considered to be local factors that are unlikely to be critical to decision-making.

Minor (negative) 25 - 50
Impacts are considered to be important factors but are unlikely to be key decision-making factors. The impact will be experienced, but the impact magnitude is sufficiently small (with and without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value. Impacts are considered to be short-term, reversible and/or localized in extent.

Moderate (negative) 50 - 75
Impacts are considered within acceptable limits and standards. Impacts are long-term, but reversible and/ or have regional significance. These are generally (but not exclusively) associated with sites and features of national importance and resources/ features that are unique and which, if lost, cannot be replaced or relocated.

Major (negative) 75 - 100
Impacts are considered to be key factors in the decision-making process that may have an impact of major significance, or large magnitude impacts occur to highly valued/sensitive resource/receptors. Impacts are expected to be permanent and non- reversible on a national scale and/or have international significance or result in a legislative non- compliance.

8 IMPACT ASSESSMENT FINDINGS AND PROPOSED MITIGATION MANAGEMENT MEASURES

8.1 INTRODUCTION

This chapter presents the findings of the EIA for the proposed project as per the EIA process, scope and methodology set out in Chapter 2 and Chapter 6. A range of potential impacts have been identified that may arise as a result of the proposed project. The aim of this EIA report is to focus on the significant impacts that may arise as a result of the proposed project. This chapter therefore only considers the significant impacts and or those that may have specific interest to the community and stakeholders. A summary of impacts that are not considered significant is discussed in section 8.2.

To enable the processing of oxides and sulphide concentrates, modifications to the plant are required. For this amendment, the modification to the Namzinc Refinery will involve constructing an additional roaster within the plant, amongst other improvements, to double the output volume of the refined zinc metal per annum. Impacts that are considered significant or are those of interest to the community and stakeholders due to the proposed project amendment are as follows:

- Impact on air quality due to the new processing unit;
- Possible impacts on the groundwater and soils resulting from a new residue waste stream as a result of the changed process; and
- Potential socio-economic benefits such as increased employment opportunities, on-the-job training, and local economic effects in Rosh Pinah.

For each potential significant or sensitive impact, a summary is provided which includes the activity that would cause an impact; the potential impacts; embedded or best practice mitigation (stated where required / available); the sensitivity of receptor that would be impacted; the severity, duration and probability of impacts; the significance of impacts before mitigation and after mitigation measures are applied.

8.2 IMPACTS NOT CONSIDERED AS SIGNIFICANT

As a result of an iterative development process, mitigation has been incorporated and embedded into the project, thereby designing out potential environmental and social impacts or reducing the potential impact so that it is not significant. Best practice has also played a role in avoiding or reducing potential impacts. The EMP provides best practice measures, management and monitoring for all impacts.

Impacts that have been assessed as **not being significant** are summarised in table 9 and thus not discussed further.

TABLE 9 - IMPACTS NOT CONSIDERED SIGNIFICANT

ENVIRONMENT OR SOCIAL TOPIC	POTENTIAL IMPACT	SUMMARY OF ASSESSMENT FINDINGS
Cultural heritage	Potential to uncover heritage remains during project activities.	Findings are unlikely as the site has been studied and known heritage sites are already mapped and protected for the project area. The site also has a tried and tested chance find procedure in place in the very unlikely event a heritage item is discovered. No further assessment on this topic will be considered.
Waste management	Solid waste may be produced during the proposed project's construction and operational period.	This impact was deemed to be possible, however, the proponent has an ongoing waste management plan to counter the impact of waste dispersal on and surrounding the project site. All waste disposal sites should be managed in accordance with documented, site-specific waste management plans: (i) Solid, liquid, and hazardous wastes are transferred only to facilities specifically designed, approved, and operated for that purpose; (ii) Access to the site is controlled and disposal activities are supervised by trained personnel; and (iii) Records are maintained of the types, approximate quantities, and point of origin of the wastes.
Biodiversity	Potential impacts to flora and fauna from the proposed construction.	The potential impact to fauna and flora is unlikely as the proposed project will be established in an already disturbed footprint of the Mine.
Noise	Potential for noise from movement of vehicles (trucks) and machinery. Noise impacts to neighbours.	The potential for the Namzinc Refinery to generate noise that will impact neighbours is extremely unlikely given the distance from the facility's operations to the nearest sensitive receptor. The Rosh Pinah town is approximately 20 km from the Namzinc Refinery.
Fire risks and	Operational activities may	With the existing mitigation measures

ENVIRONMENT OR SOCIAL TOPIC	POTENTIAL IMPACT	SUMMARY OF ASSESSMENT FINDINGS
occurrences	increase the risk of fire occurrences. Fire risks may result in property damage, possible injury and impacts caused by explosions or uncontrolled fires.	such as a fire protection and prevention plan, with the inclusion of an emergency response and firefighting procedure, fire risks can be managed. Additional fire extinguishers or hoses should be installed at the new infrastructure as well. Especially the electrowinning plant and roaster. The occurrence of fire is possible but very rare for the proposed activities. The proponent and its business partners will take precautions throughout the development and use of an environmental contingency plan to avoid the occurrences of this impact. Therefore, this impact has been assessed to be of low significance.
Landscape and visual amenity	Potential changes to the landscape by the construction activities of the Namzinc Refinery	The Namzinc Refinery is envisioned to be constructed in the existing accessory works area B. Given the existing area of operation there will be no notable change in the landscape or visual amenity to the site.
Tailings Storage Facility	Potential to generate excessive volumes of tailings and disposals	The Namzinc Refinery operations are unlikely to generate excessive volumes of waste nor new tailings waste streams that cannot be managed by the current waste management facility. It is a negligible change to current operations. The current tailings conveying and disposal system can be used for the disposal of combined goethite tailings (neutralization residue).

8.3 SIGNIFICANT ISSUES TO BE ADDRESSED

Impacts that have been identified as significant are summarised in table 10 below.

TABLE 10 - TABLE OF POTENTIAL SIGNIFICANT IMPACTS

ENVIRONMENT OR SOCIAL TOPIC	POTENTIAL IMPACT	SUMMARY OF ASSESSMENT FINDINGS

ENVIRONMENT OR SOCIAL TOPIC	POTENTIAL IMPACT	SUMMARY OF ASSESSMENT FINDINGS
Air quality impacts	There is potential for gas emissions to be emitted during operation, as a result of the calcine handling unit, roaster plant, acid plant and pre- heater. Dust particles during construction and operation from machinery and vehicles use may as well, potentially have an impact on the ambient air quality of the surrounding area.	The gas emissions to be potentially emitted from the roasters were identified to be minimal and short term. It is expected that with the higher concentrate throughput capacity, SO_2 and NOx emissions would also increase. Dust from the operational activities may also pose a problem since the prevailing wind is south west. The site has a dust suppression system to management this impact.
Climate change – cause / contribute to	The proposed project contributing to climate change through the discharge of greenhouse gas emissions and due to increase in electricity consumption	The proposed project will generate emissions contributing to atmospheric greenhouse gas accumulation. Additionally, the Namzinc Refinery's anticipated emissions may increase due to the electricity consumption doubling in support of the additional 150 000 tpa production and amendments to be. The proponent will carry out a scope for emissions to verify the carbon footprint in line with Namibia Paris agreement commitments and also the Vedanta Group commitments.
Groundwater contamination due to potential acid seepage from TSF	The TSF is unlined and this could likely result in acid seepage from TSF and potentially impacting the groundwater quality. Tailings that are likely to be high in metals and contain approximately 8% sulphides which are classified as Potential Acid Forming (PAF). Calcine leach residue has some potential to generate acid drainage.	The sulphides in the tailings although reactive, do not produce sufficient acid to lower the pH of the material which is typically around pH 8. It is therefore considered unlikely that oxidised zones within the TSF will significantly acidify. The calcine leach residue may have a high acid drainage potential but will be neutralised with limestone. Limestone has a significant potential to neutralize acidity.

