

**ENVIRONMENTAL ASSESSMENT
FOR
THE EXISTING SEWAGE TREATMENT PLANT IN
ROSH PINAH, //KARAS REGION, NAMIBIA**



**OPERATIONAL
ENVIRONMENTAL MANAGEMENT PLAN
FEBRUARY 2021**



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PROJECT DETAILS

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ABBREVIATIONS

COA	Conditions of Authorisation
DWAF	Department of Water Affairs and Forestry
EAP	Environmental Assessment Practitioner
EC	Environmental Clearance
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act (No. 7 of 2007)
EMP	Environmental Management Programme
EO	Environmental Officer
GIS	Geographic information system
I&APs	Interested and Affected Parties
IFC	International Finance Corporation
MEFT: DEA	Ministry of Environment, Forestry & Tourism: Department of Environmental Affairs
NEC	Namibia Environmental Consultants
OEMP	Operational Environmental Management Plan
PCB	Polychlorinated Biphenyls
STP	Sewage Treatment Plant

1 INTRODUCTION

1.1 PURPOSE OF THIS EMP

This Environmental Management Plan (EMP) addresses the management of environmental impacts related to the operation of the existing Sewage Treatment Plant (STP) in Rosh Pinah. The document should be used as a basis for managing, mitigating and monitoring the environmental impacts associated with the operational phases of the environmental study, conducted by Namibia Environmental Consultants (NEC).

This EMP is intended for the management of the impacts of the sewage storage facility and operation thereof. This EMP is therefore a standalone document which must be kept and used on site during the operational phase of the Sewage Treatment Plant.

The Operational Environmental Management Plan (OEMP) contains the necessary mitigation and recommended actions as well as the timeframe and person responsible for the actions. The ultimate responsibility of the implementation of the OEMP rests on the Manager of RoshSkor/operator. The OEMP is a legal binding document that is an important part of the Environmental Assessment process and needs to be strictly adhered to. Workers must be made aware of the OEMP, their responsibilities and sensitive / no-go areas. Any transgressions must be treated as serious with remedial action to be taken. Any parties responsible for transgression of the underlying management measures outlined in this document will be held responsible of non-compliances and will be dealt with accordingly. This document should be flexible so as to allow RoshSkor Township (Pty) Ltd to conform to the management commitments without being prescriptive. The management commitments prove that the anticipated risks on the environment will be minimised if they are adhered to consistently.

This Operational Environmental Management Plan has been compiled for the management of operational phase of the existing Sewage Treatment Plant of Rosh Pinah. The OEMP will provide specific recommendations and mitigation measures on how to minimise negative impacts and therefore protecting the environment on a social as well as biophysical level.

1.2 OBJECTIVES AND PURPOSE OF THE EMP

The primary objectives of the EMP are as follows:

- To describe action plans for achieving the mitigation measures described in the EIA.
- To indicate responsibilities, schedules and staff resources regarding the implementation of these action plans.
- To highlight a monitoring programme, that will enable review of the success of the EMP and the provision of such information to the relevant decision-makers.
- To provide specific recommendations and mitigation measures on how to minimise negative impacts and therefore protecting the environment mostly on the biophysical as well as social level.
- In general, the purpose of this EMP is to formulate mitigatory measures that should be implemented and made binding to all contractors during the operational phase.

- To outline mitigation measures and environmental specifications which must be implemented to ensure environmental and social protection of the surrounding environment and to prevent long-term or permanent environmental degradation.

1.3 COMPONENTS OF THE OEMP

Environmental issues identified in this OEMP are specific to the operational phase of the Sewage Treatment Plant. The OEMP has been prepared in an issues-based format that nominates for each environmental issue or impacting activity, the tasks that are required to be addressed during the operational phases of the Sewage Treatment Plant, covering:

- Environmental issues
- Environmental objectives
- Environmental intent
- Control measures
- Responsibility
- Monitoring
- Reporting
- Corrective action

In terms of the Environmental Assessment Policy of 1994 and the Environmental Management Act No 7 of 2007 (EMA), certain activities have been identified, which could have a substantially detrimental effect on the environment. These listed activities require an Environmental Clearance Certificate (ECC) from the competent environmental authority, i.e. Ministry of Environment, Forestry and Tourism: Department of Environmental Affairs (MEFT: DEA), prior to commencing. The following activities identified in the EIA Regulations (Table 1) apply to the proposed project:

Table 1: List of triggered activities identified in the EIA Regulations which apply to the proposed project

Activity description and No(s):	Description of relevant Activity	The portion of the development as per the project description that relates to the applicable listed activity
Activity 2.1 Waste Management, Treatment, Handling and Disposal Activities	The construction of facilities for waste sites, treatment of waste and disposal of waste	The project entails the operation of the existing Sewage Treatment Plant.
Activity 2.3 Waste Management, Treatment, Handling and Disposal Activities	The import, processing, use and recycling, temporary storage, storage transit or export of waste.	Waste is currently stored and treated on site.

2 PROJECT LOCATION AND DESCRIPTION

2.1 PROJECT LOCATION

Rosh Pinah is a small mining town located in southern Namibia near the Orange River in //Karas Region, close to the border with South Africa. The town is located 360 km south of Keetmanshoop. Rosh Pinah belongs to the Oranjemund electoral constituency and it is connected via the road to Aus. The existing Sewage Treatment Plant of Rosh Pinah is located to the southern side of the town, approximately 500 meters out of Rosh Pinah – *refer to **figure 1** for the locality map below.*

