Submitted to
Transnet SOC Ltd
Richards Bay
3900

Submitted by
AECOM
263A West Avenue
Centurion

16 July 2015

Richards Bay Port Expansion – Environmental Management Programme

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Transnet SOC Ltd Richards Bay 3900	AECOM 263A West Avenue Centurion

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TITLE	:	Richards Bay Port Expansion Environmental Impact Assessment – Environmental Management Programme
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For AECOM SA (Pty) Ltd

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Contents

List of Tables

List of Figures

List of Terminology and Definitions

TERM	EXPLANATION
Activity	Any action needed for the design, construction and completion of a project.
Alien species	A species occurring in an area outside of its historically known natural range as a result of intentional or accidental dispersal by human activities.
Applicant/Client	Transnet SOC Limited (Transnet Capital Project) is the Applicant who will expand and construct the Port and recapitalise facilities in the Port of Richards Bay, is also AECOM's Client for the compilation of this EMPr.
Construction	Construction in this case means the building or rebuilding of the Port's new and existing structures; and recapitalise facilities in the Port of Richards Bay in order to accommodate the increase in general freight demand.
Communication register	A register aimed at tracking all communication activities within the project.
Contaminated water	Water containing pollutants from on- or off-site activities; e.g. concrete-laden water and runoff from plant / personnel wash areas. Contaminated water must be treated for appropriate reuse or to ensure that water meets minimum standards and guidelines prior to disposal or being released into the environment.
Department of Environmental Affairs	The national authority responsible for the review and/or approval of an Environmental Management Programme.
Department of Water and Sanitation	The national authority responsible for and with authority over the nation's water resources and their use, including the equitable allocation of water for beneficial use, the redistribution of water, and international water matters.

TERM	EXPLANATION
Environment	The surroundings in which humans exist and which comprise: • the land, water and atmosphere of the earth; • micro-organisms, plant and animal life; • any part or combination and interrelationships; and • the physical, chemical, aesthetic, historical, cultural and economic properties and conditions of the foregoing that can influence human health and wellbeing.
Environmental Aspect	A product's or production process's environmental impact or important issues in the environment that an organisation should take into consideration.
Environmental Audit	Systematic, documented, regular and objective evaluation to see how well an organisation or facility is operating in terms of the Environmental Management Programme and is complying with statutory requirements and the organisation's Environmental Policy.
Environmental Authorisation	The authorisation by a competent environmental authority for commencement of listed activities in terms of the National Environmental Management Act (Act 107 of 1998).
Environmental Control Officer	A person who is responsible for undertaking site inspections to audit and report on compliance with environmental specifications with the Environmental Management Programme.
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially that results from an organisation's activities.
Environmental Impact Assessment	The process of collecting, organising, analysing, interpreting and communicating information in accordance with the environmental legal requirements set out in GNR. No 543, GNR. 544, GNR. 545 and GNR 546, as published in Government Gazette No. 33411 of 2 August 2010, promulgated in terms of Chapter 5 of the National Environmental Management Act (Act 107 of 1998) for the purposes of obtaining an Environmental Authorisation in accordance with Chapter 5 of the National Environmental Management Act.
Environmental Management Inspector	A person designated as an environmental management inspector in terms of Section 31B or 31C of the National Environmental Management Act (Act 107 of 1998).
Environmental Management Programme	A tool used to prescribe management mechanisms or methods for the prevention of undue or reasonably avoidable adverse environmental impacts and for the enhancement of the positive environmental benefits of a development.
Environmental objectives	The overall environmental goal arising from the Environmental Policy that an organisation sets itself to achieve, and is quantified where practicable.
Fauna	All living biological creatures, usually capable of motion, including insects, and predominantly of protein-based consistency.
Fire danger index	A relative number denoting an evaluation of rate of spread or suppression difficulty of a fire in relation to specific combinations of fuel, fuel moisture and wind speed.
Fire hazard	The relative combination of fuel, oxygen and heat that could lead to the start and spread of a fire.
Fire Protection Association	An association registered in terms of the National Veld and Forest Fire Act (Act 101 of 1998) for the purposes of predicting, preventing, managing and extinguishing veld fires.
Flood line	The line or mark to which a flood could rise every 50 (1:50 year flood line) or 100 (1:100 year flood line) years.
Flora	All living plants, grasses, shrubs and trees typically incapable of easy natural motion and capable of photosynthesis.
Fresh water	
Groundwater	Water that fills the natural openings in below-surface rock or unconsolidated sands.
Hazardous waste	Waste that has the potential to cause harm, because of its chemical reactivity, toxic, explosive, corrosive, radioactive or other characteristics, causes danger or is likely to cause danger to health or the environment.
Heritage resources	Any place or object of cultural, archaeological or paleontological significance in terms of the National Heritage Resources Act (Act No 25 of 1999).