ENVIRONMENT OR SOCIAL TOPIC	POTENTIAL IMPACT	SUMMARY OF ASSESSMENT FINDINGS
		Ongoing monitoring of seepage rates through recovery and observation boreholes should be maintained.
Surface water contamination	Suspended and dissolved solids and metals; and oil and grease likely to be present in water effluent	Water use shall be minimized as practicable, possibly through the recycling or reuse of water and the cascading of cooling water and wastewater between production processes using lower-quality water. At Namzinc all wastewater streams are directed to a treatment facility prior to discharge to the environment.
Changes to surrounding landscape	There is potential for visual impacts due to the optimal construction of the 70 meters height stacks (acid plant) as per the AQIA recommendation.	The acid plant infrastructures will be the tallest visible infrastructure in the region, which will potentially change the surrounding landscape. However, the 70 meters stacks will be far from receptors and the nearest town and residential area is Rosh Pinah. The visual impacts of the infrastructure are assessed, indicating noticeable visual points.
Potential impacts to Avian Fauna	There is potential for bird collision risk due to the optimal construction of the 70 meters height stacks (acid plant) as per the AQIA recommendation.	There is little identification or birdlife observed in the study area, the proposed stack at the Namzinc Refinery is not in a roosting area and it is unlikely to be in a flight line or migratory path for the birds due to the existing operational activities on site.

8.4 POTENTIAL PROJECT IMPACTS AND ASSESSMENT: SOCIOECONOMIC ENVIRONMENT

The term socio-economic impact assessment embraces both social impacts and economic impacts. Economic impacts include issues such as employment, changes in economic activity, and increased expenditure. The significant economic impact or impact that holds specific interest to the community and stakeholders is employment creation and is summarised in this section.

8.4.1 EMPLOYMENT

Whilst Namibia has a medium unemployment rate, the !Karas Region has one of the highest employment rates in Namibia. In Rosh Pinah, most of the employment is through the mining sector, which to a large degree is developed. Mining in the !Karas Region employs a large number of local residents; fishing is also one of the main sectors of employment in the Lüderitz area. The national value and sensitivity of employment is considered to be high as it is of importance to the country and the local economy.

DIRECT EMPLOYMENT: CONSTRUCTION

Approximately 1000 jobs will be generated during the construction phase. The proponent will employ local people wherever possible and feasible to fulfil the roles. Construction work will take approximately 18 months; the beneficial impact of creating 1000 temporary jobs will result in a temporary impact with a low magnitude of change. A minor beneficial impact on the community and economy is therefore expected.

DIRECT EMPLOYMENT: OPERATION

The proponent is currently providing approximately 1300 direct jobs (skilled and semi-skilled). With the expansions of operations, the proponent will be able to maintain its employees as a direct result of the project, with the anticipated downstream of jobs such as goods procurement services, and contractor works expected throughout the lifespan of the project. The magnitude of change during operation is considered as low but has long term effects thereby resulting in a minor beneficial impact on the community and economy.

SUMMARY OF EMPLOYMENT IMPACTS

TABLE 11 - SUMMARY OF IMPACTS TO LOCAL ECONOMY

Activity	Receptor	Impact	Nature of impact	Value & Sensitivity	Magnitude of change	Significance of impact
Construction works - general	– Community – Job seekers – Local economy	Creation of 1000 jobs for construction period	Beneficial Direct Partially Reversible Regional Short Term Reversible	Medium	Minor	Beneficial Minor (9)

Activity	Receptor	Impact	Nature of impact	Value & Sensitivity	Magnitude of change	Significance of impact
Operations of the proposed project	– Community – Job seekers – Local economy	Maintaining of 1300 jobs, with the potential of creating new opportunities	Beneficial Direct Partially Reversible Regional Long Term Reversible	Medium	Minor	Beneficial Minor (9)
Downstream economic injection (multiplier effect)	– Local economy (goods and services trade businesses)	Financial injection into goods and services trading businesses in the local economy	Beneficial Indirect Partially Reversible Local Long Term Reversible	Medium	Minor	Beneficial Minor (9)

8.5 Potential Project Impacts and Assessment: Biophysical Environment

8.5.1 Impacts on Air Quality

Metal processing plants are facilities that extract various metals from ore to create more refined metal products. Metallurgical complexes primarily cause pollution through gaseous and particle release into the environment. A potential impact to air quality is the deterioration in air quality from gases emissions and particulate matter (i.e. total suspended particulate matter (TSP), PM10 and dust deposition) generated from the refinery operations. In this case the primary output for Namzinc is the production of refined zinc metal. Extractive metallurgical processes can be highly polluting activities when not controlled properly.

Facilities that carry out metal processes are known to emit high quantities of air pollutants. In addition, the procedures in metal refining use large volumes of sulphuric acid, which can contribute to the release of gaseous emissions or pollutants. Pollutants may be released as fine particles or volatile compounds, either via the chimney or as “fugitive” emissions from general operations. Organic vapours and sulphur oxides resulting from secondary roasting operations and fuel combustion can cause smog, containing ozone, fine airborne particles, nitrogen oxides, sulphur dioxide and carbon monoxide. Metal-bearing dust particles can travel far distances to pollute the soil and surface waterways.

Modern processing plants can be designed and operated to control releases to very low levels. One key aspect is to improve the quality of operations. The opportunities for improvement may be taken into consideration when processing plants are upgraded for economic and production reasons.

An AQIA was conducted to assess the potential for impacts from the proposed project on the surrounding environment and human health. The overall conclusion interpreted from IMA Trader 20 in 2015 indicated that the impact on the receiving environment from the proposed project were negligible, particularly considering the uninhabited project site area. The recommendation entailed that the proposed metallurgical process plant at Skorpion Zinc should be authorised and considering the minimal ground level SO_2 concentrations, the stack should be built to a minimum height of 70 m.

In further consultation, a technical review and qualitative evaluation was done by Airshed Planning Professionals in September 2021, which, indicated that increasing the Skorpion Zinc Refinery production from 150 000 tpa to 300 000 tpa of refined zinc metal, the potential for air quality impacts is likely to remain low and within the relevant AQG, with the exception of NO_2 which has a potential for short-term exceedances at nearby receptors. The recommendation included were in agreement that the acid plant stacks be built to a minimum height of 70 m, isokinetic stack tests are recommended to ensure that the ‘as-built’ design complies with the emission rates, and to meet requirements for best international practice and the additional recommendation refer to the management of fugitive sources associated with the proposed

refinery and expansion which includes the handling, transport, and storage of ores and concentrates, which, could be significant sources of dust (PM) emissions.

8.5.2 Carbon Footprint Contributions and Vedanta Group commitments

The proposed project will contribute to climate change through the discharge of greenhouse gas emissions and potentially due to the increase in activities to support the proposed amendments of the refinery. The generated emissions will contribute to greenhouse gas accumulation. Additionally, the anticipated emission of the refinery may increase due to the electricity consumption doubling up to nearly 160 MWh.