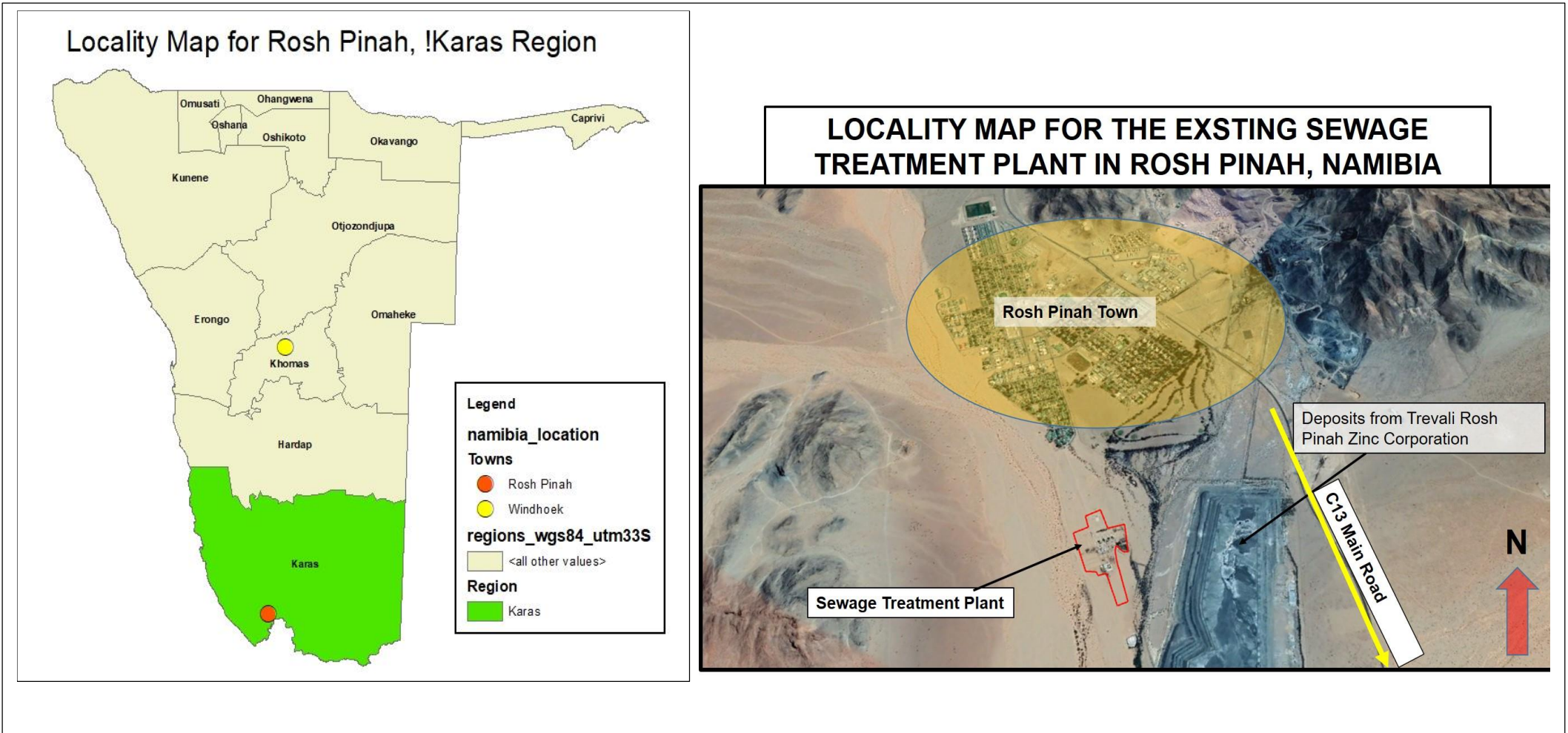


Figure 1: Locality map of Rosh Pinah and the Sewage Treatment Plant

2.2 PROJECT DESCRIPTION

Rosh Pinah is a small mining town located in southern Namibia near the Orange River in //Karas Region, close to the border with South Africa. Rosh Pinah was proclaimed a town due to the expansion of the town as well as the establishment of the Skorpion Zinc mine and refinery. The Rosh Pinah Zinc Corporation together with the Skorpion Zinc mine had previously formed a joint venture company known as RoshSkor Township (Pty) Ltd with the intention to manage the town and set in place the initial management structures and systems needed to operate the town until the new local authority structures are established. In that regard, over the years the town has been growing and expanding due to the increase in population growth as well as job opportunities within the area mostly created by the mines.

Given the increase in population growth of the town, RoshSkor Township (Pty) Ltd which manages the town realised the need to construct and develop a Sewage Treatment Plant for the town. The need for RoshSkor Township (Pty) Ltd to seek for the Environmental Clearance Certificate arose given that the construction and operations of Sewage Treatment Plants is a listed activity under the Environmental Management Regulations that may not be undertaken without an Environmental Clearance Certificate (ECC). The Sewage Treatment Plant for Rosh Pinah was constructed during the time the Environmental Management Regulations were not passed. A Sewage Treatment Plant is a setup designed to purify contaminated substances and these substances may either be liquid, solid or semi-solid. The sewage treatment entails the process of removing contaminants from municipal wastewater that contains mainly household sewage as well as other industrial wastewater.

Sewage is treated at the Treatment Plant in order to reduce pollutants found in wastewater to levels that the natural environment can handle when released back into the environment. The Treatment Plant is located outside of town for the reason that it does not cause any nuisance (in terms of odour) to the residents of the town.

The Sewage Treatment Plant measures approximately 9000 m² in extent whereby part of the area is not yet utilised and will be used for the expansion of the Treatment Plant.

The STP is an operating facility that requires careful attention and maintenance. In general, the Treatment Plant consists of three basic and major stages as follows:

Sedimentation: The first process involves sedimentation of solid waste so that only liquid matter floats on top. This liquid matter is then separated from the solid waste with the help of the clarification process or the machines called clarifiers. The basic principle behind this process is to eliminate solid waste and leave only liquid waste for the next part of the sewage treatment.

Aeration: given that wastewater has a very high a biological demand for oxygen (BOD), this demand is met with the help of aerators. The aerators help increase the oxygen content by mixing the waste with the oxygen generated in the aeration tanks.

Disinfection: Depending on the waste, there are many processes that help in the treatment of wastewater. But generally, the last process in wastewater treatment is disinfection. This process helps disinfect wastewater and eliminate toxicity so that it can be disposed of in local water tanks.

RoshSkor Township (Pty) Ltd (proponent) is of the intention to acquire an Environmental Clearance Certificate (ECC) for the operation of the existing Sewage Treatment Plant and has appointed Namibia Environmental Consultants to undertake the environmental assessment

exercise in order to obtain the ECC for the Treatment Plant in Rosh Pinah. The competent authority is the Ministry of Environment, Forestry and Tourism: Department of Environmental Affairs (MEFT: DEA).

The process will be undertaken in terms of the gazette Namibian Government Notice No. 30 Environmental Impact Assessment Regulations (herein referred to as EIA regulations) in terms of the Environmental Management Act (No 7 of 2007) (herein referred to as the EMA).

2.2.1 Existing structure of the Sewage Treatment Plant

The Sewage Treatment for Rosh Pinah is well demarcated and fenced off and only authorised personnel are allowed to enter. There is a guard house for the security located just at the entrance of the Treatment Plant site. The existing Sewage Treatment Plant is currently sufficient enough to manage the municipal waste generated from its households as well as other industrial activities. However, in future there will be a need for future expansion of the Treatment Plant due to the influx of people to the town which will result in increased population growth. The Treatment Plant has treatment steps that it follows as highlighted below.

Step 1: Screening and Pumping

The incoming wastewater passes through screening equipment where objects such as sanitary materials, plastics, and grease are removed. The material removed is washed and pressed and disposed of at an authorised landfill. The screened wastewater is then pumped to the next step: grit removal.

Step 2: Grit Removal

In this step, heavy but fine material such as sand and gravel is removed from the wastewater. This material is also disposed of at an authorised landfill.

Step 3: Primary Settling

The material, which will settle but at a slower rate is taken out using large circular tanks called clarifiers. The settled material, called primary sludge is pumped off the bottom and the wastewater exits the tank from the top.

Step 4: Aeration / Activated Sludge

In this step, the wastewater receives most of its treatment. Through biological degradation, the pollutants are consumed by microorganisms and transformed into cell tissue, water, and nitrogen.

Step 5: Secondary Settling

Large circular tanks called secondary clarifiers allow the treated wastewater to separate from the aeration tanks at this step, yielding an effluent, which is now over 90% treated. The activated sludge is then continuously pumped from the bottom of the clarifiers and returned to the aeration tanks in step four.

Step 6: Filtration

The material captured on the surface of the disc filters is periodically backwashed and returned to the head of the plant for treatment.

Step 7: Disinfection

This step ensures that the treated wastewater is virtually free of bacteria.

Sludge Treatment

The primary sludge pumped from the bottom of the primary clarifiers in step three along with the continuous flow of waste activated sludge from the aeration process in step four, must be treated to reduce volume and produce a usable end product.

Treated wastewater (referred to as grey water) from the Treatment Plant is then pumped straight from the storage tank to be used for flushing toilets and irrigation (sports fields) purposes as it contains a higher proportion of nutrients that are good for plants.

