CONSTRUCTION AND OPERATIONAL ACTIVITIES OF SEAWORK FISH PROCESSING, WALVIS BAY

UPDATED ENVIRONMENTAL ASSESSMENT SCOPING REPORT

Assessed by:

Assessed for:

October 2022

Project:	**CONSTRUCTION AND OPERATIONAL ACTIVITIES OF SEAWORK FISH PROCESSING, WALVIS BAY: UPDATED ENVIRONMENTAL ASSESSMENT SCOPING REPORT**	
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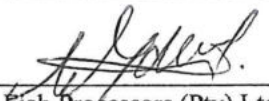
Report Approval	 **André Faul**	

I WILLEM ALBERTUS DU TOIT acting as the Proponent's representative (Seawork Fish Processors (Pty) Ltd), hereby confirm that the project description contained in this report is a true reflection of the information which the Proponent provided to Geo Pollution Technologies. All material information in the possession of the proponent that reasonably has or may have the potential of influencing any decision or the objectivity of this assessment is fairly represented in this report and the report is hereby approved.

Signed at WALVIS BAY on the 8 day of NOVEMBER 2022.



Seawork Fish Processors (Pty) Ltd

CY/2002/0257
Business Registration/ID No.

EXECUTIVE SUMMARY

Geo Pollution Technologies (Pty) Ltd was appointed by Seawork Fish Processors (Pty) Ltd to update their existing environmental impact assessment (EIA) for construction and operational activities at their existing fish processing facility in Ben Amathila Avenue, in the industrial area of Walvis Bay. The updated assessment aims at including the operations on the adjoining erven of Benguella Properties (Pty) Ltd and Omankete Seafood Processors (Pty) Ltd. The erven are 4672 (Seawork Fish Processors), 3695 and 2891 (Benguella Properties) and 5032 (Omankete Seafood Processors), all located in Ben Amathila Avenue in the industrial area of Walvis Bay. Benguella Properties is a 100% subsidiary of Seawork Fish Processors while Omankete Seafood Processors is a 40% subsidiary of Seawork Fish Processors (and 60% of Omankete Investments). Operational activities on all three sites, both current and future, are typical of fish processing facilities in Walvis Bay. This include fish receipt, handling, processing, packaging, cold storage and marketing. Additional activities include service hub operations (berthing, launching, storage, quay, etc.), extraction of seawater and disposal of process water into the harbour, and the operation of a consumer fuel installation to supply their vessels with diesel.

Seawork plans the construction of a reverse osmosis seawater desalination plant. This will aid in alleviating pressures on public water supply, as well as ensure a constant and reliable supply of potable water to the facility. On the Benguella Properties' site, a new fish processing facility with cold storage is planned for the near future. Other construction activities at the facility may include general maintenance and upgrades.

This update of the environmental assessment is conducted to determine all environmental, safety, health and socio-economic impacts associated with the Seawork, Omankete and Benguella facilities. Relevant environmental data has been compiled by making use of secondary data and from a reconnaissance site visit. Potential environmental impacts and associated social impacts will be identified and addressed in this report.

The facilities are within an industrial area in the fishing harbour of Walvis Bay and is surrounded by similar industrial type developments, some also being fish processing industries. Due to the nature and location of the development, impacts can be expected on the surrounding environment, see summary impacts table below. It is recommended that regular environmental performance monitoring be conducted and adapted as the project develops, to ensure compliance and that corrective measures be taken if necessary.

The fishing industry is one of the major contributors to the Namibian economy and provides employment to a large number of people. The existing operations of the Proponent provides employment to almost 2,000 employees. With the construction and commissioning of the new processing facilities at Benguella Properties, it is anticipated that more than 450 new employment opportunities will become available for Namibians. Seawork, Omankete and Benguella contributes to the local economy by processing locally sourced products (value addition) and by providing employment. By appointing local contractors and employees and implementing educational programs, the positive socio-economic impacts can be maximised while mitigating any negative impacts.

The major concerns related to the construction and operational activities at the various facilities are that of health and safety, waste production and surface water impacts. All relevant local regulations and internationally accepted best practices should be adhered to, as it pertains to the management of health and safety risks to employees and contractors on site. Noise pollution should at all times meet the minimum requirements of the health and safety regulations of the Labour Act and the World Health Organization's guidelines for noise to prevent hearing loss and not to cause a nuisance to nearby receptors. Water contaminated by pollutants, that can no longer be disposed of in the normal effluent disposal streams, and any other waste products, must be prevented from entering the ocean at all costs and should be disposed of at an approved waste disposal facility, or re-used or recycled where possible. Hazardous waste must be disposed of by a registered service provider and at an approved hazardous waste disposal site. An emergency response plan must be implemented in the event of major system failures.

The environmental management plan should be used as an on-site reference document during operational activities at the facility. This document and its supporting impact assessment, should be

reviewed on a regular basis, in order to ensure that it is still relevant to the activities executed on site. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken. A health, safety, environment and quality (HSEQ) policy or similar should be used in conjunction with the environmental management plan. Operators and responsible personnel must be taught the contents of these document and monitoring and reporting performed as outlined in the management plan.

Impact Category	Impact Type	Construction	Operations
	Positive Rating Scale: Maximum Value	5	5
	Negative Rating Scale: Maximum Value	-5	-5
EO	Skills, Technology and Development	2	4
SC	Employment	2	4
EO	Revenue Generation	2	4
SC/EO	Demographic Profile and Community Health	-1	-2
EO	Traffic	-2	-2
SC/EO	Health, Safety and Security	-2	-2
EO	Fire	-3	-3
PC	Noise	-2	-2
PC/BE	Waste production	-2	-3
PC/BE	Ecosystem and Biodiversity Impact	-1	-3
PC	Groundwater, Surface Water and Soil Contamination	-2	-3
SC	Visual Impact	-1	-1
EO	Impacts on Utilities and Infrastructure Seabed Scouring	-3	-2

BE = Biological/Ecological EO = Economical/Operational PC = Physical/Chemical SC = Sociological/Cultural

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LIST OF ABBREVIATIONS

%	Percentage
°C	Degrees Celsius
AIDS	Acquired Immune Deficiency Syndrome
BCLME	Benguela Current Large Marine Ecosystem
BE	Biological/Ecological
BOD	Biological Oxygen Demand
$CaCO_3$	Calcium carbonate
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COD	Chemical Oxygen Demand
DAF	Dissolved Air Flotation
DEA	Department of Environmental Affairs
DWA	Department of Water Affairs
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMA	Environmental Management Act No 7 of 2007
EMP	Environmental Management Plan
EMS	Environmental Management System
EO	Economic/Operational
ES	Environmental Classification
EU	European Union
FAO	Food and Agriculture Organization
FOG	Fat, oil and grease
GPT	Geo Pollution Technologies
HACCP	Hazard Analysis and Critical Control Points
HIV	Human Immunodeficiency Virus
HSEQ	Health, Safety, Environment and Quality
IAPs	Interested and Affected Parties
IUCN	International Union for Conservation of Nature
kVA	Kilovolt-ampere
LNAPL	Light Non-Aqueous Phase Liquids
m/s	Meter per second
m^2	Square meter
m^3	Cubic meter
Ma	Million Years
mbs	Meters below surface
MEFT	Ministry of Environment, Forestry and Tourism
mg/l	Milligrams per litre
mm/a	Millimetres per annum
MSDS	Material Safety Data Sheet
N	Nitrogen
NaCl	Sodium chloride
NaOCl	Sodium Hypochlorite
NH_3	Ammonia
PC	Physical/Chemical
PCB	Polychlorinated Biphenyl
PPE	Personal Protective Equipment
ppm	Parts per million
SADC	Southern African Development Community
SANS	South African National Standards
SC	Sociological/Cultural
SO_2	Sulfur dioxide
SS	Total Suspended Solids
STPP	Sodium Tripoly Phosphate
TDS	Total Dissolved Solids
WHO	World Health Organization

GLOSSARY OF TERMS

Alternatives - A possible course of action, in place of another, that would meet the same purpose and need but which would avoid or minimize negative impacts or enhance project benefits. These can include alternative locations/sites, routes, layouts, processes, designs, schedules and/or inputs. The "no-go" alternative constitutes the 'without project' option and provides a benchmark against which to evaluate changes; development should result in net benefit to society and should avoid undesirable negative impacts.

Assessment - The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making.

Competent Authority - means a body or person empowered under the local authorities act or Environmental Management Act to enforce the rule of law.

Construction - means the building, erection or modification of a facility, structure or infrastructure that is necessary for the undertaking of an activity, including the modification, alteration, upgrading or decommissioning of such facility, structure or infrastructure.

Cumulative Impacts - in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Environment - As defined in the Environmental Assessment Policy and Environmental Management Act - "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, palaeontological or social values".

Environmental Impact Assessment (EIA) - process of assessment of the effects of a development on the environment and can also be considered / defined as an environmental risk assessment.

Environmental Management Plan (EMP) - A working document on environmental and socio-economic mitigation measures, inclusive of health & safety of employees, which must be implemented by several responsible parties during all the phases of the proposed project.

Environmental Management System (EMS) - An Environment Management System, or EMS, is a comprehensive approach to managing environmental issues, integrating environment-oriented thinking into every aspect of business management. An EMS ensures environmental considerations are a priority, along with other concerns such as costs, product quality, investments, PR productivity and strategic planning. An EMS generally makes a positive impact on a company's bottom line. It increases efficiency and focuses on customer needs and marketplace conditions, improving both the company's financial and environmental performance. By using an EMS to convert environmental problems into commercial opportunities, companies usually become more competitive.

Evaluation – means the process of ascertaining the relative importance or significance of information, the light of people's values, preference and judgements in order to make a decision.

Hazard - Anything that has the potential to cause damage to life, property and/or the environment. The hazard of a particular material or installation is constant; that is, it would present the same hazard wherever it was present. It can also be referred to as a risk.

Interested and Affected Party (IAP) - any person, group of persons or organisation interested in, or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

Mitigate - The implementation of practical measures to reduce adverse impacts.

Proponent (Applicant) - Any person who has submitted or intends to submit an application for an authorisation, as legislated by the Environmental Management Act no. 7 of 2007, to undertake an

activity or activities identified as a listed activity or listed activities; or in any other notice published by the Minister or Ministry of Environment & Tourism.

Public - Citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of publics, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

Scoping Process - process of identifying: issues that will be relevant for consideration of the application; the potential environmental impacts of the proposed activity; and alternatives to the proposed activity that are feasible and reasonable.

Significant Effect/Impact - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Stakeholder Engagement - The process of engagement between stakeholders (the proponent, authorities and IAPs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision-making process. The term is considered to be more appropriate than the term "public participation".

Stakeholders - A sub-group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (IAPs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

Sustainable Development - "Development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs and aspirations" – the definition of the World Commission on Environment and Development (1987). "Improving the quality of human life while living within the carrying capacity of supporting ecosystems" – the definition given in a publication called "Caring for the Earth: A Strategy for Sustainable Living" by the International Union for Conservation of Nature (IUCN), the United Nations Environment Programme and the World Wide Fund for Nature (1991).

1 BACKGROUND AND INTRODUCTION

Geo Pollution Technologies (Pty) Ltd was appointed by Seawork Fish Processors (Pty) Ltd to update the environmental impact assessment (EIA) for construction and operational activities at their existing fish processing facility in Walvis Bay. The assessment aims at including the operations on the adjoining erven of Benguella Properties (Pty) Ltd and Omankete Seafood Processors (Pty) Ltd. The erven are 4672 (Seawork Fish Processors), 3695 and 2891 (Benguella Properties) and 5032 (Omankete Seafood Processors), all located in Ben Amathila Avenue in the industrial area of Walvis Bay (Figure 1-1). Benguella Properties is a 100% subsidiary of Seawork Fish Processors while Omankete Seafood Processors is a 40% subsidiary of Seawork Fish Processors (and 60% of Omankete Investments). While each entity has its own processing facilities, Seawork Fish Processors performs all onshore fish processing on the three sites. Thus, for purposes of the EIA, the Proponent is Seawork Fish Processors, while all three entities will be responsible for implementation of environmental management measures in so far as they are respectively involved in construction, operational and possible decommissioning activities. The Proponent will however oversee the environmental management plan (EMP) and delegation and implementation thereof.

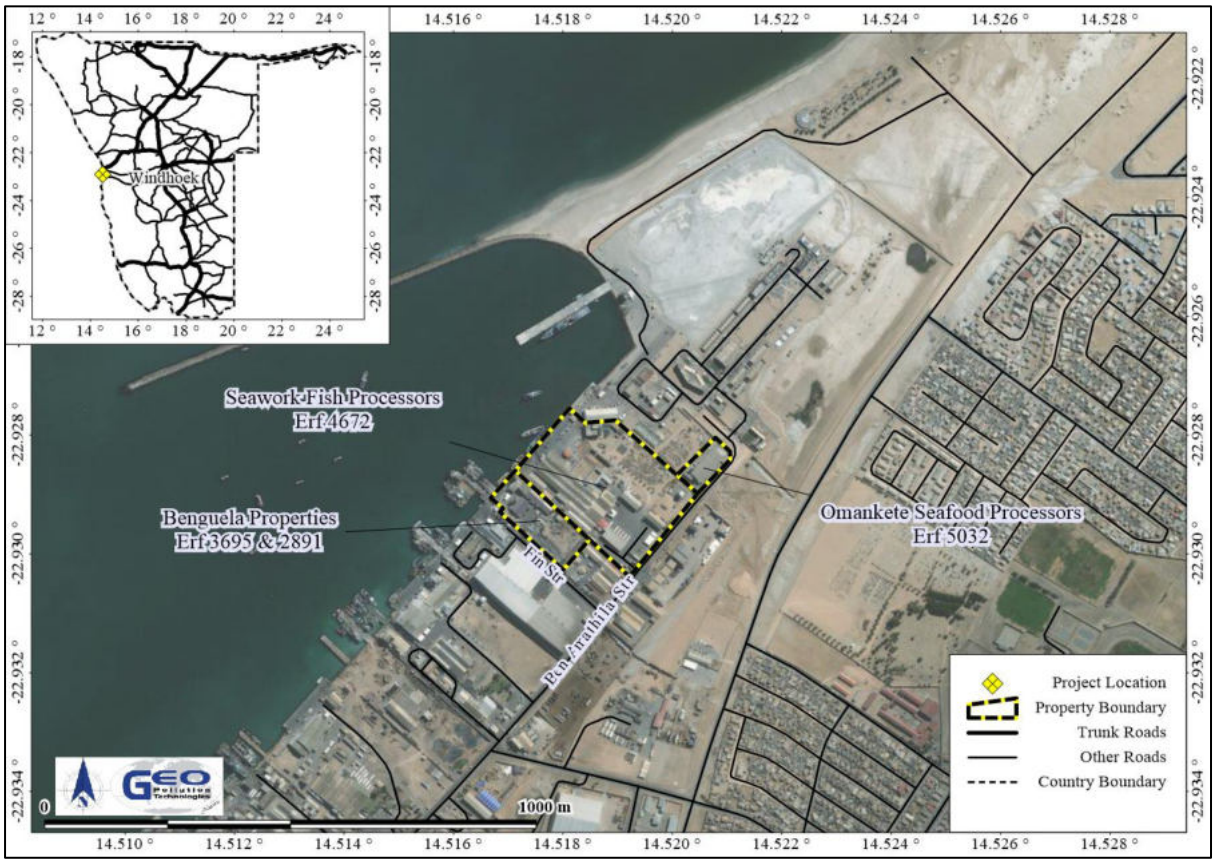

Figure 1-1 Project location

The main activities considered in the updated EIA are the operations of existing fish processing facilities, service hubs, as well as all proposed and existing infrastructure enabling operations on the properties. More details on construction and operational processes are provided in Section 4.

An updated risk assessment was undertaken to determine the potential impact of the construction and operational phases of the project on the environment. The environment being defined in the Environmental Assessment Policy and Environmental Management Act as “land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values”.

The updated environmental assessment will be used to apply for an amended environmental clearance certificate in compliance with Namibia's Environmental Management Act (Act No 7 of 2007).

Project Justification – The facilities are operated within the Walvis Bay fishing harbour, which is one of only two harbours in Namibia and the main location for the offloading and processing of fish in Namibia. The fishing industry contributes significantly to the development and economy of Namibia, and remains an important natural resources. The facilities, along with their fishing fleets also create almost 2,000 direct employment opportunities (permanent and temporary combined), while the planned new fish processing and cold storage facilities at Benguella Properties will create an additional 450 employment opportunities. Furthermore, the planned construction of a seawater desalination plant will ensure a reliable supply of potable water to the facility, while alleviating pressure on the Kuiseb water supply scheme.

Benefits of the facilities and related infrastructure include:

- Contribution to the food security of Namibia and other SADC countries
- Contribution to the economy of Namibia and towards a positive trade balance through the export of seafood products
- Employment and skills development
- Relieving pressure on the public water demand
- Alternative sustainable source of potable water

2 SCOPE

The aims and objectives of this updated environmental assessment report are to:

1. Determine the potential environmental impacts emanating from the operations of the fish processing facilities and related infrastructure.
2. Identify a range of controls which could avoid or mitigate the potential adverse impacts to acceptable levels.
3. Comply with Namibia's Environmental Management Act (2007).
4. Provide sufficient information to the Ministry of Environment, Forestry and Tourism (MEFT) to make an informed decision regarding all current and proposed activities of the Proponent.

3 METHODOLOGY

The following methods were used to update the potential impacts on the social and natural environment due to the operations of the facilities:

1. Baseline information about the site and its surroundings was obtained from existing secondary information as well as from a reconnaissance site visit.
2. As part of the scoping process to determine potential environmental impacts, interested and affected parties (IAPs) were consulted about their views, comments and opinions and these are put forward in this report.

4 INFRASTRUCTURE AND RELATED ACTIVITIES

The following section provides a description of the various infrastructure components and related operations on the various properties. It is divided into three subsections, one each for Seawork Fish Processors (Seawork), Benguella Properties (Benguella) and Omankete Seafood Processors (Omankete).

4.1 SEAWORK FISH PROCESSORS

Seawork operates on erf 4672 which also hosts the majority of the infrastructure as covered in this environmental assessment. The location and general layout of the existing, as well as proposed infrastructure, of Seawork is presented in Figure 4-1. The main, existing infrastructure on the site, includes a fish processing facility, cold stores, ice plant, fish shop, seawater treatment facility, consumer fuel installation and receiving area (quay and stevedoring).

Seawork has four Europan Union (EU)-compliant wet fish trawlers and one trawler currently undergoing reconstruction. The fleet operates within the southeast Atlantic, Food and Agriculture Organization (FAO) Major Fishing Area 47, where Hake (*Merluccius capensis* / *Merluccius paradoxus*) as well as some by-catches like Kingklip (*Genypterus capensis*) and Monkfish (*Lophius vomerinus*) are caught and processed.

Seawork currently catches and processes around 22,000 tons of whole, round hake per annum, with the fish processing facility having a total daily capacity of 55,000 kg. Seawork proposes the construction of a seawater desalination plant and related infrastructure. The following section provides a description of the infrastructure and their operations as well as some construction activities to be performed.

4.1.1 Ship Docking and Offloading of Fish

The Seawork facility has a quay at the service hub where fishing vessels are moored, and servicing (general maintenance), loading and offloading takes place. General operations on the quay also include the operations of cranes, forklifts and small trucks or vehicles. Support infrastructure on the quay includes power, fresh and sea water, ice and fuel supply as well as fish offloading infrastructure.

The caught fish is kept cold with flake ice, on the vessels, as well as during offloading and storage, before proceeding to the factory for further processing. Fish are offloaded in bins, using a crane. After offloading, vessels are restocked with food, freshwater supply and ice and refuelled before heading back to sea.

As part of the general operations, some maintenance dredging of the area surrounding the quay may have to be performed. This is to ensure that the water depth remains sufficient to allow the vessels safe entry and docking. It is not expected that dredging will be required, however, should dredging be required, volumes to be dredged will minimal. Dredging is typically conducted with a grab dredger operated from the quay side. The grab is emptied into tipper trucks parked on the quay. The truck will remain on the quay to allow excess water to drain from the dredged material and back into the sea. Dredged sediments are then disposed of at dedicated dumping areas.

Figure 4-1 Site layout – Seawork Fish Processors

4.1.2 Fish Processing Facility Operations

The plastic bins with fish, offloaded from the vessels, proceed to a chiller room after re-icing, from where the fish are removed from the ice (de-iced) and sorted according to weight. This ensures the fish remains cold throughout the process. From the chiller room, the fish is transported to the automated grading and sorting lines. Here the fish is graded and sorted according to weight, before entering the processing line. In the processing line, fish is filleted by hand, mechanically skinned, and quality checked. Thereafter, the filleted fish is cut, weighed, sorted to size or weight and packaged according to client requirements. Packaged fish either passes through a plate freezer, blast freezer or spiral freezer ensuring freshness is maintained. Individual boxes of frozen fish are conveyed through a metal detector to ensure no foreign metal objects accidentally ended up in the product. After processing, the packaged fish is stored in one of three cold rooms, ready for shipment.

All fish offal is transported by conveyer to an offal room, where the fish offal is kept in skips. The skips with offal are collected by contractors and sold for the production of fishmeal. All ice from the plastic fish bins is kept in tubs. The cold ice water and effluent de-icer water are used in a heat-exchanger to cool potable water used for ice production before being disposed as effluent.

Chemicals used for cleaning and disinfection purposes in the facility, as well as on the vessels, are stored in designated chemical stores at the fish factory and water treatment plant respectively.