As of 2020, Vedanta has pledged to carbon neutrality and ESG best practices. The proponent will carry out a scope for carbon footprint emissions in line with the Namibian government National Determined Contributions (NDC) in terms of the Paris Agreement commitments, as well as, the Vedanta Group commitments. In this regard, it is prudent that a carbon footprint assessment is conducted for this project, to therefore determine, reduce and enable decarbonisation by 2050. This assessment will assist in determining the new contribution to Vedanta's carbon footprint with a mission of achieving a net zero emission goal through specific emission measures, including the promotion of renewable energy, enhanced energy efficiency, water-efficient processes, green mobility, planned afforestation, and waste management and recycling.

SUMMARY OF IMPACTS ON AIR QUALITY

TABLE 12 - IMPACTS TO AIR QUALITY DUE TO NOXIOUS GASES AND DUST EMITTED DURING OPERATIONS OF THE REFINERY

Activity	Receptor	Impact description	Nature of impact	Value & Sensitivity	Magnitude of change	Significance of impact	Mitigation Measures	Significance of impact (Post mitigation)
Impacts to Air Quality	– Community – Neighboring farmers – Employees	Gas emissions from the roasters as well as the settling of dust from machinery and vehicles may potentially have an impact on the atmospheric air, affecting the air quality of the surrounding area.	>Adverse >Direct >Partially Reversible >Moderate >Medium Term >Local >Likely	Medium	Moderate	**Moderate (6)**	> Ensure mechanical equipment are maintained and serviced to ensure particulate matter is reduced > Practise dust suppression methods by means of water sprays > The process of roasting zinc include a gas cleaning and gas recovery acid plant >Where necessary consider the use of air bag filters as part of the refinery plant > Ensure monitoring of gas emissions to understand the extend of pollution in the air	**Minor (3)**

8.5.3 IMPACTS ON GROUNDWATER AND SURFACE WATER QUALITY

The potential for groundwater contamination was identified to be a significant impact in this assessment. High alkaline effluent and tailings may potentially release acid to surface water and groundwater if not contained properly and treated before discharge. The water tables of the sites are predicted to be high, and the water flow is southwest, fortunately there are currently no downstream groundwater consumers to the site.

Tailings are produced from the processing of sulphide concentrates and may have great concentrations of pyrite. Since tailings are composed of small mineral particles (the size of fine sand are smaller) and they can react with air and water more rapidly. Therefore, the potential to develop acidic conditions in pyrite-rich tailings is possible.

The Effluent Treatment Plant (ETP) Cake is classified as Hazardous Waste according to the waste classification systems (GCS Water and Environmental Consultants (Pty) Ltd, 2015). It will be transported directly from the Skorpion Zinc Mine plant to the tailings dam. All the evaporation ponds are lined with 2mm UV resistant HDPE.

The TSF design and the nature of the tailings play a role in preventing impacts to groundwater systems. At Namzinc the tailings are unlined, however, the refinery's design incorporates a zinc extraction process that recycles and reuses water to such an extent that there should be almost zero mineral effluent discharge from the refinery. It is suggested that Acid-base accounting (ABA) sampling and analyses be completed for the TSF with complementing leach tests to understand and analyse the extent of pollution potential of the site, this should be implemented especially the rainy season and periods of high air moisture content in the area. Considering the use of reclamation methods that facilitate runoff can prevent the infiltration of surface water into tailings. If not prevented or controlled, the acidic and metal-bearing waters from tailings can impact stream habitats and groundwater.

It is further recommended that a limestone blend ratio of 1:1 (1 part limestone to neutralise 1 part calcine leach residue dry basis) would minimize any potential contamination impact. It is therefore recommended to neutralise the calcine leach residue with limestone (1:1 ratio) before disposing along with other residues onto the current unlined tailings facility. To ensure the stability of this blend, a continued geochemical testing will be done (Geostratum – Groundwater and Geochemistry Consulting, 2015).

The acceptable levels for the metals should be determined for the site with consideration of site specific conditions as uniform effluent standards may not be the best suited for site specific conditions. It is thus recommended that during operation the refinery to consider placing test boreholes to monitor and determine these levels.

The management and mitigations, to reduce the potential impact of groundwater contamination, should include groundwater monitoring on a monthly basis, by taking water level measurements and quality sampling and ensure the inclusion of a long-term rehabilitation plan.

SUMMARY OF IMPACTS ON WATER

TABLE 13 - IMPACTS TO WATER

Activity	Receptor	Impact description	Nature of impact	Value & Sensitivity	Magnitude of change	Significance of impact (pre mitigation)	Mitigation Measures	Significance of impact (Post mitigation)
Discharge to surface water	– Surface Water Quality	The run-off and or uncontrolled discharge of wastewater from the refinery operations may potentially impact surface water quality	>Adverse >Direct >Reversible >Moderate >Short-term >Local >Possible	Low	Moderate	**Minor (3)**	> Ensure wastewater produced is directed into the storm water return system for treatment, before it is discharged into the environment. >Ensure wastewater produced from refinery operations activities should be sent to the processing plant for recycling/reuse in the refinery's operations. Reuse of the wastewater in the refinery operations should be encouraged once the water quality is assessed.	**Low (2)**
Incidental spills of chemicals and or hydrocarbons	– Surface Water Quality	Discharges of chemicals to surface water may potentially result in the contamination of the water	>Adverse >Direct >Reversible >Minor >Short-term >Local >Unlikely	Low	Low	**Adverse Low (1)**	> Ensure correct chemical use and clean up procedures are in place and followed. > Ensure chemical spills are cleaned up immediately and prevent spills from entering the	**Adverse Low (1)**

Activity	Receptor	Impact description	Nature of impact	Value & Sensitivity	Magnitude of change	Significance of impact (pre mitigation)	Mitigation Measures	Significance of impact (Post mitigation)
							any open surface water	
Incidental spills of chemicals and or hydrocarbons	– Groundwater quality	Potential infiltration of hydrocarbon spills or discharges of chemicals to groundwater	>Adverse >Direct >Partially-reversible >Moderate >Medium-term >Regional >Unlikely	Medium	Minor	**Minor (4)**	> Ensure correct chemical and clean up procedures are in place and followed for the refinery's operations. > Bulk fuel should not be stored in a 110 % bunded containment and majority of fleet refuelling should occur at designated areas on site. > Ensure all operators are trained on hydrocarbon/ chemical spill response for events.	**Low (2)**
Tailings disposal and ground water contamination	– Groundwater quality	Potential infiltration of acid seepage from the TSF may potentially have an impact on the quality of the groundwater	>Adverse >Direct >Partially-reversible >Moderate >Long-term >Regional >Possible	Medium	Moderate	**Moderate (6)**	> Ensure the TSF is managed in accordance with site procedures and that it is monitored and rehabilitated as required > Ensure that the calcine leach residue is neutralised with limestone before disposal onto the TSF.	**Minor (3)**

8.6 POTENTIAL PROJECT IMPACTS AND ASSESSMENT: VISUAL IMPACT

8.6.1 CHANGES TO SURROUNDING LANDSCAPE

The visual landscape is determined by considering landscape character, sense of place, aesthetic value, sensitivity of the visual resource and sensitive views. In this regard, the study area is considered to have a low significant visual landscape because the area is far from the residential areas and the nearest town "Rosh Pinah" is 20km away, however due the height of the stacks (acid plant) at 70 meters, which is the optimal height as per the AQIA recommendation, there is potential for visual impacts to be triggered. The 70 meters stacks will be the tallest infrastructures in the region of the study area (refer to the viewshed in figure 12).