2.2.2 Engineering Services for the Sewage Treatment Plant

Engineering services for the Sewage Treatment Plant entail electricity and access roads to the site which are further explained below.

Storm Water Control:

There is currently no storm water control at the site for the reason that Rosh Pinah receives an average rainfall in the ranges of 7 – 12 mm a year. Therefore, the need for this engineering set up for the site will be inconvenient for the management of RoshSkor Township (Pty) Ltd given that the town receives very low rainfall.

Access to the Site:

Access to the Sewage Treatment Plant is obtained from the internal road (Ondye Drive). The road that branches from Ondye Drive to the site not tarred and therefore frequent maintenance of the road is required and should be carried out by RoshSkor Township (Pty) Ltd.

The Sewage Treatment Plant site is fenced off and has gate that is locked at all times and only authorised personnel and vehicles are permitted to the site. There is a guard house that is adjacent to the gate of the site.

Electricity:

Electricity at the Sewage Treatment Plant is connected to the electricity network of Rosh Pinah.

A detailed engineering design for the Sewage Treatment Plant is attached under Annexure B of this document.

Below are some pictures of the Sewage Treatment Plant.



Figure 2: View of the Sewage Treatment Plant site



Figure 3: Trickling Filter Towers

Sewage is broken down by organisms before transported to the chlorine contact point



Figure 4: Sewage collection point (to sort out any solid wastes)



Figure 5: Entrance gate to the Sewage Treatment Plant



Figure 6: Treated water collection point



Figure 7: Storage Tank for treated water



Figure 8: Chlorine dosing dams

This is where chlorine added to the water



Figure 9: Chlorine contact room & Pump station room

Pump station room

Chlorine Contact Room

This is where the chlorine gas is stored



Humus Tanks

Figure 10: Humus Tanks

3 LEGAL ENVIRONMENTAL FRAMEWORK

This chapter provides an overview of the legislation and policy framework for the EIA being undertaken. The EIA will be undertaken in compliance with the relevant Namibian environmental legislation as well as taking into account international best practice for impact assessments.

3.1 THE CONSTITUTION OF THE REPUBLIC OF NAMIBIA

There are two clauses contained in the Namibian Constitution that are of particular relevance to sound environmental management practice, viz. articles 91(c) and 95(l). In summary, these refer to:

- Guarding against over-utilisation of biological natural resources;
- Limiting over-exploitation of non-renewable resources;
- Ensuring ecosystem functionality;
- Protecting Namibia's sense of place and character;
- Maintaining biological diversity; and
- Pursuing sustainable natural resource use.

The above therefore commits the State to actively promote and sustain environmental welfare of the nation by formulating and institutionalising policies to accomplish the abovementioned sustainable development objectives.

3.2 NAMIBIA'S ENVIRONMENTAL MANAGEMENT ACT (EMA)

In giving effect to articles 91(c) and 95(l) of the Constitution of Namibia, general principles for sound management of the environment and natural resources in an integrated manner have been formulated. This resulted in Namibia's Environmental Assessment Policy of 1994. To give statutory effect to this Policy, the Environmental Management Act was approved in 2007, and gazetted on 27 December 2007 as the Environmental Management Act (Act No. 7 of 2007) (EMA), Government Gazette No. 3966. Part 1 of the Environmental Management Act describes the various rights and obligations that pertain to citizens and the Government alike, including an environment that does not pose threats to human health, proper protection of the environment, broadened locus standi on the part of individuals and communities, and reasonable access to information regarding the state of the environment. Part 2 of the Act sets out 13 principles of environmental management, as follows:

- Renewable resources shall be utilised on a sustainable basis for the benefit of current and future generations of Namibians.
- Community involvement in natural resource management and sharing in the resulting benefits shall be promoted and facilitated.
- Public participation in decisions affecting the environment shall be promoted.
- Fair and equitable access to natural resources shall be promoted.
- Equitable access to sufficient water of acceptable quality and adequate sanitation shall be promoted and the water needs of ecological systems shall be fulfilled to ensure the sustainability of such systems.
- The precautionary principle and the strategy of preventative action shall be applied.

- There shall be prior environmental assessment of projects and proposals which may significantly affect the environment or use of natural resources.
- Sustainable development shall be promoted in land-use planning.
- Namibia's movable and immovable cultural and natural heritage, including its biodiversity, shall be protected and respected for the benefit of current and future generations.
- Generators of waste and polluting substances shall adopt the best practicable environmental option to reduce such generation at source.
- The polluter pays principle shall be applied.
- Reduction, reuse and recycling of waste shall be promoted.
- There shall be no importation of waste into Namibia.
- Promotion of the coordinated and integrated management of the environment;
- The Minister of Environment and Tourism was enabled to give effect to Namibia's obligations under international environmental conventions;
- Certain institutions were established to provide for a Sustainable Development Commission and Environmental Commissioner".

As the organ of state responsible for management and protection of its natural resources, the MEFT: DEA is committed to pursuing these principles of environmental management.

3.3 ENVIRONMENTAL GUIDELINES

The EMA, under section 5, states that if a proposal is likely to affect people, the following guidelines should be considered in Scoping / EA:

- The location of the development in relation to interested and affected parties (I&APS), communities or individuals;
- The number of people likely to be involved;
- The reliance of such people on the resources likely to be affected, the resources, time and expertise available for scoping / EA;
- The level of education and literacy of parties to be consulted;
- The socio-economic status of affected communities;
- The level of organisation of affected communities;
- The degree of homogeneity of the public involved;
- History of any previous conflict or lack of consultation;
- Social, cultural or traditional norms within the community; and
- The preferred language used within the community.

The MEFT also released a Draft Procedures and Guidelines for conducting EIAs and compiling EMPs in April 2008. These guidelines outline the procedures and principles that are to be followed. It will be consulted throughout the EIA process to ensure an effective process and an EMP that addresses all identified impacts.

3.4 NAMIBIA VISION 2030

The principles that underpin Vision 2030, a policy framework for Namibia's long-term national development, comprise the following:

- Good governance;

- Partnership;
- Capacity enhancement;
- Comparative advantage;
- Sustainable development;
- Economic growth;
- National sovereignty and human integrity;
- Environment; and
- Peace and security.

Vision 2030 states that natural environments are disappearing quickly. Consequently, the solitude, silence and natural beauty that many areas in Namibia provide are becoming sought after commodities and must be regarded as valuable natural assets. Vision 2030 emphasises the importance of promoting Healthy Living which includes that the majority of Namibians are provided with basic services. The importance of developing Wealth, Livelihood and the Economy is also emphasised by Vision 2030. This development therefore supports the goals to be achieved in Vision 2030, because the bulk services will provide the community currently living in non-favourable conditions with potable water, electricity and waste removal services. Not only will this improve their health, it will also result in further development of Rosh Pinah.

3.5 BIODIVERSITY LEGISLATION AND POLICIES

The following policies, aimed at biodiversity, may also be relevant for the proposed project:

- Convention on Biological Diversity (2000)
- Namibian Water Corporation Act (1997)
- Pollution and Waste Management Bill (Draft)
- Soil Conservation Act (1969)
- United Nations Framework Convention on Climate Change (1992)
- Water Resources Management Act (2004)
- Climate Change Policy (Draft with Attorney General's office)

The applicability of the aforementioned policies and legislation has been explored in further detail during this EIA phase, based on the findings of the impact assessment and specialist investigations.