Photo 4-1 Receiving area (Seawork, 2019)

Photo 4-2 Sorting and grading (Seawork, 2019)

Photo 4-3 Hand filleting (Seawork, 2019)

Photo 4-4 Shipment loading area

Photo 4-5 On-site chemical store

Photo 4-6 Ice makers

4.1.3 Ice Plant

The ice plant has four flake ice makers and ice is gravity fed to the ice bunker. The ice plant has the capacity to produce 140 tons of ice per day, and currently produces an average of 2,100 tons per month. The ice is used on Seawork's own vessel fleet as well as on land (including Benguella and Omankete site) to keep fish cold. Ice is also sold to third party vessels when needed. Seawork uses a heat exchange system (water chillers) to reduce the ice plant's energy consumption.

4.1.4 Compressor Room and Cooling Towers

For cooling and freezing purposes, Seawork has two compressor rooms on site which are operated using South African National Standards (SANS) 10147 safety standards guidelines. All compressors uses ammonia (R171) as coolant.

The main plant compressor room has seven screw compressors with four evaporative condenser (cooling towers). The system is a pump circulation system and operates at four separate temperature systems. The systems are -10°C, -35°C, -40°C and -45°C, for various operations throughout the factory ranging from general air cooling to freezers. The compressor room also has an economizer (heat exchanging technology) that aid in the cooling of ammonia and thus reduces the energy (electricity) needs of the cooling towers. An estimated eight tons of ammonia is stored in this system.

The ice plant compressor room has a total of five screw compressors. The system is a single stage pump circulation system which operates at -38.8°C suction temperature. The cooling system is used to produce ice at a production capacity of 140 ton/day, and to cool the ice bunker. An estimated three tons of ammonia is stored and circulated through this system. The ice plant provides flaked ice to Seawork and Benguella's fishing vessels, as well as to all processing facilities of all three entities.

The cooling processes generate a significant amount of heat which is cooled by evaporative condensers (cooling towers). For the main plant compressor room, a total of four cooling towers are used and for the ice plant, a total three cooling towers. Ambient air is circulated through the cooling towers where potable water is used to cool the air via heat exchange. The combined daily water usage of the main plant towers varies between 45 m^3 and 94 m^3 per day, and 10 m^3 to 40 m^3 for the ice plant, depending on production. Bleed-off water from the cooling towers are diverted to storage tanks, from where it is used at the ablution facilities to flush toilets and urinals. The overflow from the tank supplied from the main plant is diverted to the municipal sewers, and overflow from the tank at the ice plant is diverted to the freshwater effluent sump, from where it is discharged into ocean. The cooling towers are cleaned once every three months on a rotational basis. Cooling tower water is dosed with chemicals once a month to prevent bacterial growth. See Table 4-1 for a list of chemicals used for cooling water dosing. While some of these chemicals are toxic to aquatic environments in high concentrations, they are sufficiently diluted when added to the cooling towers, to not present any significant risks.

Photo 4-7 Main plant compressor room

Photo 4-8 Ice plant compressor room

Photo 4-9 Main plant cooling towers

Photo 4-10 Compressor room economizer

Table 4-1 List of chemicals which may be used in compressor rooms and cooling tower

Product Brand Name	Hazard Identification	Type / Use
Sudbak		Biocide & fungicide
Sudkor 355	Irritant	Corrosion & scale inhibitor
MOBIL SHC CIBUS 32 HT	Flammable	Lubricant
OKS 451	Flammable	Lubricant
OKS 470	None	Lubricant
OKS 471	Flammable	Lubricant
OKS 472	Toxic	Lubricant
Electrical cleaner 128	None	Electrical cleaner
Limex		Lime solvent
Castrol ATF 11 multivehicle	Harmful to aquatic life	Transmission fluid
Tekprol 131 degreaser	Flammable, Toxic	Degreaser
Casrol Alpha SP 150	None	Lubricant
WD 40	Flammable, Harmful	Lubricant
Mechanical vacuum pump oil AV-30		Lubricant
Compressor Bearing Lube		Lubricant
Sudsperse CW		Bio-dispersant
Castrol Aircol 299	None	Lubricant
Castrol Perfecto XEP 68	None	Lubricant
Suniso SL68	Irritant	Lubricant
SuperClean	Corrosive	Condenser cleaner
Depositrol BL6501	Irritant	Antiscalant, biocide
Spectrus NX1164	Corrosive, Harmful to aquatic life	Water-based microbial control agent.
Gargoyle Arctic Oil 300	Irritant	Lubricant
R507 Refrigerant gas	Compressed gas	Compressed gas
R407C Refrigerant gas	Compressed gas	Compressed gas
Mycom 68 Refrigeration Oil	None	Lubricant
CCW 5 Closed cooling water treatment	Harmful, Irritant	Cooling water treatment

Product Brand Name	Hazard Identification	Type / Use
Ammonia R717	Toxic, Flammable	Compressed gas
Refrigerant gas R22	None	Compressed gas
Refrigerant gas R404	None	Compressed gas
Refrigerant gas R417	None	Compressed gas

4.1.5 Transformers and Consumer Fuel Installation

Five oil cooled transformers are operated at Seawork, providing a combined supply of 4,600 kVA. Three of the transformers are installed at the main plant and two at the ice plant.

Main plant transformers:

- Transformer one: 1,000 kVA rating, 878 litres transformer oil
- Transformer two: 1,000 kVA rating, 878 litres transformer oil
- Transformer three: 1,000 kVA rating, 1,450 litres transformer oil

Ice plant list of transformers:

- Transformer one: 800 kVA rating, 1,430 litres transformer oil
- Transformer two: 800 kVA rating, 1,237 litres transformer oil

The transformers use polychlorinated biphenyl (PCB) free transformer oil which is sampled and analysed annually. Any old transformer oil are and will be discarded as hazardous waste according to its material safety data sheet instructions.

Seawork also operates a consumer fuel installation with a 650 m^3 aboveground storage tank, situated in a bunded area. The infrastructure of the consumer fuel installation belongs to Puma Energy. It is used to supply ships docking at the quay with diesel. Fuel is reticulated to a pump station at the quay via an underground pipeline, from where it feeds three fixed bunker points. The installation has existing spill control infrastructure and was recently upgraded to comply with SANS regulations.

Photo 4-11 Consumer fuel installation

Photo 4-12 Transformer

4.1.6 Water Usage and Waste Water Disposal

Seawork currently uses approximately 15,500 m³ potable water per month which is currently supplied from the Municipality of Walvis Bay (supplied by NamWater) (see Figure 4-3 for current water flow diagram). This volume is expected to increase to 17,000 m^3 per month within the next two to three years. Seawork also has a seawater treatment plant with a permit to abstract 600 m³ seawater per day, issued by Ministry of Agriculture, Water and Forestry (Appendix A). Due to the high water consumption of the facility, Seawork proposes the construction of a seawater desalination plant, to alleviate pressures on the public water supply, as well as ensure a reliable supply of potable water to the facility. Water usage at the fish factory is mainly for processing, cooling purposes, washing, ice production and domestic use.

Seawater Treatment Plant

Water from the seawater treatment plant is mainly used for processing of fish (cleaning, etc.) at the sorting and grading area. The plant has the capacity to deliver 12 m^3 treated seawater per hour, with the current seawater consumption being around 217 m^3 per day. Water extracted from the ocean goes to a flocculation tank and then to the dissolved air flotation (DAF) plant to remove solids. The water then passes through a settling tank to a sand filter before being stored in storage tanks where it is treated with chlorine dioxide (ClO_2) (Figure 4-2). Scum resulting from flocculation and DAF treatment, as well as backwash from the sand filter, is diverted to the freshwater effluent sump for treatment prior to disposal in the ocean.

Photo 4-13 Current DAF tanks (seawater treatment)

Photo 4-14 Current seawater intake point

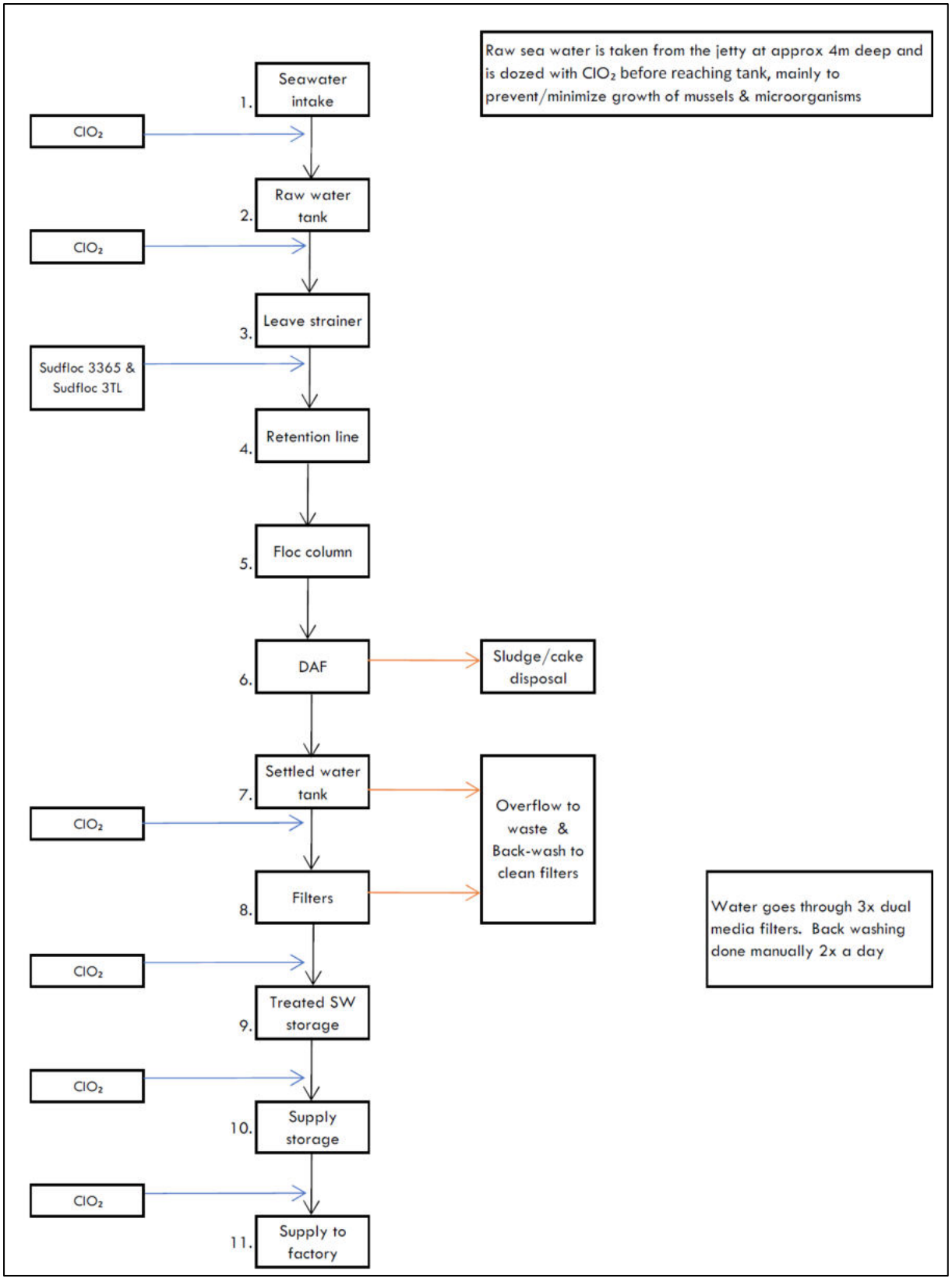

Figure 4-2 Seawater treatment process flow diagram

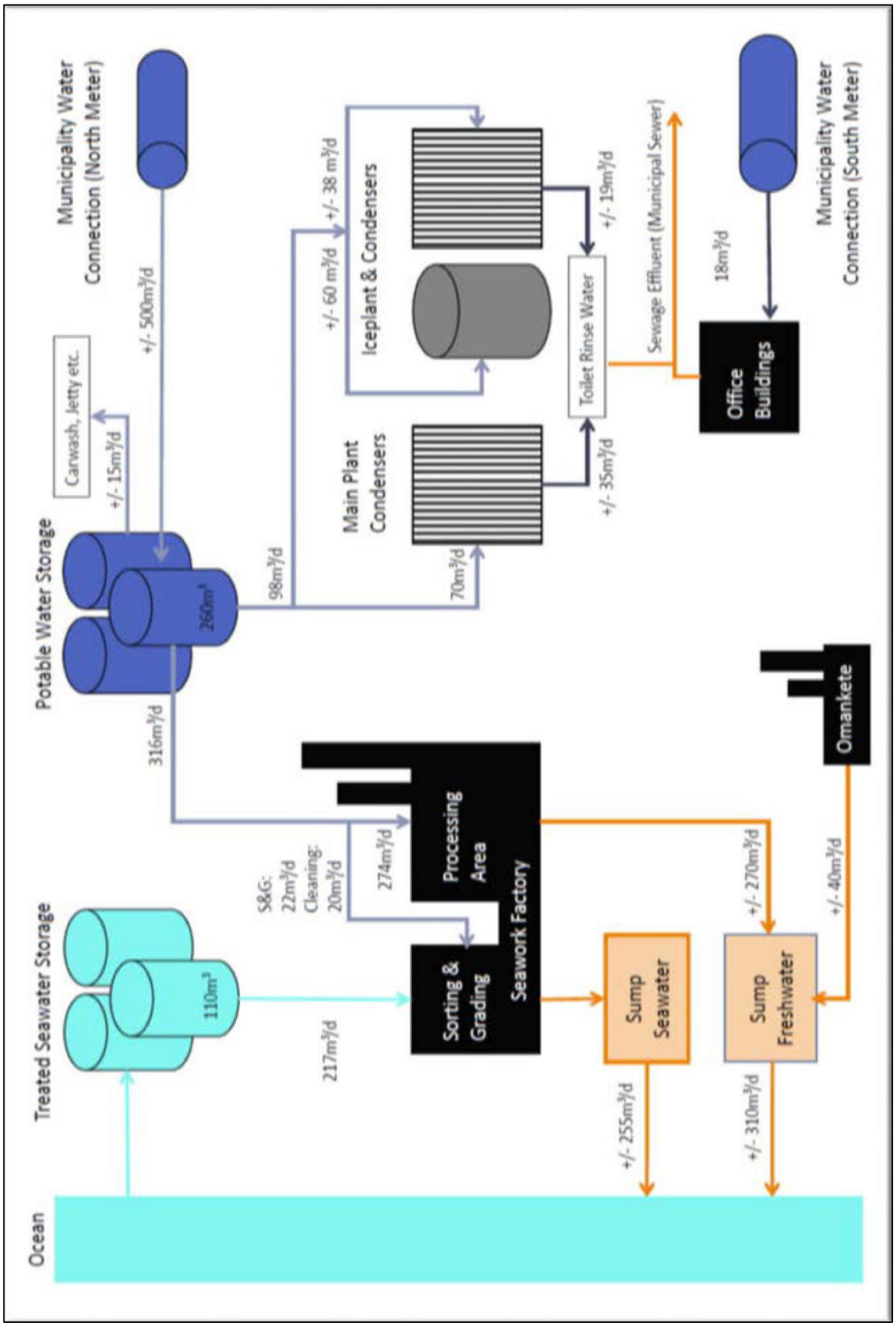

Figure 4-3 Current water flow diagram

Desalination Plant

Seawork Fish Processors and its subsidiaries, Omankete Seafood Processors and Benguella Properties, are bulk users of potable fresh water, supplied by the Municipality of Walvis Bay. Currently, Seawork together with Benguella Properties and Omankete, uses approximately 19,300 m^3 of potable water per month. This volume is expected to increase with approximately 6,000 m^3/month, to 25,300 m^3/month, over the next two to three years. The Proponent proposes to construct a reverse osmosis seawater desalination plant during this period to augment potable water supply. The plant will have an estimated production capacity, of high quality fresh water, of 450 m^3/day or 10,000 m^3/month. The balance of the potable water needs will continue to be supplied by the municipality. The plant will also produce treated seawater, alternatively desalinated seawater, for use in the sorting and grading areas and replace the current seawater treatment plant. Desalinated seawater will also be directed towards the evaporative condensers (cooling towers) where high values of Sulphates and Phosphates are found in the run-off effluent water.

Raw seawater will be sourced directly from the ocean or alternatively from a series of shallow onshore extraction points (boreholes) drilled approximately 100 meters from the shoreline and at a depth of about 11 meters below ground level. This is to ensure that the quality of the raw seawater subtracted remains constant, and not directly impacted by bacteria, algae or any other pollution in the harbour.

Application has to be made to expand the volume of seawater abstraction cited in the current abstraction permit (No. 11202) from a maximum of 600 m^3/day to 1,850 m^3/day. The seawater will be abstracted in service of the proposed desalination plant when running at full production of 450 m^3/day and for treated seawater production. It is anticipated that on average 330 m^3/day of desalinated fresh water will be produced, allowing for maintenance and repairs and other stoppages. It is estimated that brine disposal will be at a rate of 675 m^3/day at maximum production and be diluted with 60% fresh water (desalinated and Municipal) released from the freshwater effluent disposal systems of the processing facilities.

The plant design is based on feed water with a total dissolved solids concentration of around 42,000 mg/l (see Figure 4-5 for proposed plant layout). It is proposed that seawater for desalination purposes will undergo flocculation and DAF treatment to remove larger solids prior to pre-filtration where finer solids such as sand and clay particles are removed. The water then undergoes bag filtration and chemical dosing before being purified by means of reverse osmosis, a process where the water is forced through a semi-permeable membrane. This step removes the salt and other impurities from the water. The by-product of reverse osmosis is brine with an estimated total dissolved solids concentration of ± 69,000mg/l to 75,000 mg/l which will be diluted by freshwater effluent from the factory processing plant, prior to being pumped back into the ocean. The freshwater effluent is estimated to be 60% of the total freshwater produced by the desalination plant. The desalinated water will be chlorinated and then passed through a hardener column ($CaCO_3$) to condition the water before being ready for use as potable water. Water from the desalination plant will be stored in two 1,000 m^3 freshwater reservoirs. It will be used for purposes such as fish processing in the factory, cleaning, cold storage evaporators (cooling towers), ice production, ship water supply, rinsing and washing and domestic use (Figure 4-4).

Table 4-2 Proposed list of chemicals that may be used at the desalination plant

Product Brand Name	Hazard Identification	Type
Soduim hypochlorite	Corrosive, toxic	Water disinfectant
Hydrochloric acid	Corrosive, irritant	Acid
Ultrafloc blend U3500	Irritant	Flocculant
Hydrex 4102	Irritant	Antiscalant
Sodium metabisulphite	Irritant	Chlorine removal
Ferric chloride solution	Harmful	Coagulant

Ethylenediaminetetraacetic acid	Irritant, environmental pollutant	Foulant / Sulfate remover
Sodium Tri Poly Phosphate (STPP)	Irritant	Foulant / Sulfate remover
Sodium Hydroxide solution	Harmful	Alkali
Acetone	Harmful	Organic solvent
DPD free chlorine reagent	Irritant	Laboratory reagent
Sodium Hypochlorite (NaOCl)	Corrosive, toxic, irritant	Disinfectant