TABLE 14 – VISUAL IMPACTS ASSESSMENT OF THE 70M STACKS (ACID PLANT) STRUCTURE

Activity	Receptor	Impact	Nature of impact	Value & Sensitivity	Magnitude of change	Significance of impact
Potential visual impacts due to the placement of the 70m height stacks (acid plant) structure	– Landscape – Community and residents of Rosh Pinah – C13 road users / receptors – Avian fauna	The refinery infrastructure such as acid plant will be the tallest and most visible infrastructure in the region, which will potentially change the surrounding landscape. However, the 70m height stacks will be far from human sensitive receptors and the nearest town and residential area is Rosh Pinah.	Adverse Direct Partially - reversible Moderate Short-term Local Unlikely	Low	Minor	Low (2)

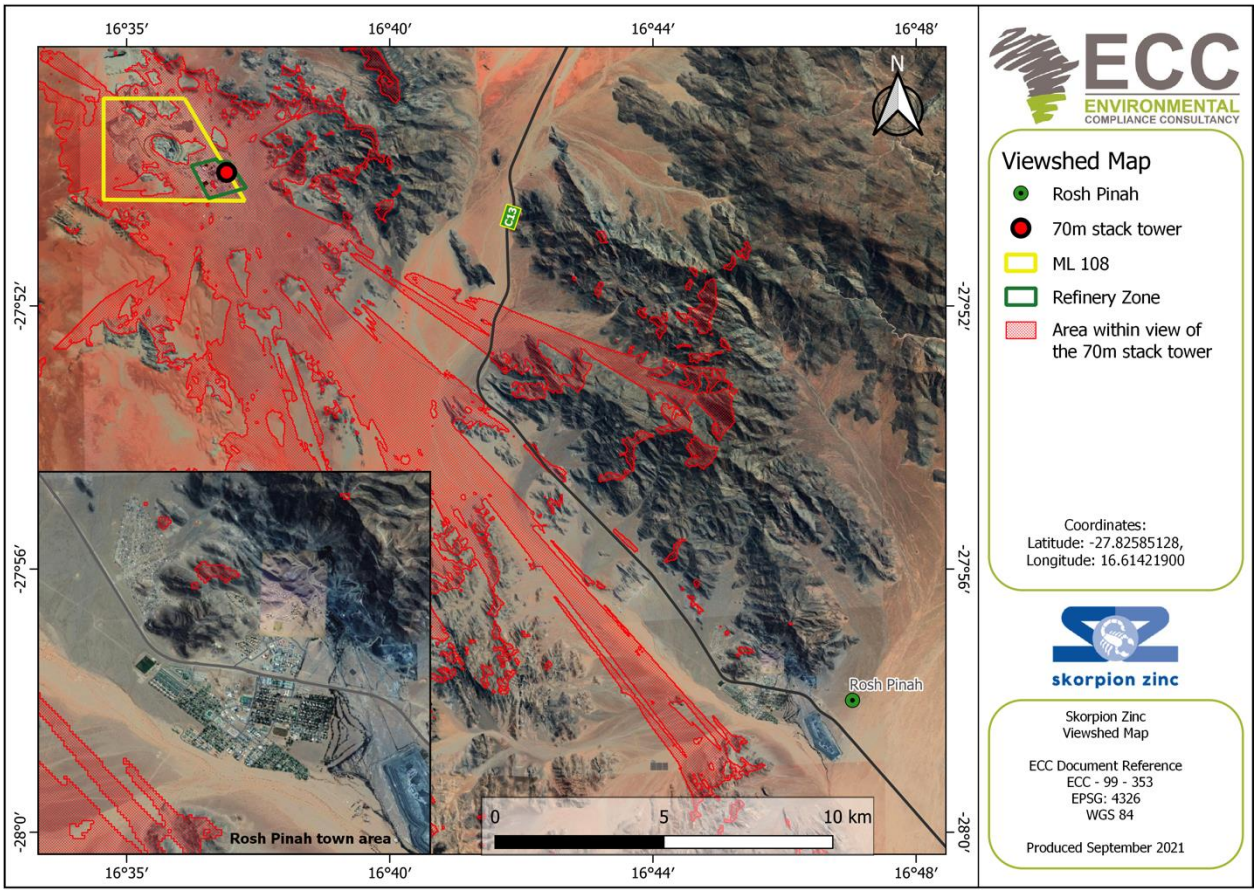


FIGURE 12 – MAP SHOWING THE AREA WITHIN VIEW OF THE 70M STACKS

In this assessment, it was identified that there are two places along the main road from where the stacks will be visible (marked as 1 and 2) for a road distance of 1.7 km each (Figure 13). They may also be visible from point 3. At the closest point (point 1), the 70 meters stacks are approximately 10 km from the human receptor ''viewer'' on the road, and approximately 50 meters height of the stacks will be visible above the horizon (Figure 13).

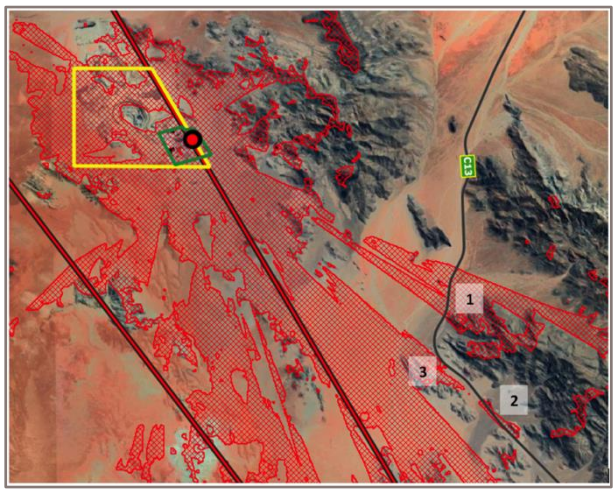


FIGURE 13 – MAP SHOWING THE IDENTIFIED POINTS WHERE THE 70M STACKS ARE VISUALLY NOTICABLE

8.6.2 IMPACTS ON AVIAN FAUNA: POTENTIAL BIRD COLLISIONS RISKS

Due to the construction and development of the 70 meters height stacks, it was identified that there may be potential risks of bird collision as a result. Factors that affect risks of collision may include:

- Structure height;
- Lightening;
- Location of structure; and
- Differing species susceptibility.

Although there are few studies published regarding the effect of tower height, there is some evidence suggesting that lower than 60 m to 150 m pose a lower risk to migrating birds. Apart from the height, often the structural factor related to collision probability is the use of lighting. Many tall structures require warning lights for aircraft and/or shipping. There are observations, both incidental and systematic, of birds being attracted to and disoriented by lights, especially on (but not restricted to) overcast nights with drizzle or fog. It is probable that light intensity and flash duration are more significant than colour, the longer the period between flashes of light, the less likely birds are to be attracted or disoriented (EPA, 2019).

The location of a structure can influence the likelihood of collision and structures that are placed on or near areas regularly used by a large number of feeding and or nesting birds, on migratory flyways or local flight paths present a greater risk of collision. Although many migrants tend to fly along a broad front, topographical features, such as mountain passes, may funnel high numbers into obstacles.