TERM	EXPLANATION
Induction training	The training provided to new / existing employees to (re)acquaint them with the company structure, their specific job requirements, practical or organisational issues and occupational health, safety and environmental considerations required on the project.
Integrated Environmental Management	Integration Environmental Management is defined as: • the promotion of the integration of the principles of environmental management, as set out in Section 2 of the National Environmental Management Act (Act 107 of 1998) in making decisions that may have a significant effect on the environment; • the identification, prediction and evaluation of the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts and maximising benefits; • ensuring that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them; • ensuring an adequate and appropriate opportunity for public participation in decisions that may affect the environment; • ensuring the consideration of environmental attributes in management and decision making, which may have a significant effect on the environment; and • identifying and employing the modes of environmental management best suited to ensure that a particular activity is pursued in accordance with the principles of environmental management as set out in Section 2 of the National Environmental Management Act (Act No 107 of 1998).
Interested and Affected Parties (I&AP)	Any person or group of people concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, customers and consumers, environmental interest groups, and the general public (after the Environmental Impact Assessment Regulations of September 1997 and Guideline Document: Environmental Impact Assessment Regulations of April 1998).
Land Use	The arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it. This definition establishes a direct link between the land cover and the actions of people in their environment.
Materials	All kinds of items (other than plant) intended to form or forming part of the Permanent Works, including the supply-only materials (if any) to be supplied by the Contractor under the Contract.
Mitigate	The implementation of practical measures to reduce any adverse impacts or to enhance the beneficial impacts of an action.
Non-compliance	Failure to comply with the requirements of the EMPr.
Non-conformance report	A report outlining a deviation from process, procedure or compliance specifications.
Open water	
Plant	The apparatus, machinery and vehicles used during the Permanent Works.
Pollution	Any change in the environment caused by substances or noise, malodours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, where that change has an adverse effect on human health or wellbeing or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.
Potentially hazardous substance	A substance that can have a deleterious effect on the environment. Hazardous chemical substances are defined in the Regulations for Hazardous Chemical Substances, published in terms of the Occupational Health and Safety Act (Act 85 of 1993).
Precautionary principle	The basic principle that, when in doubt or when there is insufficient or unreliable information, actions must be undertaken that have minimum risk.
Quality management system	A set of interrelated or interacting elements that organisations use to direct and control how the quality policies are implemented and quality objectives are achieved.

TERM	EXPLANATION
Rehabilitation	Rehabilitation of the N1 Road entails reinstating the road with major reworking of pavement layers and adding additional payment layers in the slow lane. Also refer to Construction above.
Resource recovery	Recycling of waste or the recovery of energy.
Road reserve	The road reserve is a corridor of land, defined by co-ordinates and proclamation within which the road, including access intersections or interchanges is situated. A road reserve may or may not be bounded by a fence.
Solid waste	All solid waste, including construction debris, chemical waste, excess cement / concrete, wrapping materials, timber, steel, drums, wire, nails, food and domestic waste (e.g. plastic bags and wrappers).
Site	The area in which construction is taking place.
Storm water	
Target	The detailed performance requirement, applicable to the organisation, or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.
Vegetation	Re-establishment or restoration to a healthy sustainable capacity or state.
Waste minimisation	The reduction of the volume of waste during construction by means of different processes or clean technology.
Waste prevention	The prevention and avoidance of the production of waste.
Wastewater	Water containing cement washings, oil, fuel or other contaminants.
Water resource	A watercourse, surface water, wetland, estuary or aquifer.
Wetland	Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which, in normal circumstances, supports or would support vegetation that is typically adapted to live in saturated soil (as defined in the National Water Act (Act 36 of 1998)).
Works	The Permanent Works and the Temporary Works, or either of them as appropriate.