3.6 SOCIAL POLICIES

3.6.1 The Ministry of Environment and Tourism (MEFT) Policy on HIV & AIDS

The relevance of this policy for the proposed project stems from the fact that construction and operational activities may involve the establishment of temporary construction workforce in Rosh Pinah. Experience with other projects in a developing-world context has shown that, where construction workers have the opportunity to interact with local community, a significant risk is created for the development of social conditions and behaviors that contribute to the spread of HIV and AIDS.

In response to the threat the pandemic poses, MEFT has recently developed a policy on HIV and AIDS. This policy, which was developed with support from United States Agency for International Development (USAID), Gesellschaft für Technische Zusammenarbeit (GTZ) and the German Development Fund, provides for a non-discriminatory work environment and for workplace programs managed by a Ministry-wide committee.

3.7 WATER ACT NO.54 OF 1956

This Act provides for Constitutional demands including pollution prevention, ecological and resource conservation and sustainable utilisation. In terms of this Act, all water resources are the property of the State and the EIA process is used as a fundamental management tool.

A water resource includes a watercourse, surface water, estuary or aquifer, and, where relevant, its bed and banks. A watercourse means a river or spring; a natural channel in which water flows regularly or intermittently; a wetland lake or dam, into which or from which water flows; and any collection of water that the Minister may declare to be a watercourse. Permits are required in terms of the Act for undertaking the following activity relevant to the proposed project:

- Disposal of wastewater in a manner that may detrimentally impact on a water resource in terms of Section 21 (g).

3.8 WATER RESOURCES MANAGEMENT ACT OF NAMIBIA (2004)

This act repealed the existing South African Water Act No.54 of 1956 which was used by Namibia. This Act ensures that Namibia's water resources are managed, developed, protected, conserved and used in ways which are consistent with fundamental principles depicted in section 3 of this Act. Part IX regulates the control and protection of groundwater resources. Part XI, titled Water Pollution Control, regulates discharge of effluent by permit. Thus developers are required to efficiently plan for sewage disposal.

3.9 THE DRAFT WETLAND POLICY (1993)

This policy requires that any wetlands and its associated hydrological functions form a part to be managed in such a way that their biodiversity, vital ecological functions and life support systems are protected for the benefit of present and future generations.

3.10 POLLUTION CONTROL AND WASTE MANAGEMENT BILL (IN PREPARATION)

This Bill serves to regulate and prevent the discharge of pollutants to air and water as well as providing for general waste management. The Bill will repeal the Atmospheric Pollution Prevention Ordinance (11 of 1976) (below) when it comes into force.

Only Parts 2 and 7 of the Bill applies to the existing Sewage Treatment Plant of Rosh Pinah.

Part 2 stipulates that no person shall discharge or cause to be discharged any pollutant to the air from a process except under and in accordance with the provisions of an air pollution licence issued under section 23. It further provides for procedures to be followed in licence application, fees to be paid and required terms of conditions for air pollution licences.

Part 7 states that any person who sells, stores, transports or uses any hazardous substances or products containing hazardous substances shall notify the competent authority, in accordance with sub-section (2), of the presence and quantity of those substances.

In terms of water pollution, it will be illegal to discharge of, or dispose of, pollutants into any watercourse without a Water Pollution Licence (apart from certain accepted discharges). Similarly, an Air Quality Licence will be required for any pollution discharged to air above a certain threshold.

The Bill also provides for noise, dust or odour control that may be considered a nuisance. The Bill advocates for duty of care with respect to waste management affecting humans and the environment and calls for a waste management licence for any activity relating to waste or hazardous waste management.

This bill aims to promote sustainable development and to prevent and regulate the discharge of pollutants into the environment. Once this bill is enacted it will make provision for the establishment of an appropriate framework for integrated pollution prevention and control.

The proposed development would not entail the discharge to air and or water, but might result in the generation of noise and dust during waste compaction.

3.11 PUBLIC HEALTH ACT 36 OF 1919 AND SUBSEQUENT AMENDMENTS

The Act, with emphasis to Section 119 prohibits the presence of nuisance on any land occupied. The term nuisance for the purpose of this EIA is specifically relevant specified, where relevant in Section 122 as follows:

- Any area of land kept or permitted to remain in such a state as to be offensive, or liable to cause any infectious, communicable or preventable disease or injury or danger to health; or
- Any other condition whatever which is offensive, injurious or dangerous to health.

3.12 NATIONAL HERITAGE ACT (NO.76 OF 1969)

The Act calls for the protection and conservation of heritage resources and artefacts. Should any archaeological material, e.g. old weapons, coins, bones found during the construction and operational phase work should stop immediately and the National Heritage Council of Namibia must be informed as soon as possible. The Heritage Council will then decide to clear the area or decide to conserve the site or material.

4 RESPONSIBLE PARTIES

RoshSkor Township (Pty) Ltd as the proponent will be responsible for the implementation of this Operational Environmental Management Plan (OEMP) during the operational phase of the Sewage Treatment Plant. This responsibility, in some instances may be delegated to contractors in the employment of RoshSkor Township (Pty) Ltd for practical purposes, but RoshSkor Township (Pty) Ltd will retain legal responsibility. In that capacity, RoshSkor Township (Pty) Ltd should delegate suitably qualified person(s) with the responsibility to ensure implementation of the EMP and will:

- Revise the EMP as required and inform the relevant parties of the changes.
- Protect the environment and rehabilitate the environment as prescribed in the EMP.

The following people are also required during the operation in order to implement various Environmental management related issues.

4.1 ENVIRONMENTAL CONTROL OFFICER

Due to the operation of the Sewage Treatment Plant, a suitably qualified and experienced Environmental Control Officer (ECO) shall be appointed by the proponent to ensure that the mitigation rehabilitation measures are implemented and to ensure compliance with the provisions of the EMP. The ECO will represent the Ministry of Environment, Forestry & Tourism: Department of Environmental Affairs (MEFT: DEA) and is responsible for environmental monitoring and audits.

4.1.1 Roles and Responsibilities

The role of the ECO is to oversee and monitor compliance with and implementation of the operational phase EMP. The ECO is therefore responsible for the following responsibilities:

- i. Liaison with the community, RoshSkor Township (Pty) Ltd and Environmental Authorities;
- ii. Ensuring that the requisite remedial action is implemented in the event of non-compliance;
- iii. Ensuring the proactive and effective implementation and management of environmental protection measures;
- iv. Ensuring that a register of public complaints is maintained by the proponent and that any and all public comments or issues are appropriately reported and addressed;
- v. Routine recording and reporting of environmental activities on a monthly basis;
- vi. Recording and reporting of environmental incidents;
- vii. Notifying the Environmental Authorities immediately of any events or incidents that may cause significant environmental damage or breach the requirements of the EMP and
- viii. Environmental Awareness Training courses to be conducted to the Contractor's entire team of workers.

- ix. Ensure that periodic environmental performance audits are undertaken on the project implementation.
- x. Take appropriate action if the specifications contained in the EMP are not followed.
- xi. Monitor and verify that environmental impacts are kept to a minimum, as far as possible.
- xii. Ensure that activities on site comply with all relevant environmental legislation.

4.2 ROSHSKOR TOWNSHIP (PTY) LTD

RoshSkor Township (Pty) Ltd must undertake to monitor activities on a daily basis and the ultimate responsibility for satisfying the monitoring requirements. The manager is also responsible for ensuring compliance with all aspects of monitoring.