Not all bird species are equally susceptible to collision, habitual flight activity at dusk, dawn, or night, aerial display flights, aerial pursuit hunting or territorial disputes, and flying in flocks, may contribute to collision risk. Flight height is an important factor in collision may vary depending on species and behaviour, as well as on topography, season, time of day and weather conditions (EPA, 2019).

There is little identification or birdlife observed in the study area, the proposed stacks at the Namzinc Refinery is not in a known nesting area and it is unlikely to be in a flight line or migratory path for the birds due to the existing operational activities on site. The proposed stack height is relatively low, at 70m, a height which has been shown to pose less collision risk than higher wind turbines and communication towers. Migratory flights over the area, would generally be at a height too great to encounter the stacks, thus reducing the collision risk. It is recommended that the top of the stack is indicated by white strobe (flashing) obstacle warning lights, while any light source has the potential to attract birds and therefore increase collision risk, flashing lights are involved in significantly fewer collisions than continuous lights.

TABLE 15 - IMPACTS ASSESSMENT ON AVIAN FAUNA: BIRD COLLISION RISKS

Activity	Receptor	Impact	Nature of impact	Value & Sensitivity	Magnitude of change	Significance of impact
Potential Impacts to Avian Fauna as a result of bird collisions due to the placement of the 70m height stacks (acid plant) structure	– Avian fauna	There is potential for bird collision risks due to the optimal construction of the 70 meters height stacks (acid plant) as per the AQIA recommendation.	Adverse Indirect Partially - reversible Moderate Short-term Onsite Unlikely	Medium	Minor	Minor (4)

9 ENVIRONMENTAL MANAGEMENT PLAN

The site has an approved and existing environmental management plan. The assessment for the amendment to include refinery operations and associated mitigation measures have been addressed in the environmental management plan provided as Appendix A.

10 FINAL REMARKS

Based on the findings of the assessment and taking into consideration the overall potential adverse impacts, mitigation measures and the potential beneficial impacts, ECC believes the long-term benefits of the proposed project outweigh the short-term adverse impacts. The short term adverse impacts are completely manageable. In addition, the proposed project will contribute to the sustainable development of mining in the region in line with National Development Plans.

The implementation of the EMP as an outcome of the impact assessment process would serve to minimise the impacts and risks associated with the proposed amendment to an environmental and socially acceptable standard. An Environmental Clearance Certificate could be issued, on condition that the management and mitigation measures in the EMP are adhered to.

REFERENCES

Christelis, G. & Struckmeier, W. (Eds.) (2001). Groundwater in Namibia – an explanation to the hydrogeological map. Windhoek: Ministry of Agriculture, Water and Rural Development (Department of Water Affairs).

Environment Protection Authority (EPA), (2019). Bird Collision Risks: Retrived from www.epawebapp.epa.ie/licences/lic_eDMS/090151b2807227f4.pdf

GCS Water & Environmental Consultants (2015). Skorpion Zinc Refinery Sulphide Conversion Amendment to EIA Report.

GCS Water & Environmental Consultants (2015). Environmental Management Plan (EMP) for proposed Skorpion Zinc refinery modification.

IFC (2007). Environmental, Health, and Safety Guidelines: Performance Standards.: International Finance Coorporation.

IMA Trader 20 (2015). Air Quality Impact Assessment Report for the Skorpion Zinc Refinery, Rosh Pinah, Namibia, s.l.: Skorpion Zinc.

Koch, M., Pallett, J., Tarr, P. and Wetzel, G. 2011. Strategic Environmental Assessment (SEA) for the Karas Integrated Regional Land Use Plan (KIRLUP).

Mendelshon, J., Jarvis, A., Roberts, C., & Robertson, T. (2002). Atlas of Namibia. A portrait of the land and its people. Cape Town: David Philip Publishers

MET. 2013. Management Plan for Tsau //Khaeb (Sperrgebiet) National Park 2013-2018. Windhoek, Namibia.

Ministry of Health and Social Services (MHSS) (2020). Diseases. Retrieved from www.mhss.gov.na

Ministry of Health and Social Services (MoHSS) [Namibi] and ICF Macro.2010. Namibia Health Facility Census 2009. Windhoek, Namibia. MoHSS and ICF Macro.

Namibia Statistics Agency (NSA). (2017). Namibia inter-censal demographic survey 2016 report. Windhoek: NSA

Namibia Statistics Agency (NSA). (2019). The Namibia labour force survey 2018 report. Windhoek: NSA

World Health Organization (WHO) 2016. WHO country cooperation strategy 2010 – 2015 Namibia. Windhoek: WHO

World population review. (2020). Namibian Population 2020 retrieved from http://worldpopulationreview.com/countries/namibia-population/

APPENDIX A – ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX B – PUBLIC CONSULTATION

The following was advertised in the 'Republikein, Sun, and Allgemeine Zeitung' newspapers on the 05th July 2021.

ECC ENVIRONMENTAL COMPLIANCE CONSULTANCY

skorpion zinc

PUBLIC PARTICIPATION NOTICE

ENVIRONMENTAL CLEARANCE AMENDMENT APPLICATION

ENVIRONMENTAL ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN FOR THE AMENDMENT TO THE NAMZINC REFINERY TO INCREASE OUTPUT PRODUCTION TO 300 000 TONNES PER ANNUM OF REFINED ZINC METAL, IN THE !KARAS REGION, NAMIBIA.

Environmental Compliance Consultancy (ECC) hereby gives notice to the public that Skorpion Zinc (Namzinc) Pty Ltd intends to apply to amend their existing environmental clearance certificate for the Namzinc Refinery to increase its capacity to produce 300 000 Tonnes Per Annum (tpa) of refined zinc metal.

Environmental Compliance Consultancy was appointed by Namzinc, to undertake the environmental assessment for the proposed amendment to the Namzinc Refinery infrastructure. The amendment will be made in accordance with the Environmental Management Act No.7 of 2007 as per the following:

Applicant: Skorpion Zinc (Namzinc) (Pty) Ltd
Environmental Assessment Practitioner (EAP): Environmental Compliance Consultancy
Location: !Karas Region, Namibia

Proposed Project: Namzinc intends to expand the Skorpion refinery's capacity to produce 300 000 tpa of refined zinc metal at the approved Namzinc refinery as part of the conversion project. The request for the amendment is to enable the processing of 620 000 tpa of zinc sulphide concentrates that will produce 300 000 tpa. This is an increase of 150 000 tpa, as previously granted and approved in the 2015 Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP). The proposed amendment will remain within the mine's accessory works permit area.

Application for Environmental Clearance Certificate: In terms of the Environmental Management Act No.7 of 2007, ECC on behalf of Namzinc is required to apply for an Environmental Clearance Certificate to the Ministry of Mines and Energy and the Ministry of Environment and Tourism for the above-mentioned project.