List of Acronyms and Abbreviations

ACRONYM / ABBREVIATION	EXPLANATION
CARA	Conservation of Agricultural Resources Act (No. 43 of 1983)
CBA	Critical Biodiversity Area
CEMP	Construction Environmental Management Plan
CM	Construction Manager
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DoT	Department of Transport and Public Works
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EO	Environmental Officer
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
FPA	Fire Protection Association
GIS	Geographical Information System

ACRONYM / ABBREVIATION	EXPLANATION
GN R	Government Notice Regulation
HSA	Hazardous Substances Act (No 15 of 1973)
I&AP(s)	Interested and Affected Party (-ies)
KZN DEDTEA	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs
LM	Local Municipality
m	metre
MSDSs	Material Safety Data Sheets
NEMA	National Environmental Management Act (No 107 of 1998) as amended
NEM:BA	National Environmental Management: Biodiversity Act (No 10 of 2004)
NEM:WA	National Environmental Management: Waste Act (No 59 of 2008)
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Health Resources Act (No 25 of 1999)
NWA	National Water Act (No 36 of 1998)
PCO	Pest Control Officer
PEM	
PES	Project Environmental Specification
PM	Project Manager
PPE	Personal Protective Equipment
QMS	Quality Management System
SAHRA	South African Heritage Resources Agency
SANS	South African National Standards
SES	Standard Environmental Specification
SHE	Safety, Health and Environment
TCP	Transnet Capital Projects
TNPA	Transnet National Ports Authority
TPT	Transnet Port Terminals

1. Executive Summary

An Environmental Management Programme (EMPr) is an environmental management tool that is used to prescribe management methods to prevent or reasonably avoid adverse environmental impacts, and strengthen the positive environmental benefits of a development. It also places a Duty of Care on those who cause, have caused or may in future cause significant pollution or degradation of the environment. This requirement is according to Section 28 (1) of the National Environmental Management Act (Act No. 107 of 1998) (NEMA). This EMPr, as a standalone document, shall be used to guide and regulate environmental performance on the project through the construction stage of the project.

This EMPr sets conditions for the implementation of the environmental management component for all personnel involved with the project. As such, it outlines how the project will be managed through its construction lifecycle and is designed to mitigate negative environmental impacts. It also provides an institutional structure for the roles, responsibilities and reporting lines, impact identification and the mitigation of potential negative environmental impacts.

The Transnet Port Terminals in Richards Bay are a target for major demand growth in bulk products up to 2040. The demand forecast for a rail, road and harbour bound conveyor linked industry, is expected to grow from 23 million tonnes per annum (mpta) in 2012 to over 59 mtpa by year 2040; with the bulk of demand expected to be realised in the next 10 years. It is therefore evident that Transnet needs to expand the Port and recapitalise facilities in the Port of Richards Bay to cater for the increase in general freight demand.

This EIA is done in terms of Government Notice Regulation (GNR) No. 543, 544, 545 and 546 of 2010 published in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended (NEMA) and the No 921 of 2013 in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

AECOM SA (Pty) Ltd was appointed by Transnet SOC Limited (Transnet Capital Project) in November 2013 as the environmental consultant to undertake the processes for the proposed Richards Bay Port Expansion Programme. Peter Teurlings (was the EAP until end of June 2015) and now Nicola Liversage of AECOM is the independent Environmental Assessment Practitioner (EAP) in terms of the Environmental Impact Assessment (EIA) Regulations of 2010.

The competent environmental authority is the Department of Environmental Affairs (DEA) and the KwaZulu-Natal Department of Agriculture and Environmental Affairs (KZN -DAEA) is the commenting authority. The application for environmental authorisation was submitted to the DEA on 12 December 2013. The DEA reference number for the environmental authorisation (received on the 20 December 2013) is 14/12/16/3/3/3/103. The Final Scoping Report and Plan of Study for EIA accepted by the DEA on 9 July 2014.