5 MANAGEMENT OBJECTIVES AND PRINCIPLES

The following objectives provide the framework for the environmental principles for environmental management of the project:

- Minimise the potential for deterioration of air quality during all project phases.
- Avoid “disturbing” noise levels (an increase in the ambient noise level of 7dB (A) or more at the border of the property from which the noise emanates).
- Minimise the use of clean water and avoid water wastage.
- Prevent the contamination of surface and ground water as a result of the sewage treatment activities.
- Ensure that an appropriate Emergency Procedure is in place to safeguard the environment, local community and employees.
- Enhance the creation of direct job opportunities for the surrounding community and contribution of the project to the local economy, especially during labour intensive phases (operational and decommissioning).
- Reduce the disturbance of the surrounding community from site activities to a minimum.
- Maintain transparent relations with the Interested & Affected Parties (IAPs) (including surrounding community, authorities and employees).
- Ensure that the community and employees are not subjected to increased safety hazards.

These guideline principles will form the basis for environmental management on site. Should these principles require modification or additions during the project this should be done at the discretion of the responsible person, who will ensure that any modifications are communicated, explained to and discussed with all affected parties.

The environmental operational procedures and environmental issues are identified and managed, under different phases of the project. The different phases are:

- Operational Phase; and
- Decommissioning Phase

6 OPERATIONAL PHASE

6.1 SCOPE

The general principles contained within the EMP shall apply to all operational activities. All operational activities shall observe any relevant environmental legislation and in so doing shall be undertaken in such a manner as to minimise impacts on the natural and social environment.

6.2 GENERAL

RoshSkor Township (Pty) Ltd, as the proponent is responsible for:

- Ensuring that the objectives of the EMP are given effect;
- Ensuring that all environmental impacts are managed in accordance with the EMP;
- Ensuring that all monitoring and compliance auditing occurs in line with the EMP;
- Ensuring that the environment is rehabilitated as far as practicable to its natural state or existing land use practices;
- Any environmental damage, pollution as a result of activities both in and outside the site boundaries.

With regards to the above, RoshSkor Township (Pty) Ltd shall conduct his activities so as to cause the least possible disturbance to the existing amenities, whether natural or man-made in accordance with all the current statutory requirements. Special care shall be taken by the Company manager to prevent irreversible damage to the environment. RoshSkor Township (Pty) Ltd shall take adequate steps to educate all members of his workforce as well as his supervisory staff on the relevant environmental laws and protection requirements. RoshSkor Township (Pty) Ltd shall supplement these steps with prominently displayed notices and signs in strategic locations to remind personnel of environmental obligations.

A suitably qualified independent ECO shall be appointed by the company manager to undertake the following tasks:

- Monitoring of all activities for compliance with the various environmental requirements at regular intervals;
- Routine environmental auditing and reporting of the Sewage Treatment Plant performance against the EMP;
- Reporting of environmental incidents and routine reporting of environmental issues associated with any possible construction activities and
- Identifying environmental non-conformances and initiating measures to remedy such issues.

6.3 ENVIRONMENTAL AWARENESS AND COMPETENCE

It is important to ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental harm.

6.3.1 Environmental, Health and Safety Induction Course

RoshSkor Township (Pty) Ltd is responsible for informing employees of their environmental obligations in terms of the EMP and for ensuring that employees are adequately experienced

and properly trained in order to execute the works in a manner that will minimise environmental impacts.

RoshSkor Township (Pty) Ltd shall ensure that all its employees attend an Environmental, Health and Safety Induction Course. This course shall be structured to ensure that attendees:

- Acquire a basic understanding of the key environmental features on the site and its immediate environs;
- Become familiar with the environmental controls contained in the EMP;
- Are made aware of the need to conserve water;
- Receive pertinent, written instructions regarding compliance with the relevant environmental management requirements (viz. typical environmental “do’s” and “don’ts”);
- Receive detailed training on site health and safety requirements, emergency responses and site evacuation procedures in terms of the Contractor’s health and safety plan;
- Are aware that a copy of the EMP is readily available on site and that all site staff are aware of the location and have access to the document;
- Are informed that employee information posters, outlining the environmental “do’s” and “don’ts” (as per the environmental awareness training course) will be placed at prominent locations throughout the site.

6.3.2 Human Resource and Opportunities Management

Job creation, inward migration of workers and accommodation of a workforce within a small community have the potential to result in significant social impacts.

Given that RoshSkor Township (Pty) Ltd will be most affected by the project, it is consistent with international best-practice standards (such as the Performance Standards of the IFC) that they should be given special consideration in terms of the benefits arising from the project. In order to enhance the benefits of employment creation for these communities, it is recommended that the following measures be implemented:

- RoshSkor Township (Pty) Ltd shall establish a formal and organised recruitment process.
- RoshSkor Township (Pty) Ltd should be encouraged to employ local labour (i.e. from Rosh Pinah) where possible.
- RoshSkor Township (Pty) Ltd should be encouraged to recruit Namibian labourers.

6.3.3 Working Times

Given the operational phase of the Sewage Treatment Plant, RoshSkor Township (Pty) Ltd is expected to adhere to working times of employees. Working shifts must be strictly implemented even on public holidays (if necessary).

6.4 ENVIRONMENTAL CONSIDERATIONS PERTAINING TO SITE LAYOUT - WHERE APPLICABLE

6.4.1 Access, Traffic and Haul Roads

RoshSkor Township (Pty) Ltd shall be held responsible for the control of the Sewage Treatment Plant in ensuring that Contractors remain on designated routes and within designated working times. The following mitigation measures are further proposed to limit the impact of traffic in the area:

- New roads/tracks should be constructed if the quality of existing roads deteriorates.
- Where possible, repair or upgrade existing roads/tracks.
- Road surface should be regularly assessed and upgraded where appropriate.
- No off-road driving is allowed.
- Good driving and adherence to safety rules at all times.
- Drivers must have the correct licence for the vehicle they are operating.

No new parking bay, haul or access road or passage of any sort shall be opened or be caused to be opened without prior consent of RoshSkor Township (Pty) Ltd.

6.4.2 Equipment Maintenance and Storage

All vehicles and equipment shall be kept in good working order and shall be operated by designated and competent operators. Leaking or damaged equipment shall be repaired immediately or removed from the Site. Where emergency, *in situ* maintenance operations are required, the company manager shall ensure that the soil or vegetation does not become contaminated.

RoshSkor Township (Pty) Ltd shall ensure that oil and lubricant containers are stored in an area where the ground has been protected. The containers shall be inspected regularly to ensure that no leakage occurs. The dispensing mechanism of the oil / lubricant storage container shall be stored in a waterproof container when not in use. RoshSkor Township (Pty) Ltd or the Contractors shall take all reasonable precautions to prevent accidental and incidental spillage during the use of oils.

6.4.3 Materials

6.4.3.1 Materials Handling, Use and Storage

The Contractor operating on site shall be aware of all procedures and restrictions, including “no-go” areas and designated haul routes.

The Contractor shall be responsible for any clean-up resulting from the failure by his employees.

6.4.4 Fire Control

Fires are NOT by all means permitted at the Sewage Treatment Plant site. Any fires that occur outside of designated areas shall be reported to RoshSkor Township (Pty) Ltd immediately.