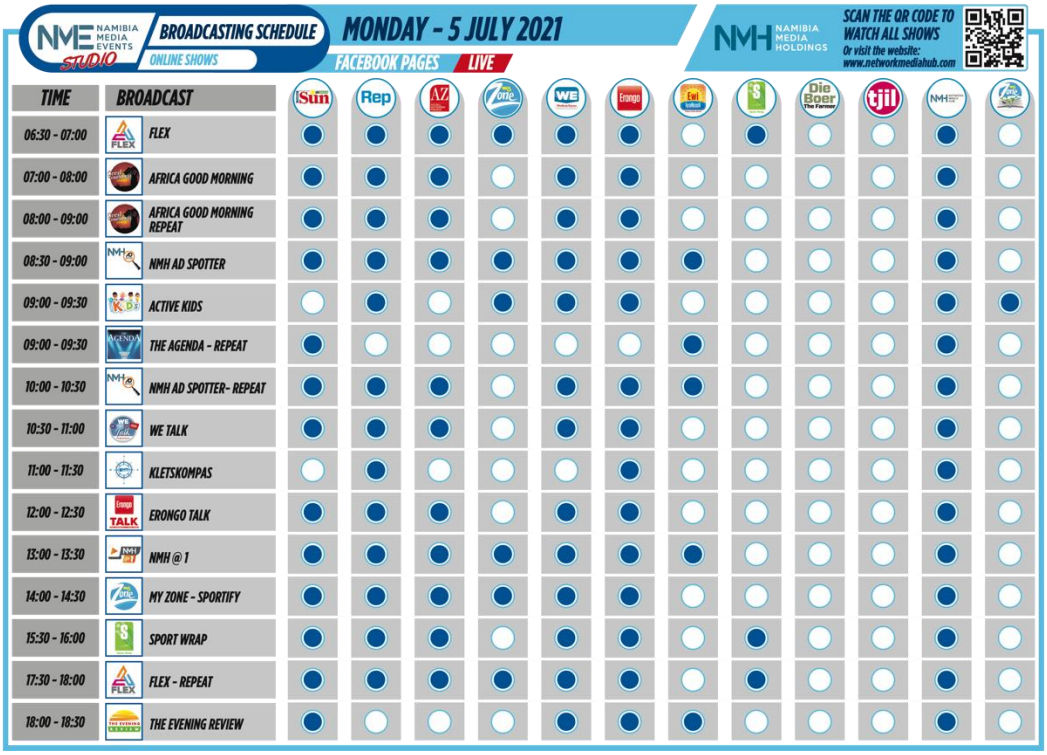
Purpose of the review and registration period: The purpose of the review and registration period is to introduce the proposed project and to afford registered Interested and Affected Parties (I&APS) an opportunity to comment on the Background Information Document (BID) to ensure that all issued, and concerns are brought forward, captured and considered further in the assessment.

Registration period: Effective from 05 to 19 July 2021.

How you can participate: ECC is undertaking the required environmental assessment and public participation process in terms of the Act. I&APs and stakeholders are required to register for the project at: www.eccenvironmental.com/projects

Environmental Compliance Consultancy Close Corporation
Registration Number: CC/2013/11404
Members: Mr JS Bezuidenhout and Mrs J Mooney
PO Box 91193, Klein Windhoek
Tel: +264 816 697 608
E-mail: info@eccenvironmental.com
Website: www.eccenvironmental.com/projects
Project ID: ECC-99-353-ADT-03-C

ECC ENVIRONMENTAL COMPLIANCE CONSULTANCY



The following was advertised in the 'Republikein, Sun, and Allgemeine Zeitung' newspapers on the 12th July 2021.

Request for Proposal
RFP No: GIPF RFP 002/2021
Construction of the New Regional Office in Ondangwa, Oshana Region for the Government Institutions Pension Fund (GIPF)

GIPF Government Institutions Pension Fund
To guard, and to grow.

The Government Institutions Pension Fund (GIPF) is a defined fund and is the biggest pension fund in Namibia and provides defined pension benefits to approximately 101,000 active members and about 48,000 annuitants. The Government Institutions Pension Fund's mission is to safeguard and grow the Fund for the benefit of its stakeholders and Namibia.

Established and experienced building contractors are hereby invited for the pre-qualification bidding stage for the construction of the new GIPF regional office in Ondangwa, Oshana Region. The standard bidding requirements and the conditions of bids of state building tenders will apply to the bid's evaluation and adjudication process. Only contractors who have managed building projects in excess of N$25 million may apply.

The bid documents are available for N$500 (non-refundable) from 25 June 2021 at 09:00.

Applicants are invited to collect a copy of the service requirements from:

Mr. Elton Job
Procurement Officer
Tel: 061 – 205 1210 | Fax: +264-61-205-1248
E-mail: ejob@gipf.com.na

Mrs. Sandra Simasiku
Officer: Property and Infrastructure Maintenance
Tel: +264-61-205-1747 | Fax: +264-61-205-1248
E-mail: ssimasiku@gipf.com.na

The closing date for this RFP is 16 July 2021 at 12H00

Kindly submit your RFP Pre-qualification Bid Documents to the below address and provide two printed copies in a closed envelop, addressed to:

The Chairman: Procurement Committee
Bid Nr: GIPF RFP 002/2021
GOVERNMENT INSTITUTIONS PENSION FUND
GIPF House
Corner Dr Kenneth David Kaunda and Goethe Street
Windhoek
Ground Floor, Main Reception
Bid/Bid Box
Namibia

ALL TECHNICAL ENQUIRIES must be addressed to Mr. Ndeu Akuenje at Kerry McNamara Architects Inc, Tel. (061) 235 065 or e-mail: ndeumono@kma.com.na

Visit: www.gipf.com.na **Email:** info@gipf.com.na

KAMBAKU SAFARI LODGE****
ACCOUNTANT
JOB ADVERT

Looking for a motivated accountant for our group of Namibian and German companies.
Our companies are engaged in the hospitality industry, the education and training sector and in property management. The office is at Kambaku Safari Lodge, between Otjiwarongo and Otavi.

Qualifications:
- Profound knowledge in bookkeeping
- English and German language mandatory
- IT orientated

If you want to join a skilled and dedicated team of financial controllers, please apply with your detailed CV and copy of qualification, or, proof of relevant prior experience.
Please apply to Thorsten Michels: tmichels@kambaku.com

ECC ENVIRONMENTAL COMPLIANCE CONSULTANCY
skorpion zinc

PUBLIC PARTICIPATION NOTICE
ENVIRONMENTAL CLEARANCE AMENDMENT APPLICATION
ENVIRONMENTAL ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN FOR THE AMENDMENT TO THE NAMZINC REFINERY TO INCREASE OUTPUT PRODUCTION TO 300 000 TONNES PER ANNUM OF REFINED ZINC METAL, IN THE !KARAS REGION, NAMIBIA.

Environmental Compliance Consultancy (ECC) hereby gives notice to the public that Skorpion Zinc (Namzinc) Pty Ltd intends to apply to amend their existing environmental clearance certificate for the Namzinc Refinery to increase its capacity to produce 300 000 Tonnes Per Annum (tpa) of refined zinc metal.

Environmental Compliance Consultancy was appointed by Namzinc, to undertake the environmental assessment for the proposed amendment to the Namzinc Refinery infrastructure. The amendment will be made in accordance with the Environmental Management Act No.7 of 2007 as per the following:

Applicant: Skorpion Zinc (Namzinc) (Pty) Ltd
Environmental Assessment Practitioner (EAP): Environmental Compliance Consultancy
Location: !Karas Region, Namibia

Proposed Project: Namzinc intends to expand the Skorpion refinery's capacity to produce 300 000 tpa of refined zinc metal at the approved Namzinc refinery as part of the conversion project. The request for the amendment is to enable the processing of 620 000 tpa of zinc sulphide concentrates that will produce 300 000 tpa. This is an increase of 150 000 tpa, as previously granted and approved in the 2015 Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP). The proposed amendment will remain within the mine's accessory works permit area.