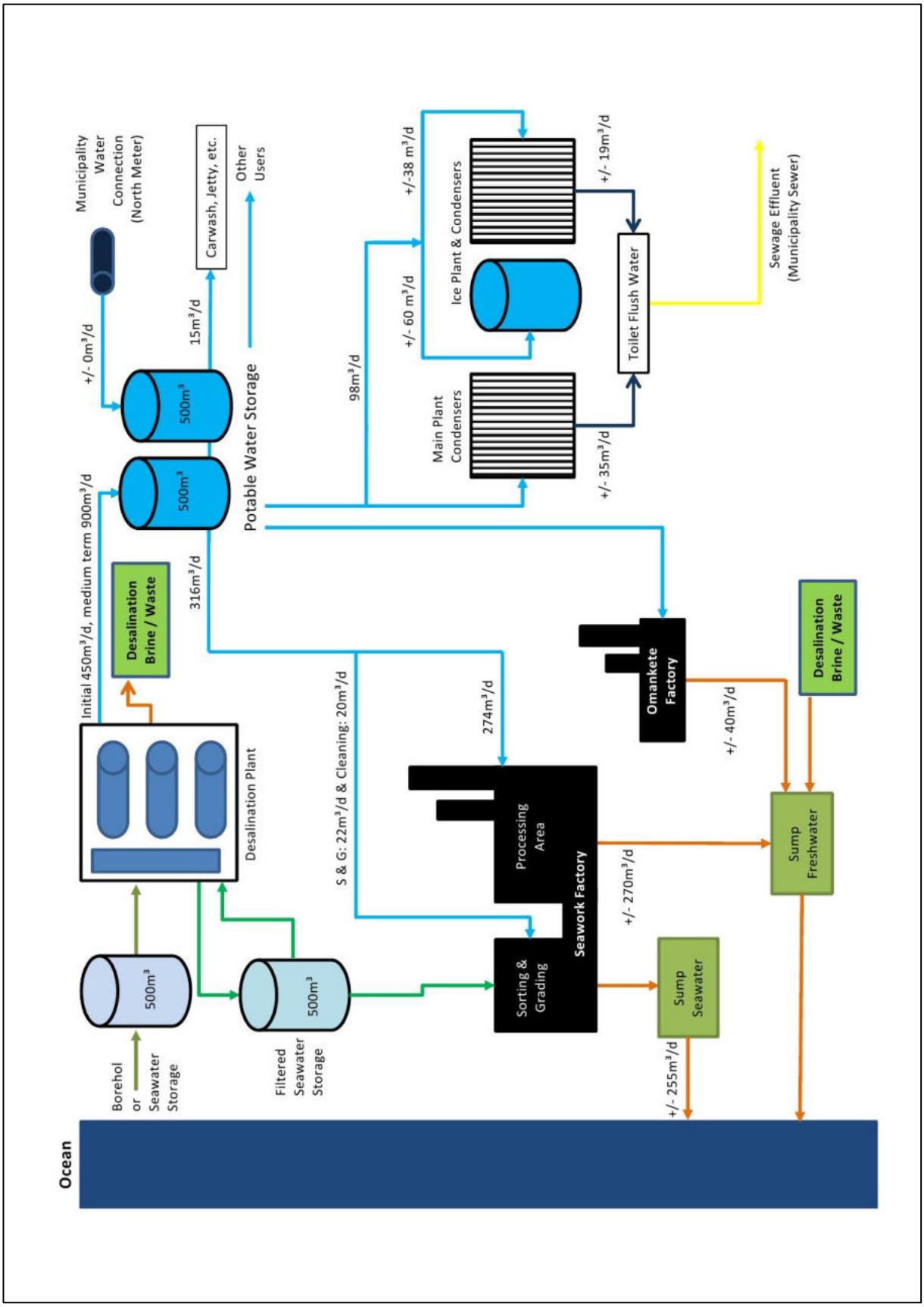

Figure 4-4 Proposed water flow diagram

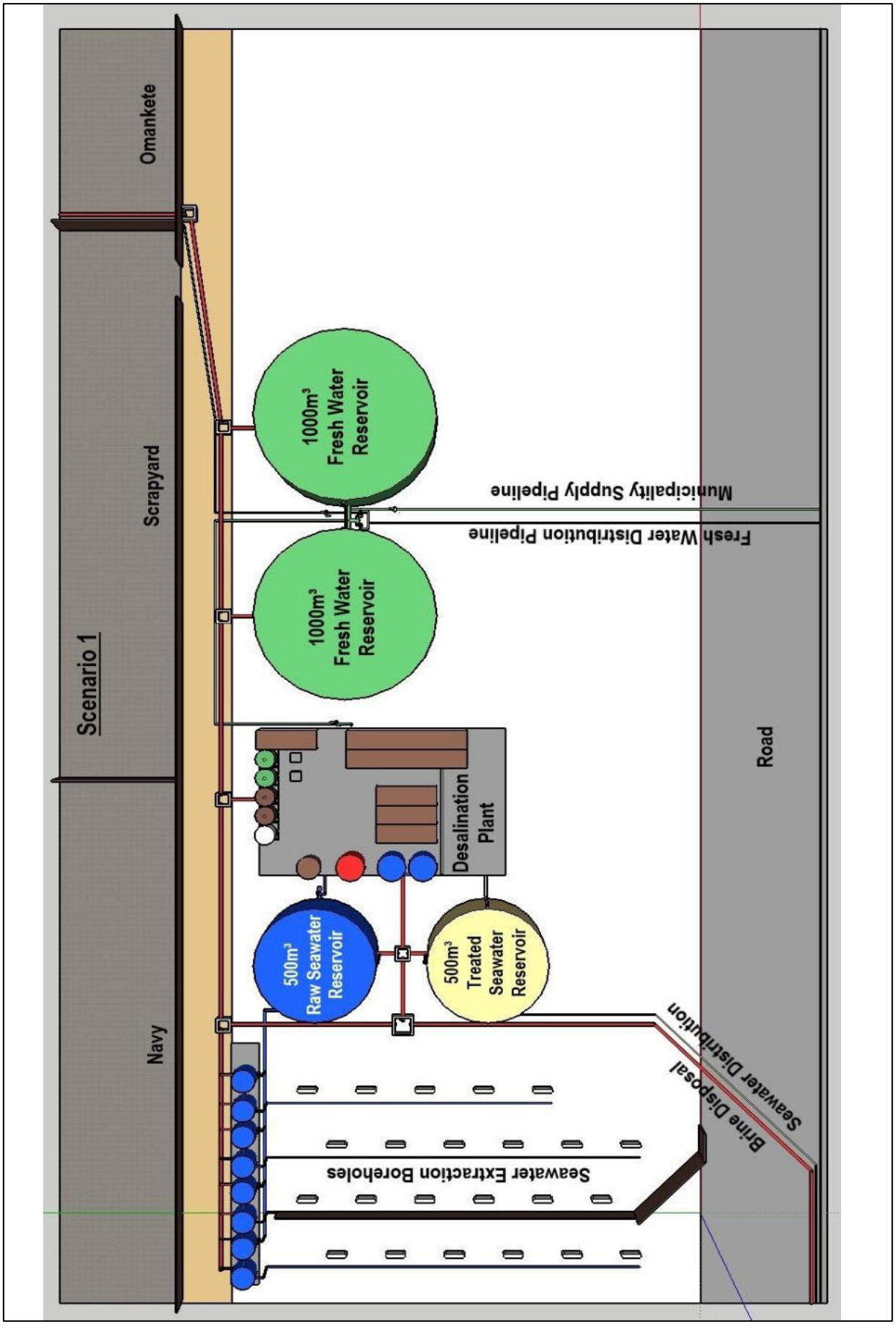

Figure 4-5 Proposed desalination plant layout

Wastewater Treatment
Two water streams are discharged into the ocean, namely freshwater effluent and seawater effluent.

The freshwater effluent contains a combination of seawater treatment backwash and scum, overflow bleed-off water from the ice plant cooling towers and fish processing area, and wash water from the bin washing area. Current volumes range between 310 m^3/day and 350 m^3/day. Brine from the desalination plant will also form part of this stream, to ensure salt concentrations are diluted prior to discharge (Figure 4-3 and Figure 4-4). Freshwater effluent from the plant currently has total dissolved solids concentration ranging around 900 mg/l to 2,000 mg/l. Brine volumes are estimated to be 675 m^3/day (maximum) during full production with an estimated total dissolved solids concentration of between 69,000 and 75,000 mg/l before dilution with fresh water effluent as mentioned before. Up to 60% of the freshwater effluent produced will be returned with the brine effluent to ensure the high total dissolved solids of the brine is effectively diluted.

All freshwater effluent is diverted to a sump for treatment. Here, solids are allowed to settle and floating debris are removed before the water is pumped through a 3 mm rotating solid screen. The rotating screen then removes all remaining solids larger than 3 mm. The treated effluent then goes to an inspection sump, from where it is diverted to the ocean. All fish offal removed in this process is collected for fishmeal production by an external company.

Effluent water from the seawater stream contains treated seawater used in the sorting and grading area (Figure 4-3 and Figure 4-4). Effluent water from this section is filtered using a screw screen. The screw screen separates the organic materials (solids) from the effluent water prior to discharge in the ocean. The solids extracted from the effluent are collected in skips and transported to a contractor for the production of fishmeal.

The Proponent has an existing a wastewater (effluent) discharge permit (Appendix B). Effluent water is analysed bi-annually as per typical effluent discharge permit conditions, which may include the following:

- Chemical Oxygen Demand (COD)
- Biological Oxygen Demand (BOD)
- Free and Saline Ammonia (N)
- Fats, Oil and Grease (FOG)
- Total Kjedahl Nitrogen
- Total Suspended Solids (SS)
- Total Dissolved Solids (TDS)
- Dissolved Oxygen
- Absorbed Oxygen
- Typical Faecal Coliforms
- Sulphide
- Phosphates
- Nitrates
- Redox Potential
- Conductivity
- Turbidity
- pH

All other wastewater, such as water generated from the ablutions, wash water within the factory and cooling towers, are disposed of in the municipal sewer systems, or collected by contractors if hazardous substances are potentially present.

4.1.7 Employment
Seawork employs 1,687 permanent employees in various sectors of the operations. This includes factory operations, fishing vessels and office staff. In addition about 239 temporary

workers who are full-time employed. Services from a number of contractors are also utilized, generating more indirect employment opportunities.

Photo 4-15 Rotating (solid trap)

Photo 4-16 Screw screen

4.1.8 Waste Handling

Seawork has an allocated waste handling area on site, where Rent-A-Drum sorts and collects waste. Recyclable waste is sorted and collected for recycling purposes. Solid waste and liquids, as well as potentially hazardous waste, are also collected by Rent-A-Drum for disposal. Plastic and packaging waste are collected in wheelie bins and black refuse bags, all recyclables are then moved to a cage at a designated area, to ensure no litter can be blown away by wind, prior to collection for recycling. All other waste is stored in a molok waste receptacle. The waste receptacle is water proof (spill proof) and extends to 3 mbs which allows you to store more waste with a smaller footprint. This also improves aesthetic appearance and reduces odours. Waste is monitored daily and collected when needed. All biological waste, such as those produced in the clinic (see section 4.1.9) is collected and disposed of according to regulations and industry accepted standards.

4.1.9 Auxiliary Operations

Seawork operates a fish shop on the premises, where fresh fish products from the factory, as well as imported products are sold to the public.

An on-site clinic which conducts eye tests, hearing tests, pre-placement and routine screenings and medical checks on food handlers is present on site. It provides general medical services and provides onsite treatment for employees injured while on duty. The clinic further offers a full range of services aimed at providing education and support to employees with regards to personal and community wellness. All biohazardous waste from the laboratory and clinic is clearly marked and disposed of according to regulations and industry accepted standards.

Seawork uses an external pest control service. The pest controllers are all trained and registered with the Ministry of Health and Social Services. External pest controllers are accompanied by an on-site quality controller during pest control procedures to ensure compliance.

Photo 4-17 On-site fish shop

Photo 4-18 On-site clinic

4.1.10 General Operational Activities

Daily operations are typical of those of fish processing facilities in Walvis Bay. These include administrative tasks, on-site security services, cleaning and basic maintenance. When required, the waste and hazardous waste generated by the facility will be collected by contractors and disposed of. Strict access control is practiced to certain areas of the facility such as food handling and processing areas to prevent unauthorised entry. Sufficient firefighting equipment is available at all section of the operations and regular maintenance is performed.

4.2 BENGUELLA PROPERTIES

Four fishing vessels operate from the Benguella site and they target monkfish and hake (with some bycatch) and are operated by Benguella Fishing Company, a partial subsidiary of Benguella Properties. The site has existing quay space and a fish processing facility (factory). The factory is currently not operational, but may become operational in future if the need arise. It has a processing area, chiller, cold storage, etc. Currently all fish is process at the Seawork erf, but if the Benguella facility becomes operational, it will also be operated by Seawork Fish Processors.

There are plans to upgrade the fish processing facilities at Benguella Properties' erven. A brief discussion on such upgrades as presented in Figure 4-7.

Figure 4-6 Site layout – Benguella Properties

4.2.1 Water Supply

Currently, all water used at Benguella is potable water as supplied by the Municipality and all effluent is discarded into the Municipal sewers. Benguella currently uses approximately 100 m^3 potable water per month, but this figure will increase to about 4,500 m^3 after completion of the planned new fish processing and cold storage facilities in the next two to three years. No seawater is used or disposed of at the Benguella properties.

4.2.2 Ice Plant

An ice plant is also present on the Benguella properties. It is only used when the Seawork ice plant cannot produce sufficient volumes of ice. Ultimately the Benguella ice plant will be demolished and the Seawork ice plant upgraded to cater for the total ice demand.

4.2.3 Compressor Room and Cooling Towers

One compressor room hosting three screw compressors are present at Benguella. Three evaporative cooling towers are present for heat exchange. Approximately 75 m^3 of ammonia is stored on the Benguella site.

4.2.4 Transformers and Consumer Fuel Installation

Benguella Properties has a consumer fuel installation to supply diesel for vessel bunkering purposes. It consists of two aboveground steel tanks of 80 m^3 each. The tanks are situated in a bund area and supply diesel to the quay area via an underground pipeline. The facility is owned and maintained by Engen Namibia. Once construction of the new fish processing and cold storage facilities at Benguella Properties commence, the consumer fuel installation will be decommissioned and all fuel will be supplied from the Seawork consumer fuel installation.

Benguella has a transformer room containing three oil-cooled transformers.

4.2.5 Employment

Benguella Fishing (a subsidiary of Benguella Properties) employs 121 employees of which 73 work at the Seawork facility. Once the new fish processing and cold storage facilities are constructed and operational, an additional 450 employment opportunities will become available.

Photo 4-19 Benguella fish processing facility

Photo 4-20 Freezer

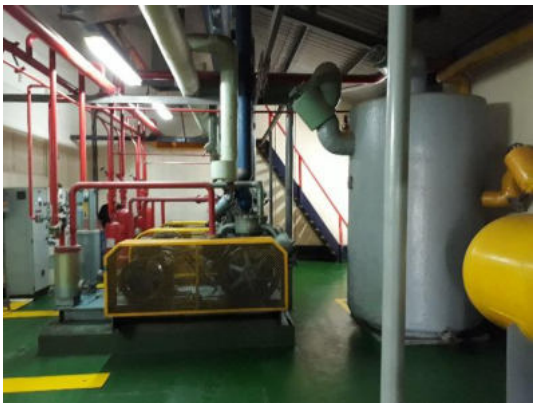

Photo 4-21 Ammonia room

Photo 4-22 Evaporative coolers

Photo 4-23 Consumer fuel installation

Photo 4-24 Quay area

4.2.6 Planned Upgrades

The complete decommissioning of most of the existing infrastructure on erven 3695 and 2891 is planned for the near future. A new state of the art fish processing and cold storage facility is then planned to be constructed on the properties. It will be a comprehensive facility containing all aspects required for the receipt, processing, packaging, cold storage and dispatch of fish, as well as all administrative and supporting infrastructure such as offices, storerooms, ablutions, etc. See Figure 4-7 for the proposed facility for Benguella Properties.

The existing facilities contains asbestos roofing that will require specific demolition and disposal methods to be performed by a qualified contractor. Once the new facility is commissioned, operations will be similar to the existing operations on the Seawork site.

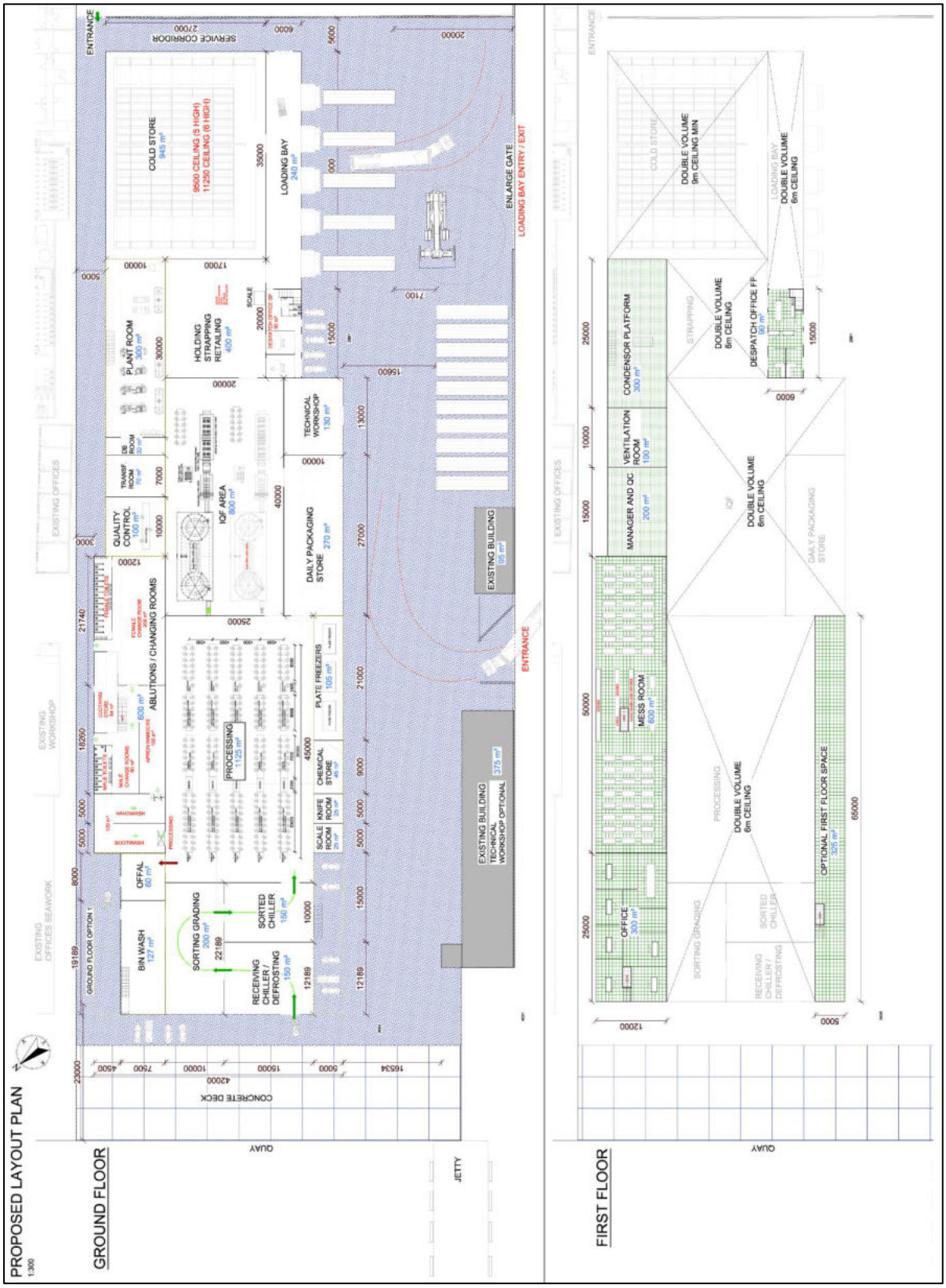

Figure 4-7 Proposed fish processing and cold storage facility for Benguella Properties

4.3 OMANKETE SEAFOOD PROCESSORS

Omankete does not have its own fishing fleet, but instead processes fish caught by Benguella and Seawork's vessels. The site has an existing fish processing facility with freezer and cold storage facilities.

Figure 4-8 Site layout – Omankete Seafood Processors

4.3.1 Water Supply

Water used at Omankete is mainly potable water as supplied by the Municipality with some seawater as supplied from the Seawork seawater abstraction and treatment plant. Omankete uses approximately 3,700 m^3 of potable water per month. This is expected to increase to 3,800 m^3 per month in the next two to three years. All effluent is discarded via the Seawork effluent streams.

4.3.2 Compressor Room and Cooling Towers

One compressor room hosting two screw compressors and one piston compressor are present at Omankete. Two evaporative cooling towers are present for heat exchange.

4.3.3 Transformers

Omankete has one transformer of 1,000 kVA with an 895 litre capacity for transformer oil.

4.3.4 Employment

All operations on Omankete's site are performed by employees of Seawork. In total approximately 576 employees of the Seawork staff complement work at Omankete's fish processing facility.

Photo 4-25 Omankete fish processing facility

Photo 4-26 Fish processing area

Photo 4-27 Ammonia room

Photo 4-28 Evaporative coolers

5 ALTERNATIVES TO THE PROJECT

The facilities are existing operations. The proposed desalination plant will be constructed on the property owned by Seawork, adjacent to the facility, within the fishing harbour of Walvis Bay. Industries on the surrounding properties are of similar nature. The facilities being located on the shore within the harbour, ensure fish are offloaded as close to the factory and other operations as possible, thus preventing additional environmental impacts such as increased traffic in Walvis Bay.

Alternative uses have been considered for brine disposal, such as the use thereof in the chlor-alkali industry, this may however not be feasible at small scale and require additional technology not readily available in Namibia.

All chemicals used on site must be handled according to their Material Safety Data Sheet MSDS requirements. For chemicals that will form part of effluent to be discharged into the ocean, environmental effects must be considered and alternative chemicals investigated if needed.

6 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

To protect the environment and achieve sustainable development, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an environmental assessment, as per the Namibian legislation. The legislation and standards provided in Table 6-1 to Table 6-4 govern the environmental assessment process in Namibia and/or are relevant to the facility and related operations.