RoshSkor Township (Pty) Ltd shall be responsible for ensuring that immediate and appropriate actions are taken in the event of a fire and shall ensure that employees are aware of the procedures to be followed.

6.4.5 Emergency Procedures

The company manager shall ensure that the necessary materials and equipment for dealing with leaks and spills are available at the Sewage Treatment Plant site at all times.

6.5 PROTECTION OF NATURAL FEATURES AND HERITAGE RESOURCES

6.5.1 Protection of Freshwater Ecosystems

Any possible contaminated runoff from the Sewage Treatment Plant site should be prevented from entering the water courses (if there is any) as far as possible. Where pipelines cross streams, they should do so in a manner that does not impede or divert the flow in the channels.

The following mitigation measures are proposed for the protection of watercourses:

- Contaminated runoff from the site should be prevented from entering water bodies as far as possible.
- Sewage shall be properly treated on site and avoid any spills.
- Avoid development in and destruction of the drainage lines throughout the area.

6.5.2 Protection of Natural Systems

RoshSkor Township (Pty) Ltd shall ensure that the disturbance of vegetation and faunal communities and their habitats (in close proximity of the STP) is kept to a minimum. The following mitigation and management measures are prescribed in this regard:

- RoshSkor Township (Pty) Ltd shall ensure that the disturbance of vegetation is kept to a minimum.
- Vegetation should only be removed where it is absolutely necessary.
- Show overall environmental commitment by adapting a minimalistic damage approach during the operational phase.
- Employees found guilty or even suspected to be guilty of poaching or setting traps shall not be allowed to continue with work at the Sewage Treatment Plant and shall be immediately removed from the working team.

6.6 COMPLIANCE AND PENALTIES

6.6.1 Compliance

Environmental management is concerned with the results of the proponent's operations to carry out the control of how the operations of the Sewage Treatment Plant are carried out. Tolerance with respect to environmental matters applies not only to the finished product but also to the standards of the day-to-day operations required to complete the works.

It is thus required that RoshSkor Township (Pty) Ltd shall comply with the environmental requirements on an on-going basis and any failure to do so will entitle the ECO to certify the imposition of a penalty as detailed below, if such non-compliance is not corrected within a period of one week of notification thereof.

6.6.2 Penalties

Penalties will be issued for certain transgressions. Penalties may be issued per incident at the discretion of the ECO. Such penalties will be issued in addition to any remedial cost incurred as a result of the non-compliance with this specification. The ECO will inform the company

manager of the contravention and the amount of the penalty and shall be entitled to deduct the amount from the monies due under the Contract.

Penalties for the activities detailed below will be imposed by the ECO on the proponent.

a) Persistent and un-repaired oil leaks from any operating machinery on site	N\$ 2,000
b) Persistent failure to monitor and empty drip trays timeously.	N\$ 2,000
c) The use of inappropriate methods for refuelling, resulting in spillages.	N\$ 2,000
d) Deliberate lighting of illegal fires at the Treatment Plant site.	N\$ 2,000
e) Employees not making use of site ablution facilities.	N\$ 2,000
f) Unauthorised removal of vegetation.	N\$ 500
g) Damage to vegetation or ground arising from equipment leaving designated haul or access routes.	N\$ 5,000

For each subsequent similar offence, the penalty shall be doubled in value to a maximum value of N\$ 20,000. The ECO shall be the judge as to what constitutes a transgression in terms of this clause.

6.7 ENVIRONMENTAL INCIDENT REPORTING

All environmental incidents occurring at the proposed site will be recorded. The incident report will have to include time, date, location and nature of the incident, extent of the incident, actions and personnel involved.

All complaints received from the neighbouring community should be directed to RoshSkor Township (Pty) Ltd management. In addition, the proponent's management should also be able to respond to the complainant within a week (even if pending further investigation).

It is important that the issues raised are considered and that the complainant feels that their concerns have been addressed to and whenever possible actions taken to address these. All complaints should be entered in the environmental register and all responses and actions taken to address these should be recorded.

6.8 ENVIRONMENTAL MONITORING

Periodic environmental monitoring must be taken on a regular basis. Monitoring should be done in order to ensure compliance with all aspects of the EMP. Findings should be liaised with to all responsible officers as chain command.

6.9 NON-COMPLIANCE OF THE EMP

Problems may occur in carrying out mitigation measures or monitoring procedures that could result in non-compliance of the EMP. The responsible personnel should encourage staff to comply with the EMP and address acts of non-compliance and penalties.

RoshSkor Township (Pty) Ltd is responsible for reporting non-conformance with the EMP to the ECO. The proponent's management in consultation with the ECO must thereafter undertake the following activities:

- Investigate and identify the cause of non-conformance.
- Report matters of non-conformance to RoshSkor Township (Pty) Ltd (depending on the severity of the incident)

- Implement suitable corrective action as well as prevent recurrence of the incident.
- Assign responsibility to corrective and preventative action.
- Any corrective action taken to eliminate the causes of non-conformance shall be appropriate to the magnitude of the problems and commensurate with the environmental impact encountered.

6.10 SUMMARY OF OPERATIONAL PHASE MANAGEMENT ACTIONS

The table below is only a summary the management actions to be taken in order to minimise negative impacts. Please turn back to the relevant section above for more details on the various management actions to be taken for each impact.

Table 2: Summarized Operational Phase Management Table

Aspect	Management Objective	Duration of Impact	Management Actions	Responsibility
General	To ensure overall compliance of the EMP.	Permanent	<ul style="list-style-type: none"> A maintenance plan for the Sewage Treatment Plant must be developed to ensure that good working order is achieved. 	RoshSkor Township (Pty) Ltd.
Monitoring	To avoid environmental pollution from potential leakages.	Permanent	<ul style="list-style-type: none"> A monitoring and eradication programme should be put in place whereby the distribution and abundance of alien and invader fauna are monitored through fixed trapping points. 	RoshSkor Township (Pty) Ltd
Sewer Line	To avoid and prevent leakage overflows.	Permanent	<ul style="list-style-type: none"> Regular monitoring of sewer line and manholes for visible leakages/ overflows. Immediate repair operation for the damaged portion of sewer line. De-siltation of blocked sewers/ manholes with sewage pumping machines-storing and disposal at appropriate refusal area after treatment. Ensure proper covering of manhole and avoid dumping of solid waste to prevent chocking of sewer line. 	Contractor / RoshSkor Township (Pty) Ltd
Sewage treatment plant and Intermediate pumping station (Noise pollution from operation activities)	To maintain noise levels generated from site.	Permanent	<ul style="list-style-type: none"> Operating machines such as pumps, generators, air diffusers, etc should be properly handled and regular maintenance should be carried out. 	Contractor / RoshSkor Township (Pty) Ltd
Health and Safety	To ensure and maintain the safety workers on site.	Permanent	<ul style="list-style-type: none"> An emergency plan (including fire management) must be developed and implemented; the relevant authority must approve this plan. 	Contractor / RoshSkor Township (Pty) Ltd