Application for Environmental Clearance Certificate: In terms of the Environmental Management Act No.7 of 2007, ECC on behalf of Namzinc is required to apply for an Environmental Clearance Certificate to the Ministry of Mines and Energy and the Ministry of Environment and Tourism for the above-mentioned project.

Purpose of the review and registration period: The purpose of the review and registration period is to introduce the proposed project and to afford registered Interested and Affected Parties (I&APS) an opportunity to comment on the Background Information Document (BID) to ensure that all issued, and concerns are brought forward, captured and considered further in the assessment.

Registration period: Effective from 05 to 19 July 2021.

How you can participate: ECC is undertaking the required environmental assessment and public participation process in terms of the Act. I&APs and stakeholders are required to register for the project at: www.eccenvironmental.com/projects

Environmental Compliance Consultancy Close Corporation
Registration Number: CC/2013/13404
Members: Mr JS Bezuidenhout and Mrs I Mwaney
PO Box 91183, Klein Windhoek
Tel: +264 836 697 808
E-mail: info@eccenvironmental.com
Website: www.eccenvironmental.com/projects
Project ID: ECC-99-353-AOT-03-C

ECC ENVIRONMENTAL COMPLIANCE CONSULTANCY

Find your dream career.

In line with its segment-led strategy, **FNB Namibia**, an equal opportunity employer, is looking for an ethical, dynamic, innovative, energetic, mature and experienced team player that performs to the highest standards of business acumen for the following role:

Job Title: Commercial Relationship Manager C
Business Unit: FNB Namibia Points of Presence Commercial
Based in Keetmanshoop

Purpose
Direct and manage Branch resources (including employee development to generate the highest return on capital employed) in line with the Bank's short- and long-term plans, policies and values. In addition, promoting customer loyalty by providing a superior customer experience (service) while identifying and promoting new business to ensure growth (sales) without incurring unmanageable risks.

Qualifications & Experience:
- Relevant Post Graduate qualification in Credit, CIAB.
- 3-8 years' experience depending on the categorisation of the branch, with at least 2-5 years' experience on a managerial/supervisory level.
- 5-7 years' experience within Commercial Agriculture Portfolio Management would be an added advantage.

Appointment will be made in accordance with our EE plan.
If this proves to be the challenge you are looking for, please visit our website, *www.fnbnamibia.com.na* and click on the "Careers" tab for more information and to submit your application.

Closing Date: 15 July 2021.

FNB
How can we help you?

Please note: Only short-listed candidates will be contacted. Ensure documents are in PDF format when uploading. Applicants will be subjected to ITC and reference checks.

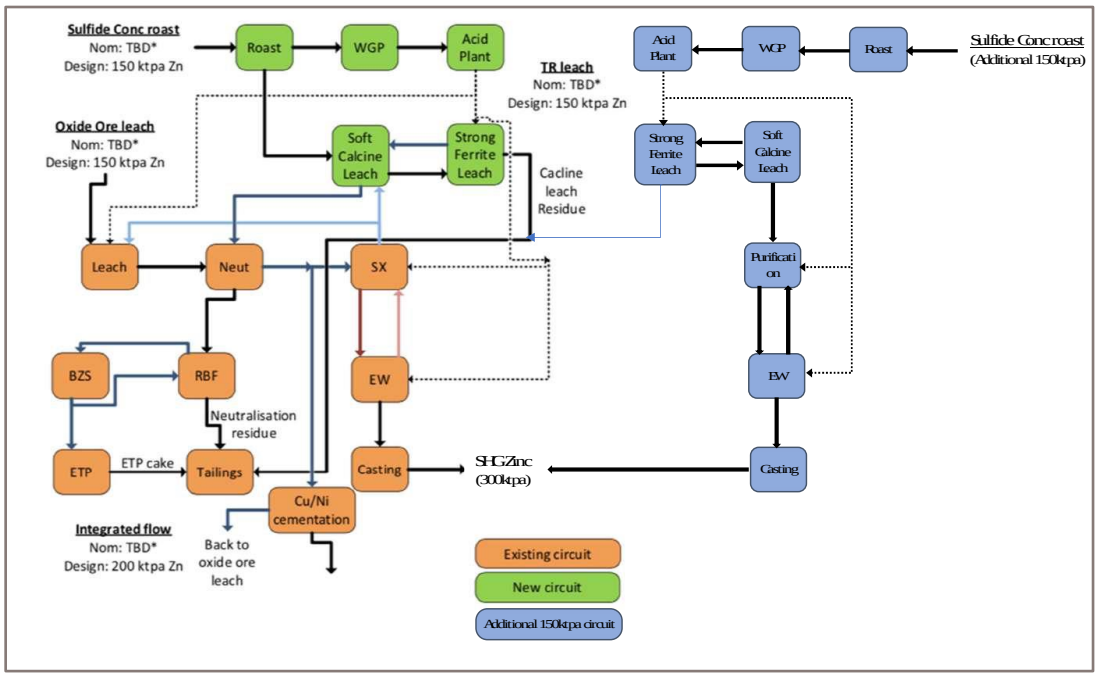
Multiple Sclerosis NAMIBIA

WHAT IS MULTIPLE SCLEROSIS?

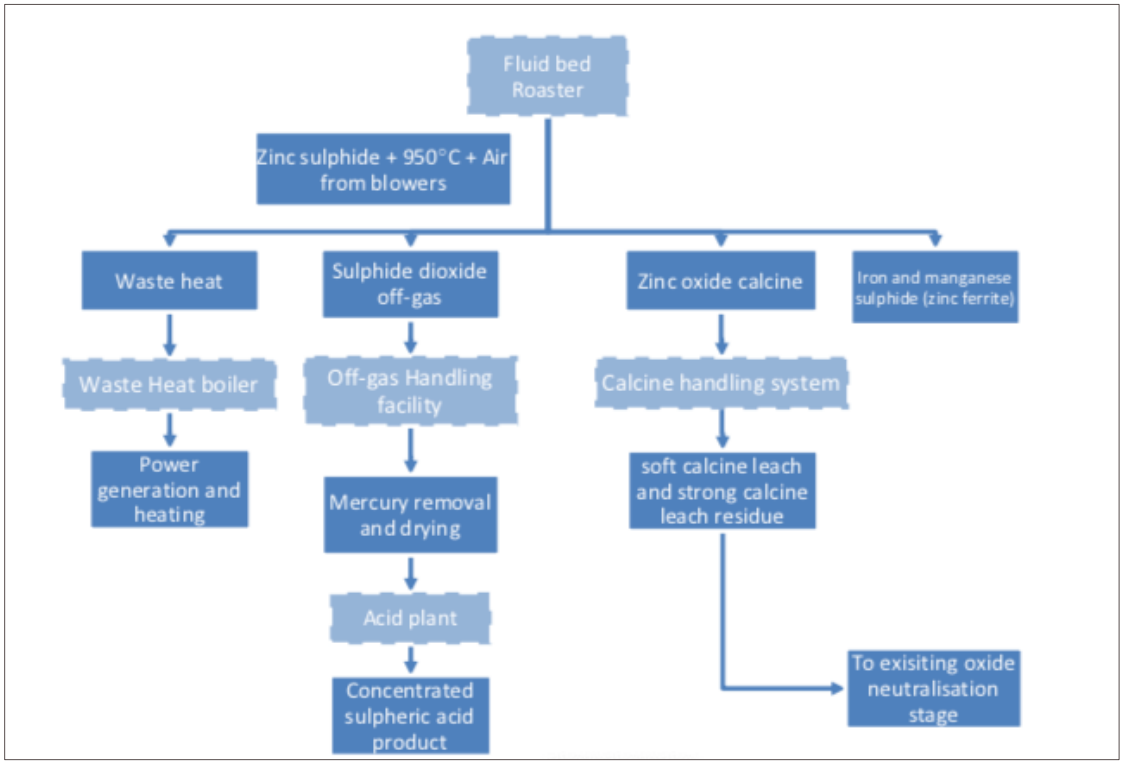
A chronic disease of the brain and central nervous system