Table 6-1 Namibian law applicable to the facility and related operations

Law	Key Aspects
The Namibian Constitution	♦ Promotes the welfare of people ♦ Incorporates a high level of environmental protection ♦ Incorporates international agreements as part of Namibian law
Environmental Management Act Act No. 7 of 2007, Government Notice No. 232 of 2007	♦ Defines the environment ♦ Promotes sustainable management of the environment and the use of natural resources ♦ Provides a process of assessment and control of activities with possible significant effects on the environment
Environmental Management Act Regulations Government Notice No. 28-30 of 2012	♦ Commencement of the Environmental Management Act ♦ Lists activities that requires an environmental clearance certificate ♦ Provides Environmental Impact Assessment Regulations ♦ Lists the "polluter pays principle" as one of the principles of environmental management
Petroleum Products and Energy Act Act No. 13 of 1990, Government Notice No. 45 of 1990	♦ Regulates petroleum industry ♦ Makes provision for impact assessment ♦ Petroleum Products Regulations (Government Notice No. 155 of 2000) ○ Prescribes South African National Standards (SANS) or equivalents for construction, operation and decommissioning of petroleum facilities (refer to Government Notice No. 21 of 2002)
Petroleum Products and Energy Act Regulations Government Notice No. 112 of 1991	♦ Regulations relating to the purchase, sale, supply, acquisition, possession, disposal, storage, transportation, recovery and re-refinement of used mineral oil
The Water Act Act No. 54 of 1956	♦ Remains in force until the new Water Resources Management Act comes into force ♦ Defines the interests of the state in protecting water resources ♦ Controls the disposal of effluent ♦ Numerous amendments
Marine Resources Act Act No. 27 of 2000	♦ Prevents the discharge of anything that may be injurious to marine resources or may disturb ecological balance in any area of the sea or which may detrimentally affect the marketability of marine resources, or which may hinder their harvesting

Law	Key Aspects
The Namibian Ports Authority Act Act No. 2 of 1994	♦ Provides for the establishment of the Namibian Ports Authority and its functions ♦ Responsible to protect the environment within its areas of jurisdiction
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	♦ Provides a framework for a structured more uniform public and environmental health system, and for incidental matters ♦ Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation
Labour Act Act No 11 of 2007, Government Notice No. 236 of 2007	♦ Provides for Labour Law and the protection and safety of employees ♦ Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997)
Local Authorities Act Act No. 23 of 1992, Government Notice No. 116 of 1992	♦ Defines the powers, duties and functions of local authority councils ♦ Regulates discharges into sewers
Atmospheric Pollution Prevention Ordinance Ordinance No. 11 of 1976	♦ Governs the control of noxious or offensive gases ♦ Prohibits scheduled process without a registration certificate in a controlled area ♦ Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process
Hazardous Substances Ordinance Ordinance No. 14 of 1974	♦ Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export ♦ Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings
Dumping At Sea Control Act Act No. 73 of 1980, Government Notice No. 1149	♦ Provides for the control of dumping of substances in the sea
Marine Traffic Act Act No. 2 of 1981, Government Notice No. 282	♦ Regulate marine traffic in Namibia
Pollution Control and Waste Management Bill (draft document)	♦ Not in force yet ♦ Provides for prevention and control of pollution and waste ♦ Provides for procedures to be followed for licence applications
Prevention and Combating of Pollution of the Sea by Oil Amendment Act (No. 24 of 1991)	♦ Amends the Prevention and Combating of Pollution of the Sea by Oil Act of 1981 to be more relevant to Namibia after independence
Aquaculture Act (2002)	♦ Provides for water quality monitoring to protect aquaculture activities
Draft Wetland Policy of 2003	♦ Considering the Walvis Bay Lagoon, the Wetland Policy of 2003 is of importance and includes: o Protection and Conservation of wetlands and ecosystems o As well as, including fulfilling Namibia's International obligations to the Ramsar Convention and the SADC Protocol on Shared Water Systems

Law	Key Aspects
Road Traffic and Transport Act Act No. 52 of 1999 Government Notice No 282 of 1999	♦ Provides for the control of traffic on public roads and the regulations pertaining to road transport
Road Traffic and Transport Regulations Government Notice No 53 of 2001	♦ Prohibits the transport of goods which are not safely contained within the body of the vehicle; or securely fastened to that vehicle, and which are not properly protected from being dislodged or spilled from that vehicle

Table 6-2 Municipal by-laws, guidelines and regulations

Municipal By-laws, Guidelines or Regulations	Key Aspects
Integrated Urban Spatial Development Framework for Walvis Bay	♦ Completed during 2014 and in the final stages of acceptance ♦ Overall vision to transform Walvis Bay to being the primary industrial city in Namibia ♦ Aims to ensure that appropriate levels of environmental management is enforced for all developments in Walvis Bay
Integrated Environmental Policy of Walvis Bay (Agenda 21 Project)	♦ Indicates the directions that the Municipality of Walvis Bay will move towards in the forthcoming years to fulfil its responsibilities to manage the environment of Walvis Bay together with the town's residents and institutions ♦ Strong focus on conservation and protection of environment
Drainage and Plumbing By-Law of 1958 (updated in 1982)	♦ Regulations regarding discharges into sewers specific to Walvis Bay

Table 6-3 Relevant multilateral environmental agreements for Namibia and the development

Agreement	Key Aspects
International Convention on Oil Pollution Preparedness, Response and Cooperation of 1990	♦ International maritime convention establishing measures for dealing with marine oil pollution incidents nationally and in co-operation with other countries
National Marine Pollution Contingency Plan of 2017	♦ Coordinated and integrated national system for dealing with oil spills in Namibian waters
Benguela Current Convention of 2013	♦ The Convention is a formal treaty between the governments of Angola, Namibia and South Africa that sets out the countries' intention "to promote a coordinated regional approach to the long-term conservation, protection, rehabilitation, enhancement and sustainable use of the Benguela Current Large Marine Ecosystem, to provide economic, environmental and social benefits."
Abidjan Convention of 1981	♦ The Convention for Cooperation in the Protection, Management and Development of the Marine and Coastal Environment of the Atlantic Coast of the West, Central and Southern Africa Region ♦ Provides an overarching legal framework for all marine-related programmes in West, Central and Southern Africa
Convention on Biological Diversity	♦ Primary goal is the conservation of biodiversity ♦ Prescribes the precautionary principle

Agreement	Key Aspects
	♦ Parties to the convention are obliged to: o Establish a network of protected areas o Create buffer areas adjacent to these protected areas using environmentally sound and sustainable development practices, and o Rehabilitate degraded habitats and populations of species
The Convention on Wetlands of International Importance especially as Waterfowl Habitat (referred as the Ramsar Convention)	♦ It is a framework for international cooperation in the conservation and wise use of wetlands and their resources ♦ Recognizes the Walvis Bay Nature Reserve – a tidal lagoon consisting of Pelican Point, adjacent intertidal areas, sandbars serving as roosting sites and mudflats exposed during low tide (12,600 ha) as a Wetland of International Importance
UN Convention for the Prevention of Marine Pollution from Land-based Sources	♦ Concerns itself with the protection of marine fauna and flora by preventing marine pollution from land-based sources ♦ Contracted parties, are committed to take all possible steps to prevent pollution of the sea as well as the direct or indirect introduction of substances or energy by humans into the marine environment resulting in such adverse effects as harm to living resources and to marine ecosystems, hazards to human health, damage to services/ facilities or interference with other legitimate uses of the area
Stockholm Declaration on the Human Environment, Stockholm 1972.	♦ Recognizes the need for a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment
Namport Specifications and Legislation	♦ Enforced Standards and Codes which governs construction and operations relating to the port

Table 6-4 Standards or codes of practise

Standard or Code	Key Aspects
South African National Standards (SANS)	♦ The Petroleum Products and Energy Act prescribes SANS standards for the construction, operations and demolition of petroleum facilities ♦ SANS 10089-1:2008 is specifically aimed at Storage and distribution of petroleum products in above-ground bulk installations o Provide requirements for spill control infrastructure

The operational and construction activities of the Seawork facility are listed as activities requiring an environmental clearance certificate as per the following points from Section 2, 8 and 9 of Government Notice No. 29 of 2012:

- 2.1 “The construction of facilities for waste sites, treatment of waste and disposal of waste”.
- 8.1 “The abstraction of ground or surface water for industrial or commercial purposes.”
- 8.12 “The release of brine back into the ocean by desalination plants.”
- 9.1 “The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974.”
- 9.2 “Any process or activity which requires a permit, licence or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an

amendment of an existing permit, licence or authorisation or which requires a new permit, licence or authorisation in terms of a law governing the generation or release of emissions, pollution, effluent or waste."

- 9.4 "The storage and handling of a dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic meters at any one location."
- 9.5 "Construction of filling stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin."

7 ENVIRONMENTAL CHARACTERISTICS

This section lists pertinent environmental characteristics of the study area and provides a statement on the potential environmental impacts on each.

7.1 LOCALITY AND SURROUNDING LAND USE

The operations of the Proponent are based in Ben Amathila Avenue, within the fishing harbour in Walvis Bay (22.9289°S; 14.5182°E). The onshore premises is zoned for industrial land use and is surrounded by properties of similar nature. The facilities are neighboured to the southwest by Guan's Packaging and Freddie Fish Processors, and to the northeast by the Namibian Navy. Southeast is Transworld Cargo by Omankete Seafood and the Namibian Navy. Two of the erven neighbouring the project location are also owned by Seawork and its subsidiaries. A map indicating neighbouring industries can be seen in Figure 7-1.

The fish processing facilities and related operations fall under the authority of the Municipality of Walvis Bay, although their activities are regulated by various ministries including the Ministry of Agriculture, Water and Land Reform (effluent disposal permit). There are no heritage or cultural sites located within close proximity to the facility.

Figure 7-1 Land use

Implications and Impacts

All three properties are situated in an area zoned for industrial purposes. Operations are in line with activities conducted in industrial areas and the fishing harbour. The cumulative impact of wastewater discharge from the various fishing industries, along with brine from desalination plants into the Atlantic Ocean, may pose a localised risk to the water quality in the harbour.

7.2 CLIMATE

Namibia's climate is dominated by dry conditions for most of the year and particularly so in the west. The location of Namibia with respect to the Intertropical Convergence Zone, Subtropical High Pressure Zone and Temperate Zone is what determines the climate, with the Subtropical High Pressure Zone being the major contributor to the dry conditions (Mendelsohn et al., 2002; Bryant, 2010).

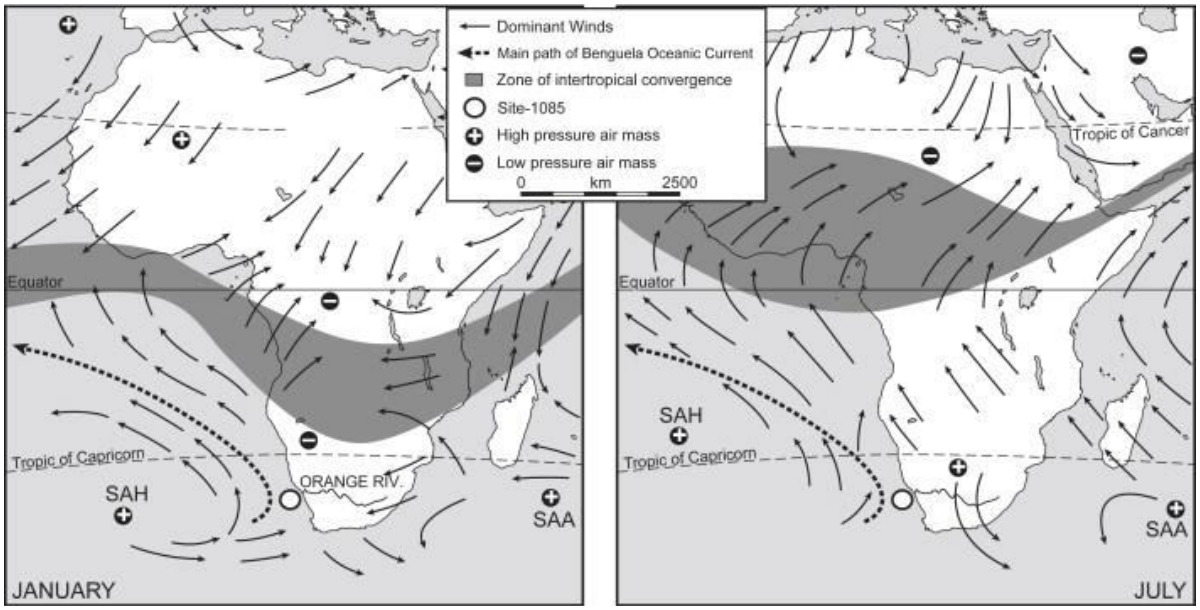

Figure 7-2 Map indicating the Intertropical Convergence Zone, Subtropical High Pressure Zone (SAH+), Benguela Current and Temperate Zone south of Tropic of Capricorn (not indicated) (from: http://www.meteoweb.eu)

Precipitation over Namibia is mainly controlled by the South Atlantic High (SAH), a high pressure cell (anticyclone) situated west of Namibia in the Subtropical High Pressure Zone. The SAH shifts during the year and is at higher latitudes in winter and lower latitudes in summer. In winter, as a result of being situated more north, the high pressure cell pushes any moisture originating from the Intertropical Convergence Zone northwards, preventing rain over Namibia. In summer, because the high pressure cell moves further south and has less of an effect on the Intertropical Convergence Zone, moist air reaches Namibia, resulting in summer rains.

Studies indicate the presence of a thermal inversion layer at Walvis Bay. Originally this was thought to be at approximately 500 mamsl (Taljaard and Schumann 1940), but recent studies indicate it as low as 200 mamsl (Patricola and Chang, 2017; Corbett, 2018). A marine atmospheric boundary layer (MBL) exists offshore of the coastline that thins from more than 500 mamsl to 200 mamsl as it nears the coast (Figure 7-3). The MBL is a layer of cool, well-mixed, stable air that is capped by a thermal inversion (Patricola and Chang, 2017; Corbett 2018). This thermal layer or inversion layer will prevent the escape of pollutants such as smoke higher into the atmosphere. The MBL however contribute to high velocity wind speeds by funnelling the winds created by the SAH, resulting in what is referred to as the Benguela Low-Level Coastal Jet (Figure 7-3). Since the MBL overlaps partially with the coastal plain, the wind generated by the Benguela Low-Level Coastal Jet also reaches inland, but diminishes relatively quickly further inland.

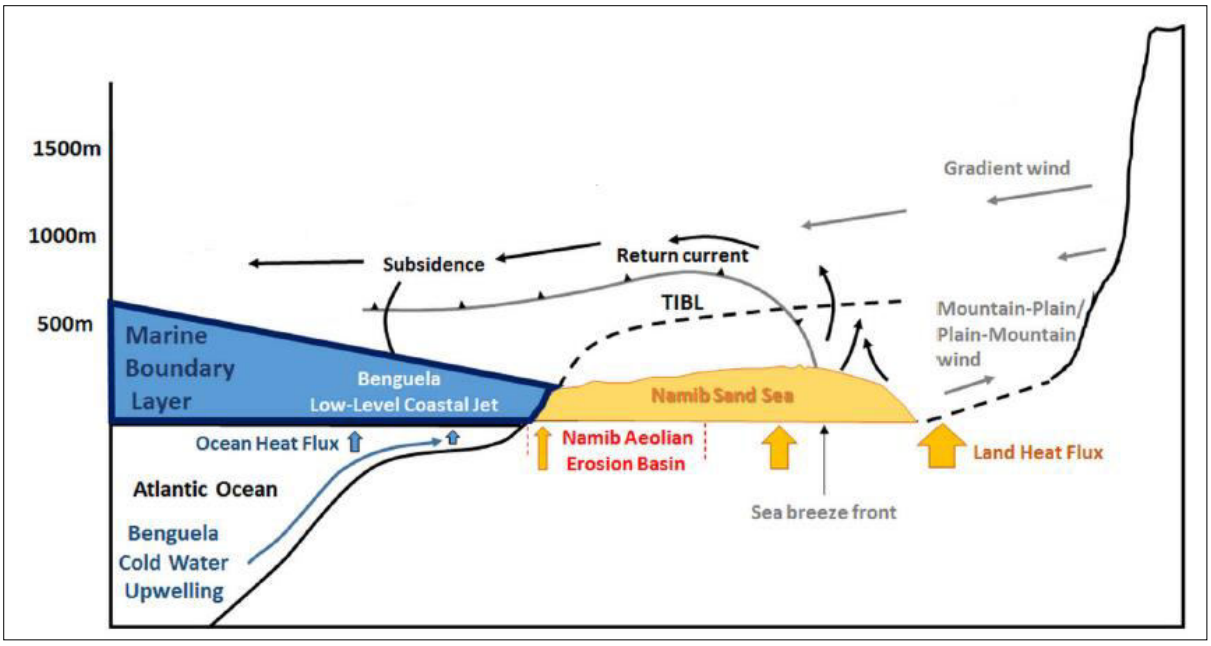

Figure 7-3 Simplified depiction of the marine atmospheric boundary layer (from: Corbett, 2018)

On a more localised scale, the climatic conditions on the central Namibian coast, and inland thereof (coastal plains), are strongly influenced by the cold Benguela current, the SAH and the relatively flat coastal plains separated from the central highlands by a steep escarpment.

The anticlockwise circulation of the high pressure SAH and the action of the earth's Coriolis force result in strong southerly (longshore) winds blowing northwards up the coastline of Namibia (Bryant, 2010; Corbett, 2018). This longshore wind is responsible for upwelling of the cold, deep waters of the Benguela Current. As a result of the temperature difference between the cold surface water of the Benguela Current and the warm coastal plains, the southerly wind is diverted to a south south-westerly to south-westerly wind at along the coast. At Walvis Bay the temperature gradient that forms over the warmer darker sands south of the Kuiseb River, compared with the cooler lighter coloured gravel plain to the north of the river, leads to the formation of cyclonic circulation (localised low-pressure systems) centred over the dune area, due to warm air that rises. This, together with topographical changes and land-use, causes a local deflection of wind flow over the Walvis Bay area, from south to southwest in Walvis Bay (Figure 7-4), to more southwest to westerly further inland, as well as reduced wind speeds. The more low speed, westerly winds are for example experienced at the Walvis Bay Airport (Rooikop) (Figure 7-5).

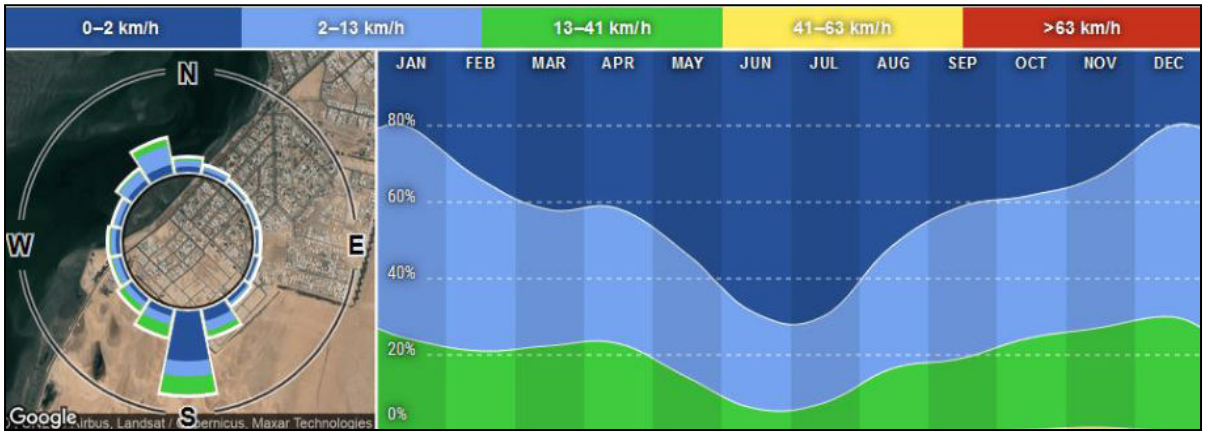

Figure 7-4 Wind direction and strength at the Walvis Bay Lagoon as measured between 2013 and 2020 (https://www.windfinder.com/windstatistics/walvis_bay_lagoon)

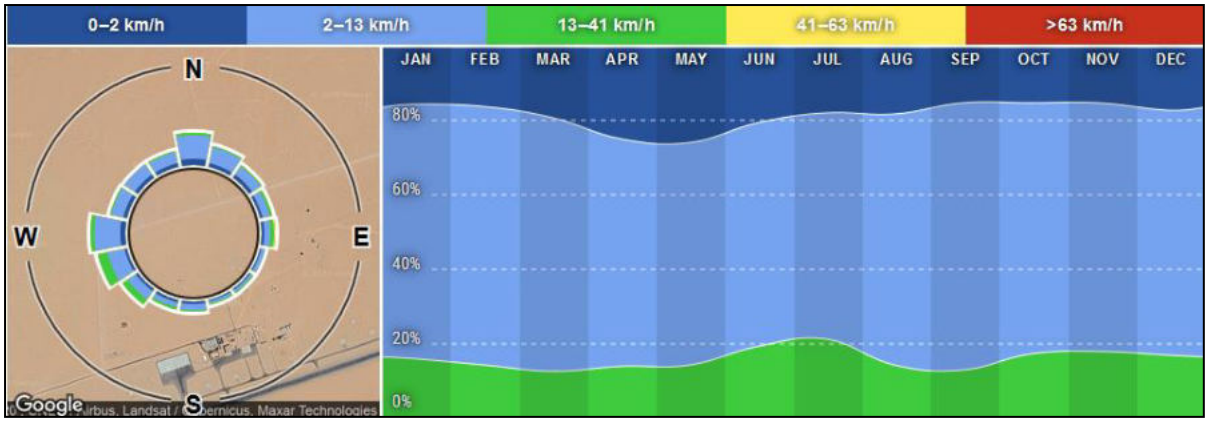

Figure 7-5 Wind direction and strength at the Walvis Bay Airport as measured between 2003 and 2020 (https://www.windfinder.com/windstatistics/walvis_bay_airport)

The winds are strongest in early to mid-summer (September to January) when the SAH is at its strongest and most persistent, and the temperature difference between the sea and the desert plains are at its greatest. Wind speeds then occasionally exceed 32 km/h and usually peaks late morning to early afternoon. In winter, the SAH loses strength and the southerly to south-westerly winds are at their weakest. Winter winds do not have enough strength to reach far inland. Autumn to winter conditions do however promote the formation of east wind conditions (berg winds) that can reach speeds of more than 50 km/h and transport a lot of sand. East winds occur when the inland plateau is cold with a localised high pressure cell, while a low pressure system is present at the coast. The high pressure cell forces air off the escarpment and as the air descents, it warms adiabatically as well as create a low pressure system due to the vertical expansion of the air column. The warm air flows toward the coastal low and ass it passes over the Namib plains, it heats up even further. The wind manifests itself as very strong, warm and dry winds during the mornings to early afternoon, but dies down late afternoon.

Throughout the year the prevailing night time wind is a weak easterly wind. This results from the mainland cooling to below the temperature of the coastal water. This results in a coastal low versus an onshore high pressure system with first no wind in the early evening, when temperatures between water and land is similar, and then weak easterly winds as the temperature difference increase.

Wind within the MBL remains dominated by the Benguela Low-Level Coastal Jet, causing a localised southerly wind over Walvis Bay, see Figure 7-2.