Aspect	Management Objective	Duration of Impact	Management Actions	Responsibility
	Workers exposed to toxic gases in sewers and hazardous materials. The toxic gases are likely to contract communicable diseases from exposure to pathogens present in the sewage.		<ul style="list-style-type: none"> Ensure that all fire extinguishers are replaced on or before their expiry dates. During cleaning/ maintenance operation, the sewer line will be adequately vented to ensure that no toxic or hazardous gases are present in the line. 	
Treatment and Disposal	To ensure waste water is treated to PCB standards or levels accepted by the environment.	Permanent	<ul style="list-style-type: none"> Monitor the treated sewage/effluent quality and ensure compliance with PCB standards for effluent disposal into surface water bodies, on land or for the agricultural use. 	Contractor / RoshSkor Township (Pty) Ltd
	To ensure that sludge is properly handled that it does not contaminate the environment (soil to be specific)	Permanent	<ul style="list-style-type: none"> Ensure proper functioning of STP for digestion of sludge and ensure adequate functioning of dewatering units for efficient functioning of system 	Contractor / RoshSkor Township (Pty) Ltd
Emergency Procedures	All employees are aware of emergency procedures.	Permanent	<ul style="list-style-type: none"> RoshSkor Township (Pty) Ltd shall ensure that employees are aware of the procedure to be followed for dealing with (any) leaks and spills. RoshSkor Township (Pty) Ltd shall ensure that the necessary materials and equipment for dealing with (any) leaks and spills (operating machinery) are available on the site at all times. 	Contractor / RoshSkor Township (Pty) Ltd
Rehabilitation	When the site has reached capacity, all material, temporary structures, temporary fences, plant and equipment are completely removed from the site.	Permanent	<ul style="list-style-type: none"> Rehabilitation operations and re-vegetation of all disturbed areas shall commence as soon as possible and even run concurrently where appropriate. 	RoshSkor Township (Pty) Ltd
Penalties	To ensure that environmental requirements are strictly adhered to.	Permanent	Penalties will be issues for certain specified transgressions.	RoshSkor Township (Pty) Ltd

7 ENVIRONMENTAL MONITORING

7.1 MONITORING, REPORTING AND AUDITING

Monitoring measures during the operational phase is as follows:

- Monthly visual inspections must be conducted at the Sewage Treatment Plant to check for any environmental incidences.
- Quarterly audit reports are to be prepared by the ECO or appointed Environmental consultant and submitted to the proponent, and MEFT: DEA.
- Any change in the scope of works during the operation of the Sewage Treatment Plant must be documented and reported to the competent authority accordingly.

8 CONCLUSION

In conclusion it should be noted that this EMP should be regarded as a living document and changes should be made to the EMP as required by project evolution while retaining the underlying principles and objectives on which the document is based.

The compilation of the EMP has incorporated impacts and mitigation measures as well as incorporating principles of best practice in terms of environmental management.

In addition, provided the operational impacts for this project are mitigated as per the EMP, the project will result in impacts that should not negatively affect the environment.

It is the proponent's responsibility to ensure that this EMP is made a binding document on the contractor (Waste Removal) by including it in the contract documentation. The contractor should thoroughly familiarise himself with the requirements of the EMP and appoint an environmental Control Officer (ECO) to oversee the implementation of the EMP on a day-to-day basis.

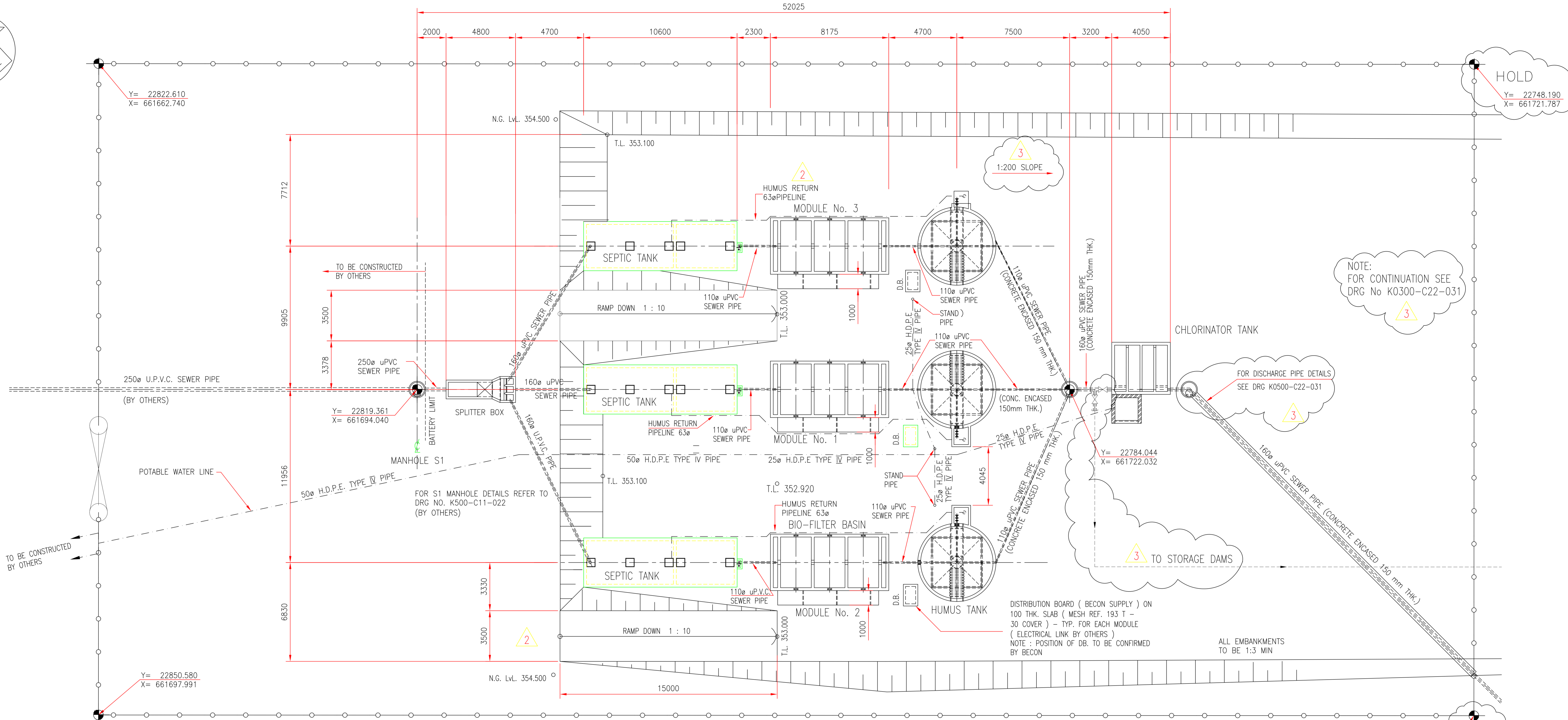
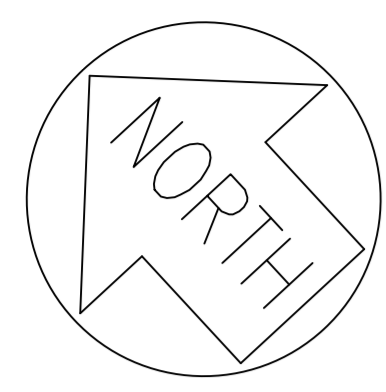
Parties responsible for transgression of this EMP should be held responsible for any rehabilitation that may need to be undertaken. Parties responsible for environmental degradation through irresponsible behaviour/negligence should receive penalties.