OFFICE HOURS:
Monday - Friday: 09h00 - 17h00
info@msnamibia.org

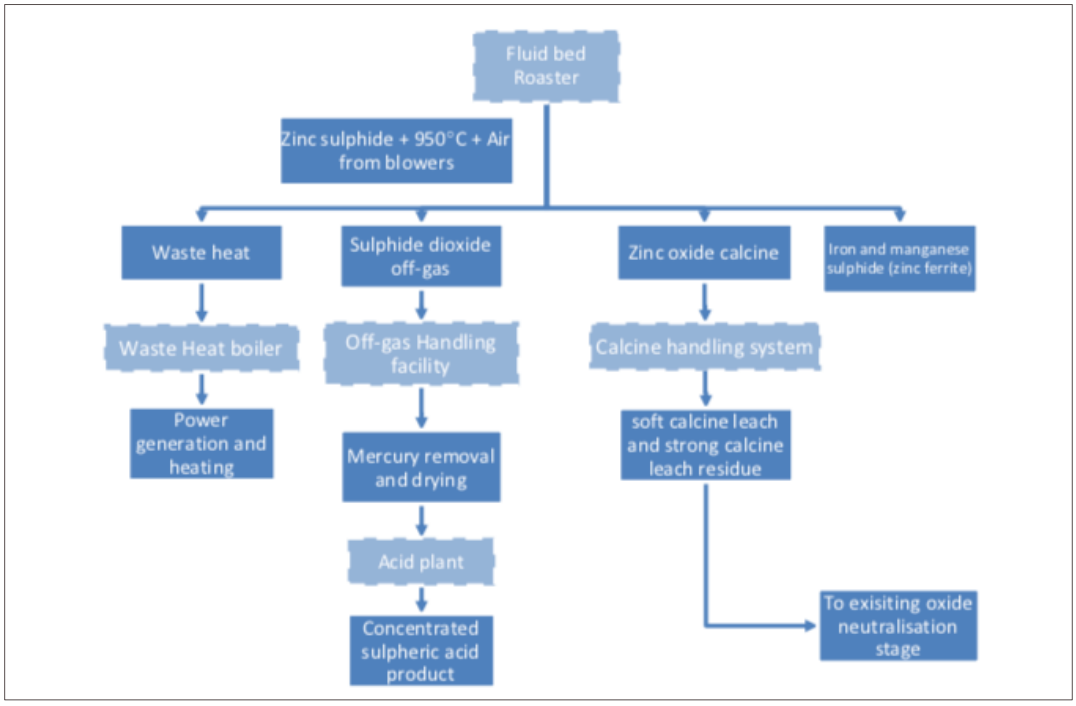
APPENDIX C – OPERATION CIRCUIT FLOW DIAGRAMS



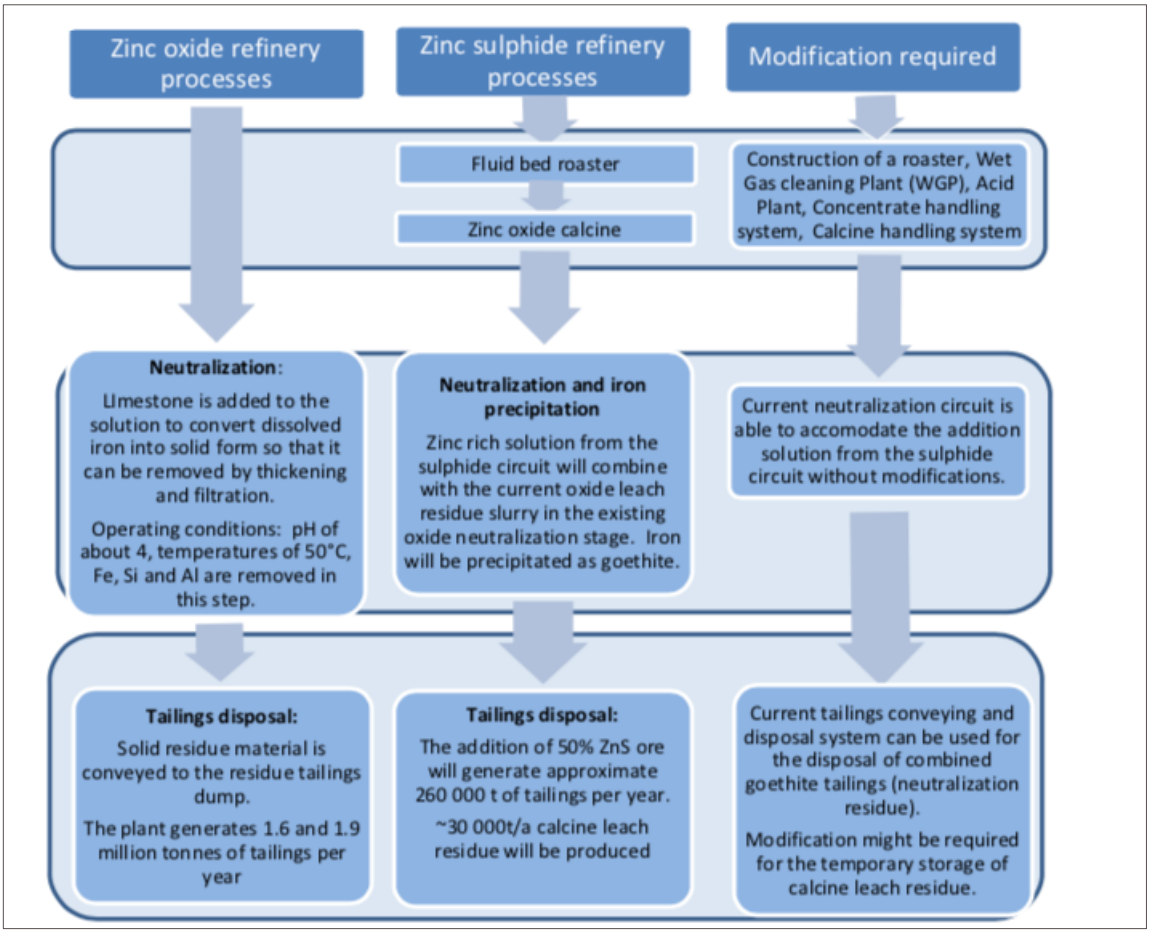
THE CONSTRUCTION OF A ROASTING CIRCUIT WITH GAS CLEANING PLANT AND GAS RECOVERY ACID PLANT



PROCESS WITHIN THE ROASTING CIRCUIT WITH GAS CLEANING PLANT AND GAS RECOVERY ACID PLANT



THE INSTALLATION AND INTEGRATION OF A NEW CALCINE LEACH CIRCUIT WITH THE EXISTING EQUIPMENT



APPENDIX D – OVERALL PLOT LAYOUT PLAN

APPENDIX E – AIR QUALITY ASSESSMENTS

APPENDIX F – CV