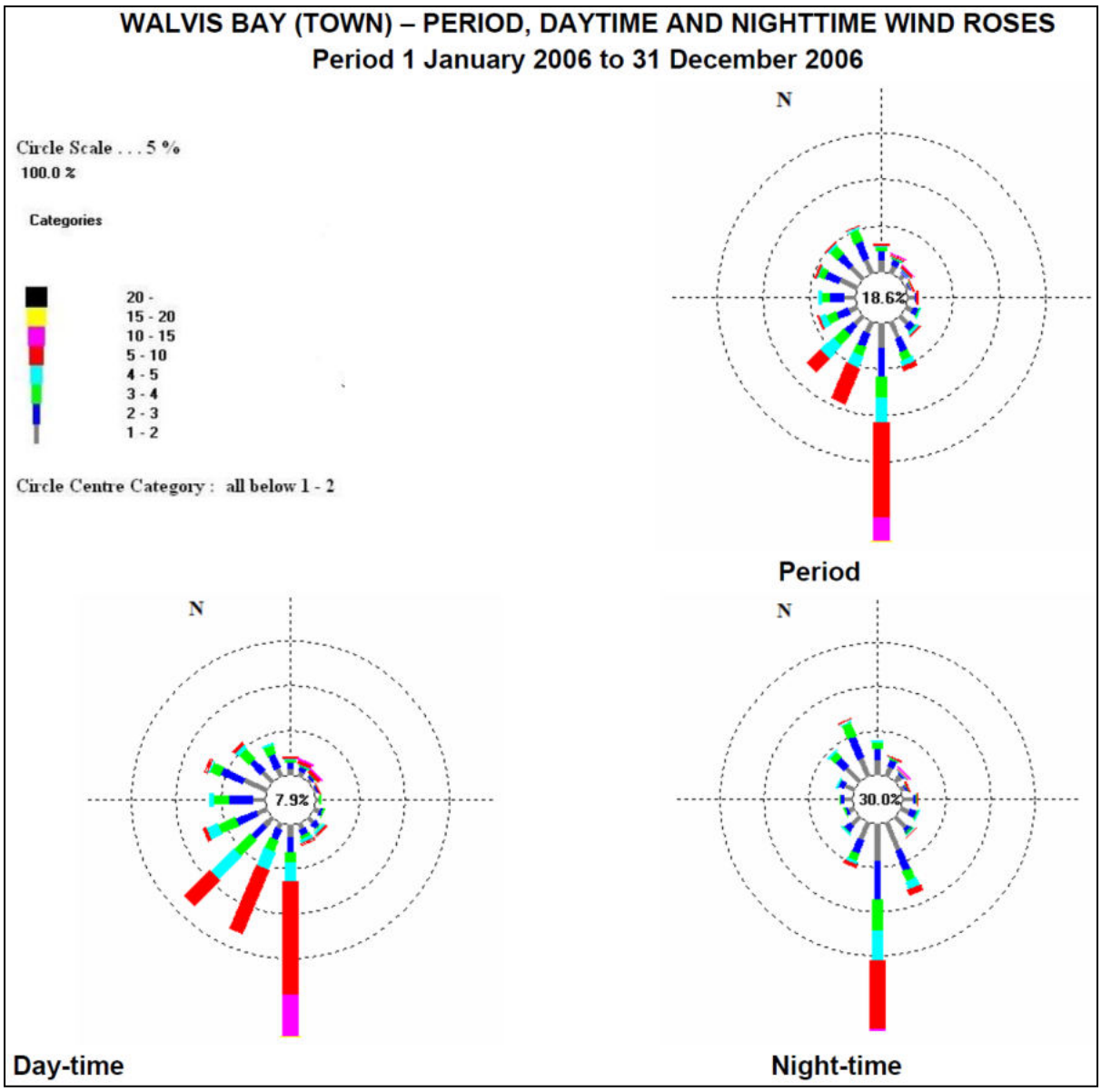

Figure 7-6 Period, daytime and night-time wind roses for Walvis Bay town for the period 2006 (Petzer, G. & von Gruenewaldt, R., 2008)

Temperature at Walvis Bay is strongly regulated by the cold Benguela current. As a result, there is typically limited variation between diurnal and seasonal temperatures. Average annual temperatures are approximately 18 °C to 19 °C with the maximum temperature seldom above 30 °C and minimums rarely below 5 °C (Figure 7-7). The only real temperature extremes are experienced during east wind conditions in the autumn to early winter months when temperatures can reach the upper thirties or even low forties. This results in these months having an average maximum temperature ranging from 30 °C to 35 °C. As one moves inland from Walvis Bay, daytime temperatures increases rather quickly while night time temperatures can get significantly colder in the desert environment.

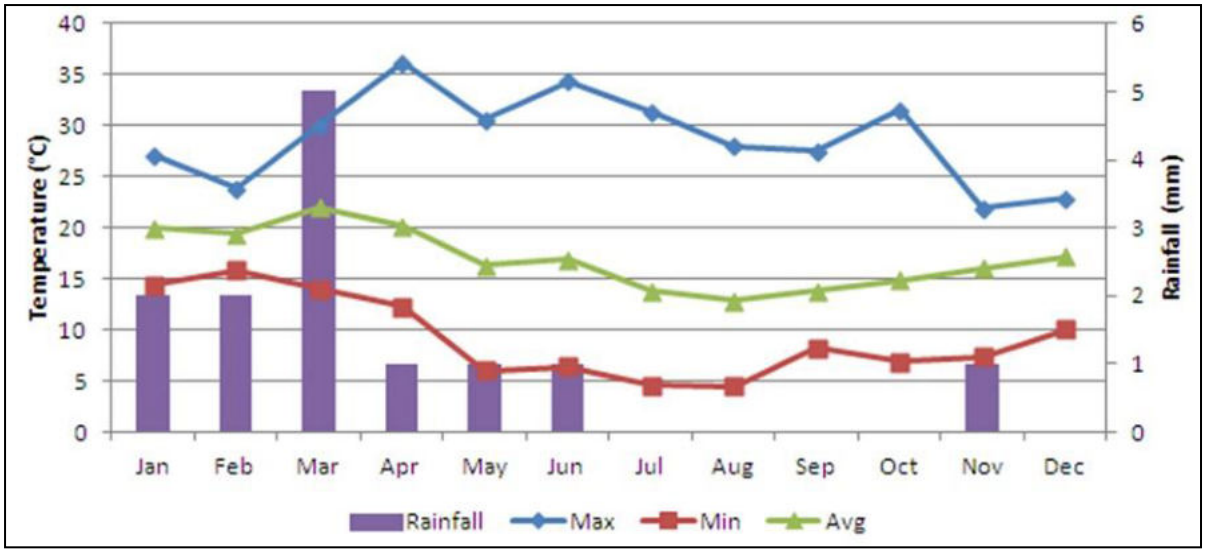

Figure 7-7 Temperature and rainfall at Walvis Bay (uMoya-NILU, 2020)

As explained above, the SAH severely limits the amount of rainfall over Namibia and especially at the coast and over the Namib Desert. As such, the average annual rainfall in Walvis Bay is below 50 mm (Figure 7-7), with variation in annual rainfall exceeding 100%. Infrequent, heavy rainfall does occur and typically results in rather chaotic conditions as Walvis Bay, and other coastal towns, has not been developed to cater for large volumes of stormwater. Fog plays a very significant role as source of water for many plants and animals along Namibia's coast and the Namib Desert. Walvis Bay has up to 900 hours of fog per year and it results from the cold Benguela water cooling the humid air above it to such a temperature that the water vapour condenses to form fog and low level clouds (Mendelsohn et al., 2002).

Implications and Impacts

It is not expected that the normal climatic conditions of Walvis Bay will impact on the operations of facilities.

7.3 CORROSIVE ENVIRONMENT

The corrosive environment of Walvis Bay may be attributed to the frequent salt-laden fog, periodic winds and abundance of aggressive salts (dominantly NaCl and sulphates) in the soil. The periodic release of hydrogen sulphide (H_2S) from the ocean is expected to contribute to corrosion (see Table 6 for corrosion comparison data with other centres).

The combination of high moisture and salt content of the surface soil can lead to rapid deterioration of subsurface metal (e.g. pipelines) and concrete structures. Chemical weathering of concrete structures due to the abundant salts in the soil is a concern.

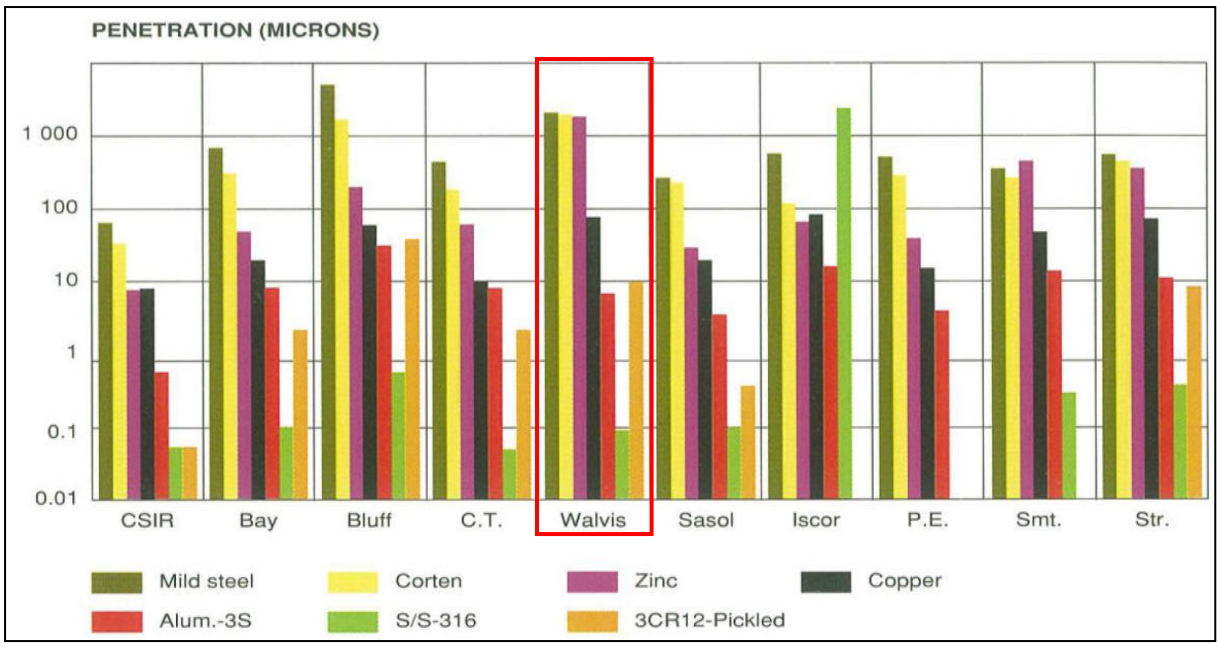

Figure 7-8 Twenty year corrosion exposure results (Callaghan B; 1991)

Implications and Impacts

Corrosion levels may be high and must be kept in mind when planning the maintenance of the facilities and related infrastructure.

7.4 TOPOGRAPHY AND DRAINAGE

Walvis Bay is located in the Central Western Plain of Namibia. The Kuiseb River forms the southern boundary of this landscape group, with the Namib Dune Field being present south of the Kuiseb River. A bay is formed by a peninsula commonly known as Pelican Point. On the southern part of the bay is a lagoon which used to be the mouth of the Kuiseb River. Dune migration however forced the flow of the Kuiseb River to the north. This flow was stopped through the construction of a flood control wall to prevent flooding of the town of Walvis Bay, thus forcing the flood waters to move through the dune area to the lagoon. The Kuiseb River now rarely reaches the lagoon.

The topography is generally flat with a local downward slope in a westerly direction towards the ocean. Drainage is poorly developed due to the lack of rainfall <50 mm/annum received in the area. A dune field is present southeast of Walvis Bay and also further to the northeast. These dunes generally migrate in a northerly direction. Further inland is the gravel plains of the central areas of the Namib Naukluft Park. Surface water around Walvis Bay is limited to the marine salt pans, lagoon and ocean as well as a man-made wetland formed as a result of the sewage treatment works. The site and surrounding areas are generally flat draining slightly to the north / northwest.

Implications and Impacts

Any pollutants that are not contained may be transported via surface water flow to the ocean and potentially pollute the surrounding environment.

7.5 GEOLOGY AND HYDROGEOLOGY

Walvis Bay is located in the Central Western Plain of Namibia. The Kuiseb River forms the southern boundary of this landscape group, with the Namib Dune Field being present south of the Kuiseb River. Northerly dune migration is forcing the Kuiseb River in a northerly direction, with Kuiseb River paleochannels being present as far south as Sandwich Harbour.

Following the breakup of West-Gondwana during the early Cretaceous (130 – 135 Ma ago), continental uplift took place, enhancing erosional cutback and the formation of the Namibian Escarpment. A narrow pediplain formed, mainly over Damara Age rocks. The South Atlantic started filling in over the pediplain, with marine conditions established around 80 Ma ago. Towards the end of the Cretaceous (70 – 65 Ma ago) a relative level surface was created, on which later deposition of sediments took place. Marine deposition took place in the parts covered by the newly formed South Atlantic Ocean, while terrestrial deposits took place on land. Further continental uplift moved the shoreline to its present position.

Northwards migration of sand covered parts of the exposed marine deposits, with Kuiseb floods also depositing material over the marine sediments. Depth to bedrock in Walvis Bay is expected to be deeper than 40 m below surface. Based on previous work conducted in the area, it is expected that the sediments under the project area would consist of medium to coarse grain sand with thin lenses of more clayey material and layers of shell material.

Implications and Impacts

Groundwater is not typically utilised in the area, but should the desalination plant realise, shallow saline groundwater will be abstracted from near the quayside. Pollution of the groundwater is prohibited. Shallow groundwater will lead to rapid lateral spreading of hydrocarbon products spilled or leaked. This will further have potential impact on underground utilities and may cause impacts on neighbouring properties.

7.6 SURFACE WATER

No freshwater sources are found in close proximity to the facility. The property is however on the shore of the Atlantic Ocean. Seawater is extracted from the Atlantic Ocean, treated and used for industrial purposes at the fish factory, and then returned to the ocean. Industrial effluent (cleaning water etc.) and brine will also be released into the Atlantic Ocean. Similar activities take place from surrounding industries of similar nature.

Implications and Impacts

Any pollutants that enter the Atlantic Ocean, whether through the waste water stream or directly from spills will deteriorate the quality of the aquatic environment. This will also reduce the quality of seawater used as processing water by the fishing industry.

7.7 PUBLIC WATER SUPPLY

Public water supply to Walvis Bay and the surrounding developments is provided by NamWater from the NamWater Kuiseb Water Supply Scheme.

Implications and Impacts

The usage of potable water, along with the influx of people to Walvis Bay, due to the growing industry may put strain on the potable water supply. The facility is a bulk consumer of potable water. Seawork proposes the construction of a desalination plant to supplement the foreseen growth in potable water demand. This will ensure a reliable and constant supply of potable water to the facility, as well as alleviate pressures on the NamWater Kuiseb Water Supply Scheme.

7.8 FAUNA AND FLORA

The site is located within an industrial area. Aside from the palm trees located at the factory shop, there is no fauna or flora present at the site. A number of birds may however roost on buildings and any other suitable perching structures.

Of note nearby is the Walvis Bay Lagoon, the salt works and the southern part of the bay west of the lagoon, which are the key components of the 12,600 ha Ramsar site (Wetland of International Importance). It is important both as an over-wintering area for Palaearctic migrant wader species as well as for African species such as Greater and Lesser Flamingos, Great White Pelican and Chestnut-Banded Plovers. The sewerage ponds, situated about 3 km south of the study area, are

regarded as sensitive manmade wetlands. Although a manmade fresh water source, they are an attraction for pelicans and flamingos. These wetlands also support 53% of the duck and geese population in the area. The wetland is formed by the constant inflow of semi-purified water and supports extensive stands of reeds. There is also flight paths for birds between the sewerage ponds, the lagoon and the offshore bird breeding platform (Ghwano Island) 6 km north northeast of the site. The facility is located close to the flight path between the Walvis Bay Lagoon and Bird Island).

The marine mammals, occurring at various times in the Walvis Bay area, are the cetaceans which are the Common Bottlenose Dolphins, the Namibian endemic Heaveside's Dolphins, Dusky Dolphins, Humpback Whales, Southern Right Whales and Pigmy Right Whales as well as the Cape Fur Seals. The Common Bottlenose Dolphin, Heaveside's dolphin and Cape Fur Seal are seen most frequently (daily), the Pigmy Right Whale less frequently (monthly) and the rest infrequently as they are seasonal or infrequent visitors. The Common Bottle Nose Dolphin with a population of less than a 100 individuals is thought of as quite unique in being one of the smallest mammal populations in Africa.

The Namibian coastal waters are home to five species of turtles and all five species are listed as threatened under the IUCN which is controlled through CITES. The most common occurring turtles near the proposed development are the Leatherback Turtle and Green Sea Turtle with the Hawksbill Sea Turtle occurring occasionally.

Implications and Impacts

Seawork operates within an already disturbed industrial area. Thus, no immediate threat to the flora or land based fauna in the area is expected, however bright lighting may negatively affect birds flying at night and may cause disorientation and collisions.

Whales, dolphins and seals are often considered as flagship species to which people attach great inherent value. This is evident from the million dollar tourism industry based on the presence of these mammals. Their role in the ecosystem is also of significant importance. Pollutants entering the marine environment may negatively impact on these animals as well as on the food chains that sustain them. Larger species may also get trapped at the current seawater intake points, which may lead to injury or death of the animal. The development of shallow onshore extraction points (boreholes) will eliminate this risk.

7.9 AQUATIC ENVIRONMENT

7.9.1 Currents and Tides

The Benguela Current flows in a north westerly direction along the Namibian coast. The average speed of the current is between 0.25 and 0.35 m/s (DMC-CSIR, 2010). The most important hydraulic conditions are shown in Table 7-1 (Tractebel, 1998; COWI, 2003a; DMC-CSIR, 2010).

Water enters and exits the bay at the northern tip of Pelican Point (DMC-CSIR 2010). Water entering flows below the exiting water. Current velocities are on average 0.12 m/s with sporadic maximums up to 0.25 m/s.

A study in 1965 indicated a pre-dominant clockwise circulation of currents in the bay (Tractebel, 1998). This was later confirmed in the COWI (2003b) and DMC-CSIR (2010) studies. Circulation occurs mostly in the upper layer and it depends on the wind direction. The current pattern is clockwise in the morning, towards the south. At Pelican Point, the current moves mostly northward for the whole day. A general northward current is found along the east side of the bay, very close to the coast. Water currents prior to the construction of the new container terminal as well as modelling of currents once construction is completed are depicted in Figure 7-9. From this figure it can be seen that, in the vicinity of the Seawork facility, the water current is weak and rotates through the small bay in a clockwise direction and current flows are modelled to be in a south-westerly direction along the quay walls.

Table 7-1 The oceanographic and hydraulic conditions of the bay and the sea (adapted from Tractebel, 1998; COWI, 2003b; DMC-CSIR, 2010).

Hydrological Conditions	Description
Tides and sea level -Tide statistics for Walvis Bay from SA Tide Tables	Highest Astronomical Tide +1.97 Mean High Water of Spring Tide +1.69 Mean High Water of Neap Tide +1.29 Mean Level +0.98 Mean Sea Level +0.966 Mean Low Water of Neap Tide +0.67 Mean Low Water of Spring Tide +0.27 Lowest Astronomical Tide 0.00
Waves	60 % southerly 23 % south-south-westerly 7 % south-westerly
Ocean current	The Benguela current runs north-westerly along the Namibian coastline at a speed between 0.25 m/s to 0.35 m/s
Tidal current	Negligible

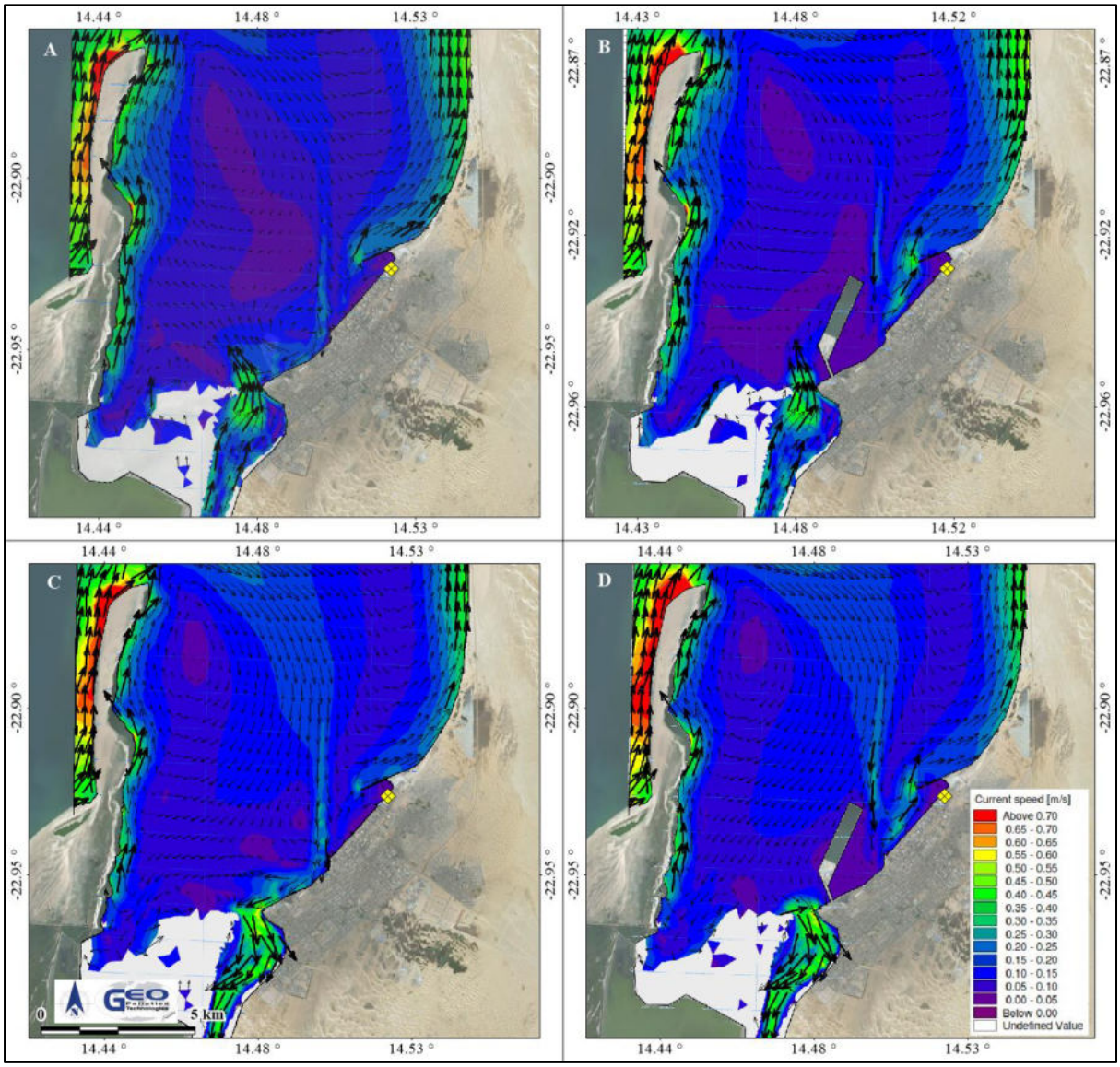

Figure 7-9 Comparison of ebb (A & B) and flood (C & D) scenarios for before and after the construction of the new container terminal (Source: Hydrodynamic Modelling Report of DMC-CSIR 2010)

Implications and Impacts

Polluted effluent or poor quality effluent disposed of into the ocean by industries upstream of the facility may result in reduced water quality and lead to a greater cumulative impact. As the facility is in an area with low current speeds, poor quality effluent and brine disposed by the facility may accumulate in this area, resulting in reduced water quality.