APPENDIX A

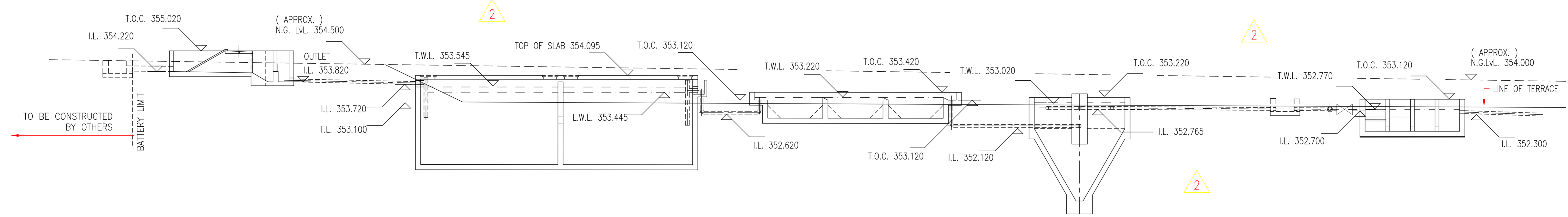
Curriculum Vitae of Environmental Assessment Practitioner

APPENDIX B

Engineering Designs for the Sewage Treatment Plant



LAYOUT OF SEWAGE PURIFICATION PLANT
SCALE 1 : 150



SECTION
SCALE 1 : 100

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DRG NO.	TITLE
K0500-C22-031	SEWAGE PURIFICATION PLANT - DISCHARGE PIPEWORK DETAILS
K0500-C28-001	SEWAGE PURIFICATION PLANT - FENCING DETAILS
K0500-C42-002	SEWAGE PURIFICATION PLANT - CONCRETE DETAILS - SHEET 2
K0500-C42-001	SEWAGE PURIFICATION PLANT - CONCRETE DETAILS - SHEET 1

REV	DESCRIPTION	BY	CHKD	APPR	DATE
03	DISCHARGE PIPE AMENDED. TERRACE EXTENDED. TERRACE SLOPE ADDED. REFERENCE DRAWING ADDED. HOLD ADDED TO FENCE SOP'S.	NSK			
02	LEVELS IN SECTION, RAMP, PIPE SIZES AND DB REVISED.	V.V.	P.J.		29-03-2001
01	HOLD REMOVED	M.R.J.	A.H.		06-03-2001
00	ISSUED FOR CONSTRUCTION	CDM	A.H.	D.B.	20-02-2001
AA	ISSUED FOR APPROVAL	ANDY H			22-01-2001

DESIG.	DATE	SIGN.	DESIG.	DATE	SIGN.
AREA MNGR	2001-02-20	E.DB.	AREA MNGR	2001-02-21	S.B.S.
ENG MNGR			ENG MNGR		
PIPING ENG			MINING ENG		
STRUCT ENG			STRUCT ENG		
ELEC ENG			ELEC ENG		
MECH ENG			MECH ENG		
INST ENG			INST ENG		
CIVIL ENG	2001-02-20	J.B.	CIVIL ENG		
PROC ENG			PROC ENG		

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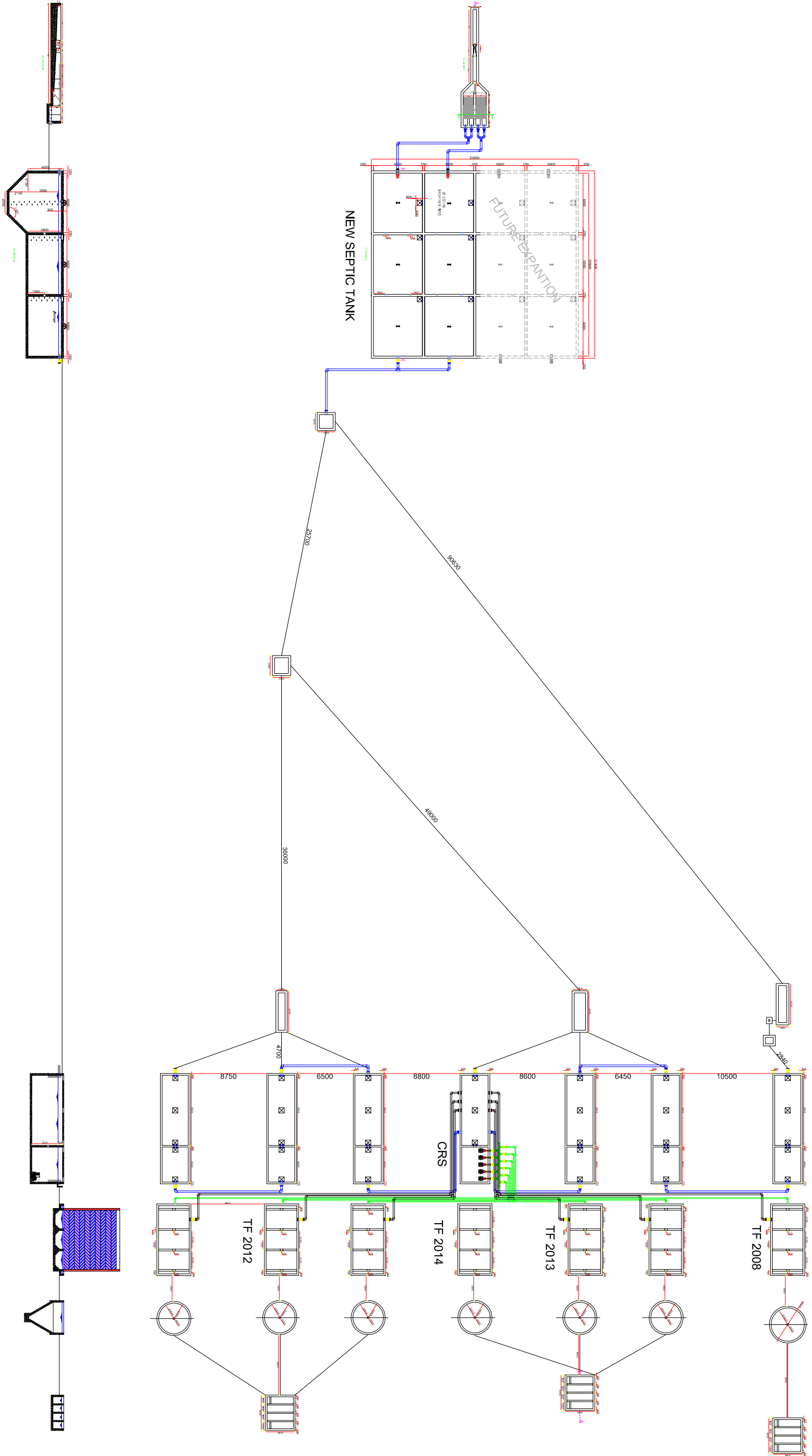
BATEMAN **SPJV** **SNC-LAVALIN**

SKORPION PROJECT JOINT VENTURE

SKORPION ZINC PROJECT

ROSH PINAH
SEWAGE PURIFICATION PLANT
GENERAL ARRANGEMENT

NAME	DATE	A1	M3858	DRAWING / FILE NUMBER	REV
DRAWN	C.M.	FEB. 2001			
CHKD	A.H.	14-02-01	Scale		
APPRVD	D.B.	20-02-01	1 : 100/150	DA-4	K0500-C31-001



NO	DATE	REVISION	INIT.

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PROJECT
 ROSH PINAH SEWAGE TREATMENT PLANT

TITLE
 GENERAL LAYOUT

DRAWN	CHECKED	SCALE
M.A	L.E	AS SHOWN

DWG. NO	DATE
1404.004.ROS-200 REV 6	2014-05-06