Any hydrocarbon pollution from the consumer fuel installations will impact on other seawater users, and may render the unfit for use until the spill is cleared.

7.9.2 Sediment Quality

Sediment in harbours are prone to contamination as a result of industrial activities related to harbours and shipping. Prior to maintenance dredging of the fishing harbour in 2015, sediment samples were analysed for chemicals of concern and the sampling locations closest to the Proponent's property are presented in Figure 7-10 (Botha and Faul, 2015). Composite samples, consisting of three grab samples each, were collected and analysed. The results of the analyses are presented in Table 7-2. Metal concentrations are compared to the Benguella Current Large Marine Ecosystem (BCLME) guidelines and are presented in three categories: 1) lower than BCLME guideline values; 2) higher than BCLME guideline values; and 3) higher than BCLME probable effect concentrations. Some chemicals of concern were elevated above BCLME recommended and probable effect concentrations in a number of locations. Notable among these are copper, cadmium and tributyltin. The contaminated sediment was removed during the 2015 dredging campaign, but recontamination may occur again over time.

Figure 7-10 Sediment sampling locations prior to maintenance dredging in 2015 (Botha and Faul, 2015)

Table 7-2 Sediment sampling results (sample sets 3 to 6) prior to maintenance dredging in 2015 (Botha and Faul, 2015)

Walvis Bay Fishing Harbour Baseline Sediment Sampling							
Project number	G139-18						
Certificate number	2015101521						
Start date	15-09-2015						
Report date	22-09-2015						
Date sampling	08-09-2015						
Sampler	P. Botha						
Map Number				17	18	19	20
Analysis	**Unit**	**BCLME Sediment (Recommended Guideline Value)**	**BCLME Sediment (Probable Effect Concentration)**				
TerrAttesT							
Version number				7.23	7.23	7.23	7.23
Characteristics							
Dry matter	% (w/w)			28.2	40.4	56.1	44.3
Organic matter	% (w/w) dm			8.6	6.1	3.7	4.6
Fraction < 2 µm (Clay)	% (w/w) dm			22.7	9	2.7	6.2
Metals							
Arsenic (As)	mg/kg dm	7.24	41.6	25	19	11	12
Barium (Ba)	mg/kg dm	No Value	No Value	49	45	34	33
Cadmium (Cd)	mg/kg dm	0.68	4.21	5.7	3.5	1.4	2.2
Chromium (Cr)	mg/kg dm	52.3	160	45	34	17	23
Copper (Cu)	mg/kg dm	18.7	108	180	130	46	73
Lead (Pb)	mg/kg dm	30.2	112	45	34	43	19
Molybdenum (Mo)	mg/kg dm	No Value	No Value	7.1	5.9	2.8	4.1
Nickel (Ni)	mg/kg dm	15.9	42.8	15	13	6.2	8.4
Vanadium (V)	mg/kg dm	No Value	No Value	26	20	14	21
Zinc (Zn)	mg/kg dm	No Value	No Value	170	140	430	86
Cobalt (Co)	mg/kg dm	No Value	No Value	3.6	3.2	2.8	2.8
Mercury (Hg)	mg/kg dm	0.13	0.7	0.057	0.083		
Phenols							
Phenol	mg/kg dm	No Value	No Value			0.06	
Polycyclic Aromatic Hydrocarbons							
Pyrene	mg/kg dm	153	1398	0.06	0.04	0.01	0.03
PAH 16 EPA (sum)	mg/kg dm	1684	16770	0.19	0.07	0.01	0.05
Phenanthrene	mg/kg dm	86.7	544	0.02			
Fluoranthene	mg/kg dm	113	1494	0.02	0.02		0.02
Chrysene	mg/kg dm	108	846	0.02			
Benzo(b)fluoranthene	mg/kg dm	No Value	No Value	0.02	0.01		
PAH 10 VROM (sum)	mg/kg dm	No Value	No Value	0.09	0.02		0.02
Benzo(a)pyrene	mg/kg dm	88.8	763	0.01			
Benzo(ghi)perylene	mg/kg dm	No Value	No Value	0.01			
Fluorene	mg/kg dm	21.2	144	0.02			
Anthracene	mg/kg dm	46.9	245				
Naphtalene	mg/kg dm	34.6	391	0.01			
Phtalates							
Bisethylhexylphtalate	mg/kg dm	No Value	No Value	2.4	1.8	0.4	1.1
Phtalates (sum)	mg/kg dm	No Value	No Value	2.4	1.8	14	1.1
Dimethylphtalate	mg/kg dm	No Value	No Value			14	
Total Petroleum Hydrocarbons							
TPH (C12-C16)	mg/kg dm	No Value	No Value	140	49	38	120
TPH (C16-C21)	mg/kg dm	No Value	No Value	170	71	56	130
TPH (sum C10-C40)	mg/kg dm	No Value	No Value	620	220	150	450
TPH (C21-C30)	mg/kg dm	No Value	No Value	150	44	29	97
TPH (C30-C35)	mg/kg dm	No Value	No Value	67	28	14	35
TPH (C35-C40)	mg/kg dm	No Value	No Value	53	20	11	30
TPH (C10-C12)	mg/kg dm	No Value	No Value	27	6	4.9	44
Volatile Organic Hydrocarbons							
Styrene	mg/kg dm	No Value	No Value			0.4	
Organic Chlorinated Pesticides							
4,4 -DDT	mg/kg dm	No Value	No Value	0.003			
DDT/DDE/DDD (sum)	mg/kg dm	No Value	No Value	0.003			0.004
Dieldrin	mg/kg dm	No Value	No Value	0.003			
Drins (sum)	mg/kg dm	No Value	No Value	0.003			
4,4 -DDD + 2,4 -DDT	mg/kg dm	No Value	No Value				0.004

Map Number				17	18	19	20
Analysis	Unit	BCLME Sediment (Recommended Guideline Value)	BCLME Sediment (Probable Effect Concentration)				
Miscellaneous Organic compounds							
Tributyltin (TBT)	mg/kg dm	No Value	No Value	0.24	0.14	0.034	0.052
Triphenyltin (TPhT)	mg/kg dm	No Value	No Value	0.05	0.05	0.05	0.05
Tributyltin (TBT) Sn	mg Sn/kg dm	0.005	0.07	0.097	0.056	0.014	0.021
Triphenyltin (TPhT) Sn	mg Sn/kg dm	No Value	No Value	0.017	0.017	0.017	0.017
Organotin sum Sn factor 0,7	mg Sn/kg dm	No Value	No Value	0.11	0.067	0.026	0.033
Organotin sum (factor 0.7)	mg/kg dm	No Value	No Value	0.27	0.17	0.069	0.087

Notes:

Only parameters detected are reported on

Not Detected / No Guideline Value
< BCLME Sediment (Recommended Guideline Value)
> BCLME Sediment (Recommended Guideline Value) < BCLME Sediment (Probable Effect Concentration)
> BCLME Sediment (Probable Effect Concentration)
> BCLME Sediment (Probable Effect Concentration) x 100

Implications and Impacts

Introduction of pollutants from any construction and operational activities at the site can cause serious negative effects on the surrounding marine environment. Mitigating measures must be in place to prevent the pollution and waste from entering the marine environment.

Maintenance dredging may mobilise pollutants contained within sediments in the water column.

7.10 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

At local level Walvis Bay has an urban population size of 62,096 (Namibia Statistics Agency, 2014) although the current estimate is around 90,000 to 100,000. Walvis Bay is the principal port of Namibia, and is an import/export facility for processed fish, mining products and beef. The area is linked to Namibia's air, rail and road network, making its port well situated to service Zambia, Zimbabwe, Botswana, Southern Angola and South Africa. The fishing industry is the major employer of low skilled workers on a permanent and seasonal basis. The total employment of this sector is estimated at 2% of the total Namibian workforce. The Proponent, at all three facilities, currently employs approximately 2,000 people as both permanent and seasonal staff. This figure will increase significantly should Benguella Properties' new processing facility and cold store realise. Economic activities relate mostly to businesses of similar nature within the area.

Table 7-3 Demographic characteristics of Walvis Bay, the Erongo Region and Nationally (Namibia Statistics Agency, 2011)

	Walvis Bay Urban Constituency	Erongo Region	Namibia
Population (Males)	19,350	79,823	1,021,912
Population (Females)	16,478	70,986	1,091,165
Population (Total)	35,828	150,809	2,113,077
Unemployment (15+ years)	27%	22.6%	33.8%
Literacy (15+ years)	99%	96.7%	87.7%

Implications and Impacts

The Proponent currently employs approximately 2,000 people and its operations aid in the economic growth of Walvis Bay and Namibia. Economic growth of the town, and appointing contractors during construction and operations may result in more job opportunities being generated.

Some skills development and training will also benefit employees during construction as well as operational phases.

7.11 CULTURAL, HERITAGE AND ARCHAEOLOGICAL ASPECTS

There are no church, mosques or related buildings in close proximity to the site. No known archaeological resources have been noted in the vicinity since the urbanisation of the area. No other structures, sites or spheres of heritage of cultural significance was determined to be in close proximity to the site.

Implications and Impacts

The operations and construction related to the Seawork facility will not impact on any cultural or historically significant areas or buildings.

8 PUBLIC CONSULTATION

Consultation with the public forms an integral component of an environmental assessment investigation and enables Interested and Affected Parties (IAPs) e.g. neighbouring landowners, local authorities, environmental groups, civic associations and communities, to comment on the potential environmental impacts associated with the facility and to identify additional issues which they feel should be addressed in the environmental assessment.

Full public participation was conducted in 2019 during the initial environmental assessment. See Appendix A for proof of the public participation processes. No written comments or feedback were received, concerns were however raised regarding potential water quality reduction in the harbour and are addressed in this report.

9 MAJOR IDENTIFIED IMPACTS

During the scoping exercise a number of potential environmental impacts have been identified. The following section provides a brief description of the most important of these impacts.

9.1 HEALTH AND SAFETY IMPACTS

Some health and safety risks are present on site and include moving vehicles and forklifts, exposure to steam or cold temperatures, slipping on wet surfaces, falling objects, injuries while cutting fish on processing lines, etc. Exposure to chemicals can occur in the compressor rooms (ammonia leaks) or during cleaning / water treatment. Ammonia is corrosive and can cause freeze burns. Inhalation of dangerous *Legionella* bacteria can occur where contaminated water becomes airborne. Typical conditions favourable to *Legionella* growth include stagnant water between 20 and 45 °C with media such as scale build-up present. These are often found in cooling towers, water coolers, water reservoirs, etc.

9.2 FIRE AND EXPLOSION

Diesel, although not very flammable at ambient temperatures, are stored on site for use in ship refuelling. These present a risk of fire. Should an ammonia leak occur in one of the compressor rooms, a mixture of 15% to 28% ammonia in air is explosive if an ignition source exist.

9.3 WASTE PRODUCTION

Waste is produced in the form of packaging material, waste water, typical office related and domestic waste. Limited hazardous waste is produced e.g. used transformer oils, biological waste from laboratory, etc. Organic waste in the form of fish offal is converted into fishmeal by a third party.

9.4 NOISE IMPACTS

Noise impacts are mostly associated with the moving parts of the fish processing lines, low frequency droning noise from the compressors of freezers and cold rooms, moving vehicles, and audible warning signals of trucks and forklifts. During construction there may be more noise

producing activities. As the facility is located in an industrial area, noise impacts will mostly be related to risks to on-site personnel.

9.5 TRAFFIC IMPACTS

During construction activities and operations some traffic impacts can be experienced when trucks and delivery vehicles access the site on Ben Amathila Avenue. As this is a street with multiple industrial operations, traffic is constant. If delivery trucks are parked outside of the facility, it may cause congestion in Ben Amathila Avenue.

9.6 SURFACE WATER CONTAMINATION

Surface water contamination can occur when pollutants, including high organic loads, enter the ocean. Insufficient removal of fish waste products from the effluent water will increase the organic load of waste water disposed of into the ocean. This increases the COD and BOD of the waste water. While the contribution of the Proponent to factors such as the COD and BOD of the fishing harbour water may be insignificant, the cumulative impact of effluent from all fishing industries should be considered. Brine released back to the ocean from the desalination plant may increase local salinity levels due to poor currents in the fishing harbour and especially behind the breakwater of the navy. The facility proposes to combine freshwater effluent with the brine prior to disposal in order to reduce salinity levels (see Figure 4-4).

Leaking tanks and pipelines, as well as accidental spills or leaks during handling, transfer and storage of hydrocarbons may contaminate the marine environment. Ammonia leaks that are absorbed in water are toxic to the aquatic environment. This will negatively impact on marine fauna as well as surrounding industries utilising seawater.

During dredging activities contaminants trapped within sediments may be suspended in the water column.

9.7 IMPACT OF LIGHTING ON BIRDS

Birds flying at night, for example flamingos, are disorientated by lights and this can result in bird collisions with manmade infrastructure. The urban environment of Walvis Bay has a strong cumulative impact in this regard, as most of the industrial and commercial areas are either near or in one or more of the flight paths. The Seawork facility is situated close to the flight path between Bird Island and the Walvis Bay Lagoon. Lights used at night to illuminate the yard may impact on birds.

9.8 SOCIO-ECONOMIC IMPACTS

Operations of the Proponent provides direct employment to an estimated 2,000 employees. Seawork thereby significantly contribute to employment and economic development in Walvis Bay and Namibia. Employees also undergo training and skills development. True value addition and contribution to the Namibian Economy is achieved by processing and packaging all fish harvested at the factories and then transporting the products to markets.

10 ASSESSMENT AND MANAGEMENT OF IMPACTS

The purpose of this section is to assess and identify the most pertinent environmental impacts that are expected from the construction and operational activities of the Seawork facility. An EMP based on these identified impacts are also incorporated into this section.

For each impact an environmental classification was determined based on an adapted version of the Rapid Impact Assessment Method (Pastakia, 1998). Impacts are assessed according to the following categories: Importance of condition (A1); Magnitude of Change (A2); Permanence (B1); Reversibility (B2); and Cumulative Nature (B3) (see Table 10-1)

Ranking formulas are then calculated as follow:

Environmental Classification = A1 x A2 x (B1 + B2 + B3)

The environmental classification of impacts is provided in Table 10-2.

The probability ranking refers to the probability that a specific impact will happen following a risk event. These can be improbable (low likelihood); probable (distinct possibility); highly probable (most likely); and definite (impact will occur regardless of prevention measures).

Table 10-1 Assessment criteria

Criteria	Score
Importance of condition (A1) – assessed against the spatial boundaries of human interest it will affect	
Importance to national/international interest	4
Important to regional/national interest	3
Important to areas immediately outside the local condition	2
Important only to the local condition	1
No importance	0
Magnitude of change/effect (A2) – measure of scale in terms of benefit / disbenefit of an impact or condition	
Major positive benefit	3
Significant improvement in status quo	2
Improvement in status quo	1
No change in status quo	0
Negative change in status quo	-1
Significant negative disbenefit or change	-2
Major disbenefit or change	-3
Permanence (B1) – defines whether the condition is permanent or temporary	
No change/Not applicable	1
Temporary	2
Permanent	3
Reversibility (B2) – defines whether the condition can be changed and is a measure of the control over the condition	
No change/Not applicable	1
Reversible	2
Irreversible	3
Cumulative (B3) – reflects whether the effect will be a single direct impact or will include cumulative impacts over time, or synergistic effect with other conditions. It is a means of judging the sustainability of the condition – not to be confused with the permanence criterion.	
Light or No Cumulative Character/Not applicable	1
Moderate Cumulative Character	2
Strong Cumulative Character	3

Table 10-2 Environmental classification (Pastakia 1998)

Environmental Classification	Class Value	Description of Class
72 to 108	5	Extremely positive impact
36 to 71	4	Significantly positive impact
19 to 35	3	Moderately positive impact
10 to 18	2	Less positive impact
1 to 9	1	Reduced positive impact
0	-0	No alteration
-1 to -9	-1	Reduced negative impact

Environmental Classification	Class Value	Description of Class
-10 to -18	-2	Less negative impact
-19 to -35	-3	Moderately negative impact
-36 to -71	-4	Significantly negative impact
-72 to -108	-5	Extremely Negative Impact

10.1 RISK ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides management options to ensure possible negative impacts emanating from the activities are minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur or to manage an emergency situation once an impact does occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary. The environmental management measures are provided in the tables and descriptions below. These management measures should be adhered to during the various phases of the operations and construction at the facility. This section of the report can act as a stand-alone document. All personnel taking part in the construction operations at the facility should be made aware of the contents in this section, so as to plan the operations accordingly and in an environmentally sound manner.

The objectives of the EMP are:

- to include all components of construction activities and operations of the facilities;
- to prescribe the best practicable control methods to lessen the environmental impacts associated with the facilities;
- to monitor and audit the performance of operational personnel in applying such controls; and
- to ensure that appropriate environmental training is provided to responsible operational personnel.

Various potential and definite impacts will emanate from the construction and operational phases. The majority of these impacts can be mitigated or prevented. The impacts, risk rating of impacts as well as prevention and mitigation measures are listed below.

As depicted in the tables below, impacts are expected to mostly be of medium to low significance and can mostly be mitigated to have a low significance. The extent of impacts are mostly site specific to local and are not of a permanent nature. Due to the nature of the surrounding areas, cumulative impacts are possible and include surface water contamination and traffic impacts.

10.1.1 Planning

During the phases of planning, construction, future operations and possible decommissioning of the facilities, it is the responsibility of the Proponent to ensure they are, and remain, compliant with all legal requirements. The Proponent must also ensure that all required management measures are in place prior to and during all phases, to ensure potential impacts and risks are minimised. The following actions are recommended for the planning phase and should continue during various other phases of the project:

- Ensure that all necessary permits from the various ministries, local authorities and any other bodies that governs the construction activities and operations of the project are obtained and valid. These include seawater abstraction permits, effluent disposal permits and consumer fuel installation certificates.
- Ensure all appointed contractors and employees enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractors, sub-contractors, employees and all personnel present or who will be present on site.
- Make provisions to have a health, safety and environmental coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site, by both the employees and contractors.
- Appoint or designate a community liaison officer to deal with complaints.

- Have the following emergency plans, equipment and personnel on site where reasonable to deal with all potential emergencies:
  - Risk management / mitigation / EMP/ Emergency Response Plan and HSE Manuals;
  - Adequate protection and indemnity insurance cover for incidents;
  - Comply with the provisions of all relevant safety standards;
  - Procedures, equipment and materials required for emergencies.
- If one has not already been established, establish and maintain a fund for future ecological restoration of the project site should a spill occur or project activities cease and the site is decommissioned and environmental restoration or pollution remediation is required.
- Establish a reporting system to report on aspects of construction activities, operations and decommissioning as outlined in the EMP.
- Prepare bi-annual monitoring reports based on the EMP and in compliance with the environmental clearance certificate conditions.
- Appoint a specialist environmental consultant to update the EIA and EMP and apply for renewal of the environmental clearance certificate prior to expiry.

10.1.2 Skills, Technology and Development

During various phases of planning, construction and operations, training is provided to a portion of the workforce, in order to maintain and operate various types of equipment on the facilities according to the required standards. This is not limited to only training in the formal sense, but also awareness practices which can assist in adherence to the safety and environmental plans. Skills are transferred to an unskilled workforce for general tasks. The technology required for the facility and proposed desalination plant is often new to the local industry, aiding in operational efficiency. Development of people and technology are key to economic development.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Technological development and transfer of skills	2	1	2	3	1	12	2	Definite
Daily Operations	Technological development and transfer of skills	3	2	2	2	2	36	4	Definite
Indirect Impacts	Enhancement in the efficiency of facilities	3	2	2	2	2	36	4	Definite

Desired outcome: To see an increase in skills of local Namibians, as well as development and technology advancements in the fishing industry.

Actions

Enhancement:

- If the skills exist locally, contractors must first be sourced from the town, then the region and then nationally. Deviations from this practice must be justified.
- Skills development and improvement programs to be made available as identified during performance assessments.
- Employees to be informed about parameters and requirements for references upon employment.
- The Proponent must employ Namibians where possible. Deviations from this practise should be justified appropriately.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Record should be kept of training provided.
- Ensure that all training is certified or managerial references provided (proof provided to the employees) inclusive of training attendance, completion and implementation.
- Bi-annual reports based on records kept.

10.1.3 Employment

An increase of skilled and professional labour takes place due to various activities and operations at the facilities. Employment is sourced locally while skilled labour/contractors may be sourced from elsewhere.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Employment	2	1	2	2	2	12	2	Definite
Daily Operations	Employment	3	2	2	3	2	42	4	Definite
Indirect Impacts	Decrease in unemployment	3	2	2	3	2	42	4	Definite

Desired outcome: Provision of employment to local Namibians.

Actions

Enhancement:

- The Proponent must employ local Namibians where possible.
- If the skills exist locally, employees must first be sourced from the town, then the region and then nationally.
- Deviations from this practice must be justified.
- Local businesses and industries should be supported

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Summary report based on employee records.

10.1.4 Revenue Generation

Resources are sourced and processed locally and then exported, contributing to the economy and trade balance of Namibia. Salaries are paid to employees and businesses supported resulting in taxes being paid to the National treasury.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Contribution to the National and local economy	2	1	2	2	2	12	2	Definite
Daily Operations	Contribution to the National and local economy	3	2	2	3	2	42	4	Definite
Indirect Impacts	Contribution to the National and local economy	3	2	2	3	2	42	4	Definite

Desired outcome: Contribution to economic development and the National treasury

Actions

Enhancement:

- The local workforce, businesses and industries should be supported

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Bi-annual summary reports based on employee records.

10.1.5 Demographic Profile and Community Health

The project is reliant on a large labour force during the operational phase. Due to this being an existing operation, a change in the demographic profile of the local community is not expected. Community health may still be exposed to factors such as communicable disease like HIV/AIDS and social ills like alcoholism/drug abuse. An increase in foreign people in the area (job seekers) may potentially increase the risk of criminal and socially/culturally deviant behaviour.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Social ills related to unemployment and transport	2	-1	1	1	2	-8	-1	Probable
Daily Operations	Social ills related to unemployment and transport	2	-1	2	2	2	-12	-2	Probable
Indirect Impacts	The spread of disease	2	-1	2	2	2	-12	-2	Probable

Desired Outcome: To prevent the in-migration and growth in informal settlements and to prevent the spread of communicable diseases and prevent / discourage socially deviant behaviour.

Actions:

Prevention:

- Employ only local people from the area, deviations from this practice should be justified appropriately.
- Adhere to all municipal by-laws relating to environmental health which includes but is not limited to sand and grease traps for the various facilities and sanitation requirements.

Mitigation:

- Educational programmes for employees on HIV/AIDs and general upliftment of employees' social status.
- Appointment of reputable contractors.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Factory inspection sheet for all areas which may present environmental health risks, kept on file.
- Report and review of employee demographics.
- Bi-annual summary report based on educational programmes and training conducted.

10.1.6 Traffic

Operations and construction activities at the facilities may increase the traffic flow to the site due to trucks collecting and delivering various products. An increase in traffic to and from the site may increase congestion and increase the risk of incidents and accidents, especially in Ben Amathila Avenue.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Delivery of equipment and building supplies	2	-1	2	2	2	-12	-2	Probable
Daily Operations	Increase traffic, road wear and tear and accidents	2	-1	2	2	2	-12	-2	Probable

Desired Outcome: Minimum impact on traffic and no transport or traffic related incidents.

Actions

Prevention:

- Erect clear signage regarding access and exit points at the facility.

Mitigation:

- Refrigerator trucks collecting finished products and construction vehicles should not be allowed to obstruct any traffic or access to neighbouring properties in Ben Amathila Avenue.
- If any traffic impacts are expected, traffic management should be performed to prevent these.
- The placement of signs to warn and direct traffic will mitigate traffic impacts.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Any complaints received regarding traffic issues should be recorded together with actions taken to prevent impacts from repeating itself.
- A bi-annual report should be compiled of all incidents reported, complaints received, and action taken.

10.1.7 Health, Safety and Security

Activity associated with the construction and operational phases are reliant on human labour and therefore exposes them to health and safety risks. Injuries can occur due to incorrect lifting of heavy equipment and materials, falling from heights, stacked items tipping over, getting caught in moving parts of machines, accidents involving forklifts and vehicles, noise and exposure to hot and cold temperatures. Some chemicals handled and stored on site is hazardous with inherent health risks to personnel on site when inhalation, accidental ingestion, eye or skin contact occurs. This includes ammonia if leaks occur. *Legionella* bacteria in water sources that can become airborne may pose health risks including Legionnaires' disease. Security risks are related to unauthorized entry, theft and sabotage.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Physical injuries, exposure to chemicals and criminal activities	1	-2	3	3	1	-14	-2	Probable
Daily Operations	Physical injuries, exposure to chemicals and criminal activities	1	-2	3	3	2	-16	-2	Probable

Desired Outcome: To prevent injury, health impacts and theft.

Actions

Prevention:

- All health and safety standards specified in the Labour Act should be complied with.
- Clearly label dangerous and restricted areas as well as dangerous equipment and products.
- Equipment locked away on site must be placed in a way that does not encourage criminal activities (e.g. theft).
- Provide all employees with required and adequate personal protective equipment (PPE) to be worn at all times.
- Ensure that all personnel receive adequate training on operation of equipment / handling of hazardous substances.
- Always follow safe stacking and storage methods.
- Implementation of maintenance register for all equipment and fuel/hazardous substance storage areas.
- Guards should be in place at conveyor belt drive systems and lockout procedures should be followed when belts are being serviced.
- A *Legionella* risk assessment and management plan should be compiled which includes bi-annual inspection and analysis of water sources potentially containing *Legionella*.
- Ammonia has a strong smell and leaks are typically quickly detected by smell only. However, leak detectors should be considered since personnel will not always be present in the compressor rooms.
- Maintain a hazard analysis and critical control points (HACCP) program for all sections.

Mitigation:

- Selected personnel should be trained in first aid and a first aid kit must be available on site. The contact details of all emergency services must be readily available.
- Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool, which includes: colour coding of pipes, operational, safe work and medical procedures, permits to work, emergency response plans, housekeeping rules, MSDS's and signage requirements (PPE, flammable etc.).
- The compressors rooms must have emergency response plans specific to ammonia if leaks or accidental release of ammonia occur. This include emergency showers and eyewash

stations, PPE and water hoses with water diffusing nozzles. Water absorbs ammonia vapour if sprayed by a fine mist or droplets of water. Refer to MSDS and SANS 10147.

- Security procedures and proper security measures must be in place to protect workers and clients.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Any incidents must be recorded with action taken to prevent future occurrences.
- A bi-annual report should be compiled of all incidents reported. The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.

10.1.8 Fire

Operational and construction activities may increase the risk of the occurrence of fires. Liquefied petroleum gas and diesel stored on the premises presents a fire risk. Various equipment like mobile equipment used for welding etc. all contribute to the risks of a fire. Ammonia if released from the refrigeration systems and present in a 15% to 28% mixture with air, is explosive. Other flammable chemicals may also be on site in small quantities.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Uncontrolled fire resulting in property damage, burn wounds or casualties	2	-2	3	3	1	-28	-3	Improbable
Daily Operations	Uncontrolled fire resulting in property damage, burn wounds or casualties	2	-2	3	3	1	-28	-3	Improbable

Desired Outcome: To prevent property damage, possible injury and impacts caused by uncontrolled fires.

Actions:

Prevention:

- Ensure all fuel or chemicals are stored according to MSDS instructions.
- Maintain regular site, mechanical and electrical inspections and maintenance.
- Clean all spills / leaks.
- Follow SANS standards for operation and maintenance of the consumer fuel installation.
- Follow MSDS and SANS standard for operation and maintenance of the refrigeration systems containing ammonia.

Mitigation:

- A holistic fire protection and prevention plan is needed. This plan must include an emergency response plan, firefighting plan and spill recovery plan.
- Special note must be taken of the regulations stipulated in sections 47 and 48 of the Petroleum Products and Energy Act, 1990 (Act No. 13 of 1990).
- The compressors rooms must have emergency response plans specific to ammonia related fire risks if leaks or accidental release of ammonia occur. This include explosive proof lighting, extractor fans, PPE and water hoses with water diffusing nozzles. Water absorbs ammonia vapour if sprayed by a fine mist or droplets of water. Refer to MSDS and SANS 10147.
- Ammonia has a strong smell and leaks are typically quickly detected by smell only. However, leak detectors should be considered since personnel will not always be present in the compressor rooms.
- Maintain firefighting equipment, good housekeeping and personnel training (firefighting, fire prevention, responsible housekeeping practices and regular fire drills).

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that such incidents do not repeat themselves.
- A bi-annual report should be compiled of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested and training given.

10.1.9 Noise

The site is situated in an industrial area and no limitations on the operating hours exist. Noise pollution will exist due to heavy vehicles accessing the site for delivery and collection of products, the use of forklifts (audible warning signs), processing machinery, and compressors of freezers and cold rooms. Construction may generate excessive noise.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Excessive noise generated from construction activities – nuisance and hearing loss	1	-2	2	2	2	-12	-2	Probable
Daily Operations	Noise generated from the operational activities – nuisance	1	-2	2	2	2	-12	-2	Definite

Desired Outcome: To prevent any nuisance and hearing loss due to noise generated.

Actions

Prevention:

- Adhere to the noise limits for work areas of the health and safety regulations of the Labour Act and the World Health Organization (WHO) guidelines on community noise (Guidelines for Community Noise, 1999) to prevent hearing impairment and nuisances.
- All machinery must be regularly serviced to ensure minimal noise production.
- The use of low frequency white noise or flashing lights should be considered instead of audible high frequency warning signals for moving forklifts or trucks.

Mitigation:

- Hearing protectors as standard PPE for workers in situations with elevated noise levels.
- Notices should be placed at areas where hearing protection is required.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Labour Act regulations and WHO Guidelines.
- Maintain a complaints register.
- Bi-annual reports on complaints and actions taken to address complaints and prevent future occurrences.

10.1.10 Waste Production

Various waste streams result from the construction and operational phases. Waste may include hazardous waste associated with the operations of the facility such as used transformer oils and organic/biological waste. Domestic waste is generated by the facility and related operations. Containers contaminated with chemicals can pose health risks if discarded at regular disposal sites where it may be collected for re-use by people. Construction waste may include building rubble and discarded equipment contaminated by hydrocarbon products. Hydrocarbon contaminated soil and water is considered as hazardous waste.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Excessive waste production, littering, illegal dumping, contaminated materials	1	-2	2	2	1	-10	-2	Definite
Daily Operations	Excessive waste production, littering, contaminated materials	2	-2	2	2	1	-20	-3	Definite

Desired Outcome: To reduce the amount of waste produced, and prevent pollution and littering.

Actions

Prevention:

- Waste reduction measures should be implemented and all waste that can be re-used / recycled must be kept separate.
- Ensure adequate temporary waste storage facilities are available.
- Ensure waste cannot be blown away by wind.
- Prevent scavenging (human and non-human) of waste.

Mitigation:

- Waste should be disposed of regularly and at appropriately classified disposal facilities, this includes hazardous material (empty chemical containers, medical waste, contaminated rugs, paper water and soil).
- See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers.
- Medical or biological waste presenting a biohazard, if any, must be incinerated.
- Liaise with the municipality regarding waste and handling of hazardous waste.
- Permits must be obtained and adhered to for the disposal of waste water and sewage.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Regular site inspections and remedial action where required.
- A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility.
- Any complaints received regarding waste should be recorded with notes on action taken.
- All information and reporting to be included in bi-annual summary reports.

10.1.11 Ecosystem and Biodiversity Impact

Dredging and quay maintenance may lead to habitat loss. However the project location is within an already disturbed fishing harbour and the nature of the operational activities is such that the probability of creating a habitat for flora and fauna to establish is low. This being an existing site, no impact on flora is expected. Impacts on fauna is mostly related to birds and marine animals. Excessive lighting used at night and especially those that are directed upwards blinds birds like flamingos that fly at night. This may result in disorientation of birds and collisions with structures. Further impacts will mostly be related to pollution of the environment and during dredging, contaminants trapped in sediments can also be suspended in the water column. Marine mammal entanglement with, or ingestion of, human generated debris.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Impact on fauna and flora. Loss of biodiversity	1	-1	3	2	2	-7	-1	Improbable
Daily Operations	Impact on fauna and flora. Loss of biodiversity	2	-2	3	2	2	-28	-3	Improbable

Desired Outcome: To avoid pollution of, and impacts on, the ecological environment.

Actions.

Mitigation:

- Report any extraordinary sightings of animals not normally encountered in the area or injured animals (land or sea) to the Ministry of Environment, Forestry and Tourism.
- Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts (refer to section 10.1.10 and 10.1.12).
- All hazardous substances, including hydrocarbons, should be stored in bunded areas with proper spill control infrastructure and emergency response plans in place.
- Ensure waste cannot be blown away by wind.
- The establishment of habitats and nesting sites at the facility should be prevented where possible.
- Seawater intake points should have screens or screening boxes to prevent the intake and entrainment of larger marine organisms.
- Lights used at site should as far as is practically possible be directed downwards to the working surfaces to prevent blinding and disorientation of birds flying at night.
- The compressor rooms must have structures (bunds) to contain any ammonia rich water which may be created if an ammonia leak is present and water is sprayed to absorb ammonia vapours. These should prevent contaminated water from entering the environment and importantly the ocean.
- Ammonia has a strong smell and leaks are typically quickly detected by smell only. However, leak detectors should be considered since personnel will not always be present in the compressor rooms. Emergency response plans should be in place if leaks are detected.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- All information and reporting to be included in a bi-annual summary report.

10.1.12 Groundwater, Surface Water and Soil Contamination

Operations entail the storage and handling of hydrocarbons which presents a contamination risk. Surface water contamination can also occur when pollutants including high organic loads enter the ocean. Insufficient removal of fish waste products from the effluent water sumps and solid traps will increase the organic load of effluent disposed of into the ocean. This increases the COD and BOD of the waste water. Contaminated water or oxygen poor water may negatively impact on aquatic ecosystems.

The release of brine from the desalination plant may lead to a local increase of seawater salinity due to poor sea currents at the proposed discharge point.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Contamination from hazardous material spillages and hydrocarbon leakages	2	-1	2	2	1	-10	-2	Probable
Daily Operations	Contamination from hazardous material spillages and hydrocarbon leakages	2	-2	2	2	2	-24	-3	Probable

Desired Outcome: To prevent the contamination of water and soil.

Actions

Prevention:

- Spill control structures and procedures related to consumer fuel installation must be in place according to SANS standards or better.
- Regular inspection and maintenance of the effluent sump and screens / solid traps.
- Contaminated water must be prevented from entering the effluent streams, and treated as hazardous waste that must be disposed of at an appropriately classified facility.

Mitigation:

- Any fuel spillage of more than 200 litre must be reported to the Ministry of Mines and Energy, Directorate of Petroleum Affairs.
- Emergency response plans and spill contingency plans must be in place and include all chemicals being handled.
- Any spill must be cleaned up immediately.
- All chemicals must be handled according to their respective material safety data sheet instructions.
- All hazardous substances, including hydrocarbons, should be stored in bunded areas with proper spill control infrastructure in place.
- For chemicals that will form part of effluent to be discharged into the ocean, environmental effects must be considered and alternative chemicals investigated if needed.
- Effluent discharge permits must be adhered to and effluent must meet standards as per the permits.
- Brine should be combined with freshwater effluent from the factory prior to discharge into the ocean in order to reduce TDS concentrations.
- Use of reputable and well trained contractors are essential.
- The compressor rooms must have structures (bunds) to contain any ammonia rich water which may be created if an ammonia leak is present and water is sprayed to absorb ammonia vapours. These should prevent contaminated water from entering the environment and importantly the ocean.

- Ammonia has a strong smell and leaks are typically quickly detected by smell only. However, leak detectors should be considered since personnel will not always be present in the compressor rooms.
- Follow SANS standards for operation and maintenance of the consumer fuel installation.

Responsible Body:
- Proponent
- Contractors

Data Sources and Monitoring:
- Regular inspections and remedial action taken if required.
- Regular effluent stream monitoring as per effluent disposal permit conditions, to ensure that any abnormal increases in organic matter or other chemicals are detected swiftly and remediation measures can be implemented.
- Bi-annual surface water monitoring should be conducted in the bay close to the facility to ensure surface water quality does not degrade due to the operations of the facility
- A bi-annual report should be compiled of all spills or leakages reported and monitoring results. The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken, comparison of pre-exposure baseline data (previous pollution conditions survey results) with post remediation data (e.g. soil/groundwater hydrocarbon concentrations) and a copy of documentation in which spill was reported to Ministry of Mines and Energy.

10.1.13 Visual Impact

This is an impact that not only affects the aesthetic appearance, but also the integrity of the facility and the visual landscape character. The facility is situated within the fishing harbour of Walvis Bay, a built up area with multiple fish factories. If kept tidy and neat it may contribute positively to the visual character of the harbour.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Aesthetic appearance and integrity of the site	1	-1	2	2	2	-6	-1	Probable
Daily Operations	Aesthetic appearance and integrity of the site	1	-1	2	2	2	-6	-1	Probable

Desired Outcome: To minimise negative aesthetic impacts associated with the facility.

Actions

Mitigation:

- Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A bi-annual report should be compiled of all complaints received and actions taken.

10.1.14 Impacts on Utilities, Infrastructure and Seabed Scouring

Any damage caused to existing infrastructure and services supply like sewers, water or electricity where present. The proposed desalination plant will have a positive impact by alleviating pressure from the public water supply.

Scouring of the seabed caused by vessel propellers. This may lead to the upwelling of sediments, which in return may impact the depth of certain areas as well as impact on the structural integrity of jetties and quays.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction Phase	Disruption of services. Too shallow vessel manoeuvring areas	2	3	2	2	1	-30	-3	Improbable
Daily Operations	Too shallow vessel manoeuvring areas. Unwanted chemicals or hydrocarbons entering any sewers	2	-1	2	2	2	-12	-2	Probable

Desired Outcome: No impact on utilities and infrastructure. No unwanted products entering sewers. Water depth maintained at safe vessel manoeuvring depths.

Actions

Prevention:

- Appointment of qualified and reputable contractors is essential.
- The contractor must determine exactly where amenities and pipelines are situated before construction commences (utility clearance e.g. ground penetrating radar surveys). Liaison with the Municipality and suppliers of services is essential.
- Liaise with suppliers of water, electricity and sewers in terms of supply and demand statistics. Timely communication of significant increases in future usage of resources, if any, to allow for planning and additional provision.
- Scour protection should be installed where necessary to protect the seabed from scouring and to prevent siltation of adjacent berthing areas. Dredging activities must comply with the capital and maintenance dredging EIA and EMP of Namport.
- Regular water depth determination.
- All drains leading directly into sewers must be closed off, and locked where possible, to prevent any unwanted products from entering sewers should an accidental spill, pipe burst, valve malfunction, etc. occur. Where drains are present to drain wash water, these should only be opened during times of washing and closed immediately thereafter.

Mitigation:

- Implement programmes to monitor consumption of water and electricity and programmes to ensure water and energy efficient strategies.
- Emergency procedures available on file.
- Timely planning for temporary measures to supply electricity and water during shortages in their supply.
- Regular maintenance dredging to be performed when necessary.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Utility drawings (municipal)
- Supply and demand statistics for water and electricity.
- A bi-annual report should be compiled of all incidents of water and electricity disruptions reported or incidents of damage to utilities and infrastructure. This should include measures taken to deal with the situation and ensure that such incidents do not repeat themselves.

10.1.15 Cumulative Impact

Although the surface water contamination impact from the operations on the premises can be sufficiently mitigated, the cumulative impact due to multiple industries in area extracting seawater and discharging effluent as well as brine from desalination plants into the Atlantic Ocean, may increase the environmental risk related to this impact.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction Phase	The build-up of minor impacts to become more significant	2	-1	2	2	2	-12	-2	Probable
Daily Operations	The build-up of minor impacts to become more significant	2	-2	2	2	2	-24	-3	Probable

Desired Outcome: To minimise cumulative impacts associated with the facility and industry.

Actions

Mitigation:

- It is recommended that all industries in the area utilising seawater and discharging effluent into the ocean implement a joint monitoring program to ensure the water quality of the harbour does not decrease.
- Reviewing biannual and annual reports for any new or re-occurring impacts or problems would aid in identifying other cumulative impacts and help in planning if the existing mitigations are insufficient.

Responsible Body:

- Proponent
- Fish processing industry

Data Sources and Monitoring:

- Annual summary report based on all other impacts must be created to give an overall assessment of the impact of the operational phase.
- A joint water quality monitoring program may be implemented by the industries in the area.

10.2 DECOMMISSIONING AND REHABILITATION

Decommissioning is not foreseen during the three year validity period of the environmental clearance certificate. Should decommissioning occur at any stage, rehabilitation of the area may be required. Decommissioning will entail the complete removal of all infrastructure including buildings and underground infrastructure. Any pollution present on the site must be remediated. The impacts associated with this phase include noise and waste production as structures are dismantled. Noise must be kept within Labour Act or WHO standards and waste should be contained and disposed of at an appropriately classified and approved waste facility and not dumped in the surrounding areas. Future land use after decommissioning should be assessed prior to decommissioning and rehabilitation initiated if the land and infrastructure would not be used for future purposes. The EMP for the facility will have to be reviewed at the time of decommissioning to cater for changes made to the site and implement guidelines and mitigation measures.

10.3 ENVIRONMENTAL MANAGEMENT SYSTEM

The Proponent could implement an environmental management system (EMS) for their operations along with their existing policies and programs. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- A stated environmental policy which sets the desired level of environmental performance;
- An environmental legal register;
- An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- Identification of environmental, safety and health training needs;
- An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy; and
- Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.
- The EMP.

11 CONCLUSION

Operation of the fish processing facilities has a positive impact on Walvis Bay and Namibia as a whole. Operations have a significant impact on employment, payment of taxes and fees and income opportunities created for the downstream businesses as a number of indirect jobs are also created through the outsourcing of certain services to contractors. In addition to this, the construction of a desalination plant will alleviate strain on the current public water supply, thereby increasing the sustainability of the NamWater Kuiseb water supply scheme.

During the environmental assessment, potential environmental impacts resulting from the construction and operational activities of the facility and related infrastructure were identified. Negative impacts can however successfully be prevented or mitigated while positive impacts can be maximised. Noise pollution should at all times meet the minimum Labour Act and World Health Organization requirements to prevent hearing loss and not to cause a nuisance to nearby receptors. Health and safety regulations should be adhered to in accordance with the regulations pertaining to relevant laws and internationally accepted standards of operation. Contaminated water must be prevented from entering the ocean. Any waste produced must be removed from site and disposed of in an appropriate way or re-used or recycled where possible. Hazardous waste must be disposed of at an approved hazardous waste disposal site. Surface water contamination is a serious concern and should be prevented by safe work practices and regular inspection and maintenance of the effluent sump. Regular surface water

monitoring should be conducted in the bay to ensure surface water quality does not degrade due to the operations of the facility. All permits should remain up to date and strictly adhered to.

The EMP should be used as an on-site reference document for all the operational activities. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken. Seawork implements various health, safety, security and environmental management procedures, these should be used in conjunction with the EMP and maintain according to operations. It is imperative that all construction and operational personnel are taught the contents of these documents to ensure better environmental practises all round.

Based on the information supplied in this EIA, and if all preventative, mitigation and monitoring methods are strictly adhered to, activities and construction at the facilities should be able to continue without significant environmental impacts.

Should the Directorate of Environmental Affairs (DEA) find that the impacts and related mitigation measures, which have been proposed in this report, are acceptable, an environmental clearance certificate may be granted to Seawork Fish Processors. The environmental clearance certificate issued, based on this document, will render it a legally binding document which should be adhered to. Focus could be placed on Section 10, which includes an EMP for this project. It should be noted that the assessment process's aim is not to stop the activity, or any of its components, but to rather determine its impact and guide sustainable and responsible development as per the spirit of the EMA.

Table 11-1 Impact summary class values

Impact Category	Impact Type	Construction	Operations
	Positive Rating Scale: Maximum Value	5	5
	Negative Rating Scale: Maximum Value	-5	-5
EO	Skills, Technology and Development	2	4
SC	Employment	2	4
EO	Revenue Generation	2	4
SC/EO	Demographic Profile and Community Health	-1	-2
EO	Traffic	-2	-2
SC/EO	Health, Safety and Security	-2	-2
EO	Fire	-3	-3
PC	Noise	-2	-2
PC/BE	Waste production	-2	-3
PC/BE	Ecosystem and Biodiversity Impact	-1	-3
PC	Groundwater, Surface Water and Soil Contamination	-2	-3
SC	Visual Impact	-1	-1
EO	Impacts on Utilities and Infrastructure Seabed Scouring	-3	-2

BE = Biological/Ecological EO = Economical/Operational PC = Physical/Chemical SC = Sociological/Cultural

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Appendix A: Seawater Abstraction Permit

REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND LAND REFORM

Telephone: (061) 2087229
Fax: (061) 2087697
Enquiries: M. Nickel
Reference: 9/3/2/3/B

Department of Water Affairs
Private Bag 13193
Windhoek
9000

PERMIT NUMBER: 11 202 **DATE: 08 February 2021**

PERMIT FOR THE ABSTRACTION OF SEA WATER ISSUED IN TERMS OF SECTION 2 (m) OF THE WATER ACT, 1956 (ACT 54 OF 1956), AS AMENDED AND AS APPLICABLE ON SEA WATER

NAME OF PERMIT HOLDER	:	Seawork Fish Processors (Pty) Ltd
ADDRESS	:	P. O. Box 1709, Walvis Bay
LOCATION	:	Walvis Bay
DISTRICT	:	Walvis Bay
AREA WHERE WATER MAY BE ABSTRACTED	:	Atlantic Ocean
VALIDITY PERIOD	:	5 (five) years
PURPOSE FOR WHICH WATER MAY BE USED	:	Industrial
ABSTRACTION PER DAY	:	600m³ maximum

This permit authorizes the abstraction and use of water for industrial purposes from the Atlantic Ocean, subject to the following conditions:

All official correspondence must be addressed to the Executive Director

Appendix B: Wastewater and Effluent Disposal Exemption Permit (Disposal into the Sea)

REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND LAND REFORM

Telephone: 2087229
Fax: 2087697
Enquiries: M. Nickel
Ref. No.: 10/ 7/1/6/12/4

Department of Water Affairs
Private Bag 13193
Windhoek
NAMIBIA

PERMIT NUMBE: 770

DATE: 28/09/2020

WASTEWATER AND EFFLUENT DISPOSAL EXEMPTION PERMIT ISSUED IN TERMS OF SECTION 21(5) AND 22(2) OF THE WATER ACT, 1956 (ACT 54 OF 1956) AND SECTION 70 OF THE WATER RESOURCES MANAGEMENT ACT, ACT 11 OF 2013

NAME OF PERMIT HOLDER	: Seawork Fish Processors (PTY) LTD
POSTAL ADDRESS	: P. O. Box 1709 Walvis Bay
REGION	: Erongo
METHOD OF TREATMENT	: Filtration
VALIDITY PERIOD	: Five (5) years
EXPIRY DATE	: 30 September 2025

1. **AIM OF PERMIT**

It is recommended that a Wastewater and Effluent Disposal Exemption Permit in terms of Section 21 and 22 of the Water Act 54 of 1956, be granted to Seawork Fish Processors (Pty) Ltd, exempting it from compliance with the provisions of Section 21 (1) and 21 (2) of the Water Act, (Act 54 of 1956 as Amendment Water Act 22 of 1985), , in order that the industrial wastewater produced through fish processing activities at Seawork Fish Processors (Pty) Ltd be filtered in order to remove solid materials and then be disposed of into the Atlantic Ocean, provided that it complies with the National Special Standards for Effluent of Namibia; and that domestic wastewater is to be discharged into the Walvis Bay Municipal sewerage system for further treatment and disposal by the local authority.

All official correspondence must be addressed to the Executive Director

Appendix C: Business Registration Certificates

Municipality Walvis Bay

REGISTRATION CERTIFICATE NO. 2012/4363

SEAWORK FISH PROCESSORS (PTY) LTD

is registered to carry on business as a

FISH PROCESSING (FACTORY), GENERAL DEALER FRESH AND FROZEN FISH AND RELATED PRODUCTS

in accordance with the Local Authorities Act 1992 (Act 23 of 1992) and the General Health Regulations 1969 (GN121 of 1969)
Under the following conditions

ALL FOOD HANDLERS MUST SUBMIT PROOF THAT THEY ARE MEDICALLY FIT TO HANDLE FOOD

Name of Owner: PETER HUGO PAHL

Name of Manager: PETER HUGO PAHL

Business Address: P O BOX 1709, WALVIS BAY, NAMIBIA, 13013

Street Address: 58, BEN AMATHILA AVENUE, WALVIS BAY

Erf No: W4672

MUNICIPALITY OF WALVIS BAY
BUSINESS REGISTRATION OFFICE
Receipt No.:
EFT
27 APR 2022
ENVIRONMENTAL HEALTH SECTION
O. DANIEL
PRIVATE BAG 5017 TEL: 064 2013288

Date of Registration: 2022/04/26

Expiry Date: 2023/04/25

REGISTRATION OFFICER

Please note: This certificate does not exempt the holder of obtaining a permit or any other document which may be required by law imposed by other ministeries. Any alteration of this certificate without the approval of the Registration Authority constitutes a criminal offence.

Municipality Walvis Bay

REGISTRATION CERTIFICATE NO. 2012/0804

BENGUELLA SEA PRODUCTS (PTY) LTD

is registered to carry on business as a

FISHING COMPANY

in accordance with the Local Authorities Act 1992 (Act 23 of 1992) and the General Health Regulations 1969 (GN121 of 1969)
Under the following conditions

Name of Owner:	BENGUELLA SEA PRODUCTS (PTY) LTD
Name of Manager:	JURGEN SANDER
Business Address:	P O BOX 272, WALVIS BAY, NAMIBIA, 13013
Street Address:	18, BEN AMATHILA AVENUE, WALVIS BAY
Erf No:	W2891

Receipt No.:	Date of Registration:	Expiry Date:
90169948	2022/01/13	2023/01/12

MUNICIPALITY OF WALVIS BAY
BUSINESS REGISTRATION OFFICE
B. DANIEL
21 JAN 2022
REGISTRATION OFFICER
ENVIRONMENTAL HEALTH SECTION
PRIVATE BAG 5017 TEL: 064 2013208

Please note: This certificate does not exempt the holder of obtaining a permit or any other document which may be required by law [illegible] certificate without the approval of the Registration Authority constitutes a criminal offence.

Municipality Walvis Bay

REGISTRATION CERTIFICATE NO. 2012/0645

OMANKETE SEAFOOD PROCESSORS (PTY) LTD

is registered to carry on business as a

FISH PROCESSING

in accordance with the Local Authorities Act 1992 (Act 23 of 1992) and the General Health Regulations 1969 (GN121 of 1969)
Under the following conditions

Name of Owner:	OMANKETE INVESTMENTS & SEAWORK FISH PROC
Name of Manager:	PETER HUGO PAHL
Business Address:	P O BOX 1709, WALVIS BAY, NAMIBIA, 13013
Street Address:	35, BEN AMATHILA AVENUE, WALVIS BAY
Erf No:	W5032

Receipt No.:	Date of Registration:	Expiry Date:
EFT	2021/12/08	2022/12/07

MUNICIPALITY OF WALVIS BAY
BUSINESS REGISTRATION OFFICE
D. DANIEL
14 DEC 2021
REGISTRATION OFFICER
ENVIRONMENTAL HEALTH SECTION
PRIVATE BAG 5017 TEL: 064 2013288

This certificate does not relieve the holder of obtaining a permit or any other document which may be required by law imposed by other ministeries. Any alteration of this certificate without the approval of the Registration Authority constitutes a criminal offence.

Appendix D: Proof of Public Consultation (2019)

Notified IAPs

Organisation	Contact Person
Ministry of Works and Transport	Pinehas N. Auene
Municipality of Walvis Bay	David Uushona
Municipality of Walvis Bay	Hilia Hitula
Municipality of Walvis Bay	Ephraim Nambahu
Municipality of Walvis Bay	Nangula Amutenya
Municipality of Walvis bay	Rauna Nghifikwa
Municipality of Walvis bay	Peter Etzebeth
Municipality of Walvis bay	Laetitia Kahona
Municipality of Walvis bay	Z. Job
Municipality of Walvis bay	Dennis Basson
Municipality of Walvis bay	Riaan Archer
Swakopmund Municipality	Paulina Engelbrecht
NamPort	Tim Eiman
NamPort	Elzevir Gelderbloem
Ministry of Defence	Navy
Ministry of Fisheries and Marine Resources	Viktor Libuku
Ministry of Fisheries and Marine Resources	Anja Kreiner
Benguela Current Commission	Ms Thandiwe Gxaba
Ministry of Defence - Navy	Angela Magongo
Omankete Seafood Processors (Pty) Ltd	Douglas Johnsen
Trans World Cargo (Pty) Ltd	Levanus
Buco Hardware	Jada Humphries
Benguela Sea Products (Pty) Ltd	Annagreth Nuabes
Namibia Dolphin Project	Dorothy Fourie
WB Youth Leader	Elise Elias
Kuisebmund Activist	Thomas Baisako
Tutaleni Committee	Moreen G Somaes

Registered IAPs

Organisation	Contact Person
Municipality of Walvis bay	Deville Dreyer
Municipality of Walvis bay	Berdine Botha
Municipality of Walvis bay	Dennis Gurirab
Municipality of Walvis bay	Lydia Hilumbwa
Municipality of Walvis bay	Environmental Department
Municipality of Walvis bay	Rauna Nghifikwa

Notification Letter

TEL.: (+264-61) 257411 ♦ FAX.: (+264) 88626368
CELL.: (+264-81) 1220082
PO BOX 11073 ♦ WINDHOEK ♦ NAMIBIA
E-MAIL: gpt@thenamib.com

30 April 2019

To: **Interested and Affected Party**
Re: **Environmental Assessment for the Construction and Operational Activities at the Seawork Fish Processing Facility, Walvis Bay**

Dear Sir/Madam

In terms of the Environmental Management Act (No 7 of 2007) and the Environmental Impact Assessment Regulations (Government Notice No 30 of 2012), notice is hereby given to all potential interested and affected parties that an applications will be made to the Environmental Commissioner for Environmental Clearance Certificates for the following project:

Project: The Construction and Operational Activities at the Seawork Fish Processing Facility, Walvis Bay

Proponent: Seawork Fish Processors (Pty) Ltd

Environmental Assessment Practitioner: Geo Pollution Technologies (Pty) Ltd

Seawork Fish Processors (Pty) Ltd currently operates a fresh fish processing facility situated in Ben Amathila Avenue, Walvis Bay. As part of the operations of the facility, Seawork intend to construct a desalination plant to supplement potable water supply to the facility. Seawater will be supplied to the desalination plant from shallow boreholes (±15 m deep) on their property. Current and future operational activities are typical of fish processing facilities in Walvis Bay and include jetty operations as well as fish receipt, handling, processing and storage. Fish is supplied to the facility by five wet fish trawlers, operated by Seawork. Additional activities include consumer fuel installation operations and the disposal of filtered effluent and brine into the Altantic Ocean.

Geo Pollution Technologies (Pty) Ltd was appointed by the proponent to conduct an environmental assessment for the facility. As part of the assessment we consult with interested and affected parties. You are hereby invited to register as an interested and affected party for this project. By registering you are provided with the opportunity to share with Geo Pollution Technologies, any comments, issues or concerns related to the facility, for consideration in the Environmental Assessment.

Should you require any additional information please contact Geo Pollution Technologies at telephone 061-257411. Comments for consideration during the environmental assessment should reach us by 13 May 2019.

Fax: 088-62-6368 or
E-Mail: seawork@thenamib.com

Thank you in advance.

Sincerely,

Wikus Coetzer (Environmental Assessment Practitioner)
Geo Pollution Technologies

Notification Letter: Municipality of Walvis Bay

GEO Pollution Technologies

TEL.: (+264-61) 257411 ♦ FAX.: (+264) 88626368
CELL.: (+264-81) 1220082
PO BOX 11073 ♦ WINDHOEK ♦ NAMIBIA
E-MAIL: gpt@thenamib.com

15 April 2019

To: **Interested and Affected Party**
Re: **Environmental Assessment for the Construction and Operational Activities at the Seawork Fish Processing Facility, Walvis Bay**

Dear Sir/Madam

In terms of the Environmental Management Act (No 7 of 2007) and the Environmental Impact Assessment Regulations (Government Notice No 30 of 2012), notice is hereby given to all potential interested and affected parties that an applications will be made to the Environmental Commissioner for Environmental Clearance Certificates for the following project:

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Seawork Fish Processors (Pty) Ltd currently operates a fresh fish processing facility situated in Ben Amathila Avenue, Walvis Bay. As part of the operations of the facility, Seawork intend to construct a desalination plant to supplement potable water supply to the facility. Seawater will be supplied to the desalination plant from shallow boreholes (±15 m deep) on their property. Current and future operational activities are typical of fish processing facilities in Walvis Bay and include jetty operations as well as fish receipt, handling, processing and storage. Fish is supplied to the facility by five wet fish trawlers, operated by Seawork. Additional activities include consumer fuel installation operations and the disposal of filtered effluent and brine into the Altantic Ocean.

Geo Pollution Technologies (Pty) Ltd was appointed by the proponent to conduct an environmental assessment for the facility. As part of the assessment we consult with interested and affected parties. You are hereby invited to register as an interested and affected party for this project. By registering you are provided with the opportunity to share with Geo Pollution Technologies, any comments, issues or concerns related to the facility, for consideration in the Environmental Assessment.

Should you require any additional information please contact Geo Pollution Technologies at telephone 061-257411. Comments for consideration during the environmental assessment should reach us by 6 May 2019.

Fax: 088-62-6368 or
E-Mail: seawork@thenamib.com

Thank you in advance.

Sincerely,

Wikus Coetzer (Environmental Assessment Practitioner)
Geo Pollution Technologies

MUNICIPALITY OF WALVIS BAY
Office of the
17 APR 2019
Chief Executive Officer
PRIVATE BAG 5017, TEL: 064 201 3201

Public Consultation - Notification: Environmental Impact Assessment for the Construction and Operational Activities at Seawork, Walvis Bay

Name & Surname	Organisation / Address	Tel / Mobile	Email	Signature
Angela Magongo	NAMA	Privacy Block		
Douglas Johnsen	OMAANKETE			
Tevanius	TWC			
JADA HUMPHRIES	BUCO			
Annagreth Nicodes	Benguella Sea Products			
Laetitia Kahona.				

Municipality of Walvis Bay Stakeholder Meeting: Attendance Register

MEETING ATTENDANCE LIST

Project: Seawork Fish Processors - EIA

Name & Surname	Organisation	Position	Tell/Cell Nr.	Fax Nr.	Email
David Uushona	WB Mun	Man: SWEM	Privacy Block		
Paulina Engelbrecht	Swk mun	Env. Officer			
Lovisa Hailaula	WBM	Env. Officer			
Victor Miti Libuku	MFMR	Biologist			
Nangula Amutenya-Amati	WB mun	Env. Coordinator			
Dorothy Farie	NDP	Field Officer			
Petrus Elisabeth	WB Mun.	Foreman: SW			
Rauna Nghifitwa	Muni WB	Volunteer / Environme			
Etise Elias	WB youth leader Represent	youth Member			
Ephraim Nambahu	Mun WB	Town Planning: O			
Deville Dreyer	Mun W Bay	Chief Health Serv			
Thomas Basalo	Bewaseerumd Aktivist				
Moreen G Somoes	Tutaleni Commeetee	Secretary			
Riaan Ardel	Mun of W/B	Haz Waste Insp			
Dennis Basson	W/B Mun	Fire Brigade			

Venue: Municipality of Walvis Bay **Time:** 15:00 **Date:** 2019/05/09

Appendix E: Consultant's Curriculum Vitae

ENVIRONMENTAL SCIENTIST **André Faul**

André entered the environmental assessment profession at the beginning of 2013 and since then has worked on more than 160 Environmental Impact Assessments including assessments of the petroleum industry, harbour expansions, irrigation schemes, township establishment and power generation and transmission. André's post graduate studies focussed on zoological and ecological sciences and he holds a M.Sc. in Conservation Ecology and a Ph.D. in Medical Bioscience. His expertise is in ecotoxicological related studies focussing specifically on endocrine disrupting chemicals. His Ph.D. thesis title was The Assessment of Namibian Water Resources for Endocrine Disruptors. Before joining the environmental assessment profession he worked for 12 years in the Environmental Section of the Department of Biological Sciences at the University of Namibia, first as laboratory technician and then as lecturer in biological and ecological sciences.

CURRICULUM VITAE ANDRÉ FAUL

Name of Firm	:	Geo Pollution Technologies (Pty) Ltd.
Name of Staff	:	ANDRÉ FAUL
Profession	:	Environmental Scientist
Years' Experience	:	21
Nationality	:	Namibian
Position	:	Environmental Scientist
Specialisation	:	Environmental Toxicology
Languages	:	Afrikaans – speaking, reading, writing – excellent
		English – speaking, reading, writing – excellent

EDUCATION AND PROFESSIONAL STATUS:

B.Sc. Zoology	:	University of Stellenbosch, 1999
B.Sc. (Hons.) Zoology	:	University of Stellenbosch, 2000
M.Sc. (Conservation Ecology)	:	University of Stellenbosch, 2005
Ph.D. (Medical Bioscience)	:	University of the Western Cape, 2018

First Aid Class A	OSH-Med 2022
Basic Fire Fighting	OSH-Med 2022

PROFESSIONAL SOCIETY AFFILIATION:
Environmental Assessment Professionals of Namibia (Practitioner)

AREAS OF EXPERTISE:
Knowledge and expertise in:
- Water Sampling, Extractions and Analysis
- Biomonitoring and Bioassays
- Biodiversity Assessment
- Toxicology
- Restoration Ecology

EMPLOYMENT:

2013-Date	:	Geo Pollution Technologies – Environmental Scientist
2005-2012	:	Lecturer, University of Namibia
2001-2004	:	Laboratory Technician, University of Namibia

PUBLICATIONS:

Publications:	5
Contract Reports:	+16
Research Reports & Manuals:	5
Conference Presentations:	1