The EIA process is currently in the EIA Phase and this report, the Draft EIA Report, documents the outcomes of the EIA Phase and the accompanying draft Environmental Management Programme (EMPr). The Draft EIA Report aims to address the potential impacts associated with the Option 3A of the proposed Richards Bay Port Expansion, and to provide an assessment of the project in terms of the biophysical, social and economic environmental factors.
This assessment aids both the environmental authority, in this case the competent authority is the Department of Environmental Affairs (DEA) and the KwaZulu-Natal Department of Agriculture and Environmental Affairs (KZN -DAEA) is the commenting authority.
Associated with the Draft EIA Report is a draft EMPr which will serve as a means to ensure that the issues highlighted in the Draft EIA Report that can be mitigated, are mitigated in a sustainable and effective manner. That is, the Draft EMPr acts as the constraints under which the construction, operation and potential eventual decommissioning phases of the project are controlled, monitored and assessed.

2. Introduction

2.1 Background to the EMPr

An Environmental Management Programme (EMPr) is an environmental management tool used to prescribe management mechanisms or methods for the prevention of undue or reasonably avoidable adverse environmental impacts and for the enhancement of the positive environmental benefits of a development. An EMPr is generally based on the findings emanating from the environmental impact assessment (EIA) process, which is conducted in terms of the EIA Regulations (Government Notice No R. 543, 544, 545, and 546 in the Government Gazette of 18 June 2010) of the National Environmental Management Act (Act No. 107 of 1998) (NEMA).

The EMPr is drafted in compliance with NEMA Sec 24N (Environmental Management Programme) requirements. An EMPr also describes the measures that need to be taken to ensure the Duty of Care is discharged by those who cause, have caused or may in future cause pollution or degradation of the environment, as per Section 28 (1) of NEMA. Section 28 (1) has been amended to include significant pollution or degradation that occurred before the commencement of NEMA, that arises or is likely to arise at a different time from the actual activity that caused the contamination or that arises through an act or activity of a person that results in a change to pre-existing contamination. Non-compliance to the Section 28 Duty of Care may lead to criminal prosecution and is a criminal offence.

The scope of this EMPr is to set conditions for the implementation of the environmental management component for all personnel involved with the project. As such, the EMPr outlines how the project will be managed through its operational and maintenance lifecycle and is designed to mitigate negative environmental impacts. The EMPr also provides an institutional structure for the roles, responsibilities and reporting lines, impact identification and the mitigation of potential negative environmental impacts. This EMPr would need to form part of the tender documentation to the Contractor(s) and becomes legally binding on the Contractor(s) and anyone acting on behalf of the Contractor(s) or the applicant during construction, operation and decommissioning activities

2.2 Project Description

Currently, the Port occupies 2,157 ha of land area and 1,495 ha of water area, but has the potential of expanding, making Richards Bay potentially one of the largest ports worldwide. Richards Bay serves the coalfields of KwaZulu-Natal (KZN) and Mpumalanga, together with timber and granite exporters from as far away as the Eastern and Northern Cape. Exports remain the primary activity of the port. The port has extensive rail and conveyor belt systems servicing the berths from nearby factories and plants. A dedicated railway line connects the port with Mpumalanga and Gauteng and was designed specifically to handle the majority of South Africa's coal exports. Other rail links connect Richards Bay with Durban in the south and Swaziland and Mpumalanga to the north.

In order to accommodate the foreseen increase in general freight demand, the expansion of the Port and recapitalise facilities in the Port of Richards Bay requires an extension of the existing railway lines with a rail balloon and a split off for Ferro-Manganese with a short train arrival yard and a long train arrival yard, just to name a few proposed activities. Additionally, the development of the railway is also associated with the construction of new railway sidings to the 600 series berths and 2 new Tipplers; the upgrading or realignment of existing roads within the Port and the construction of a new road-over-rail bridge with a reserve wider than 13,5m, at the eastern entrance to the Port. The increasing carrying capacity of railways and roads within the port area will improve transportation requirements for the proposed capacity expansion programme, plus grant access to specific areas within the proposed development area. Hence, an application of a permit or license in terms of national or provincial legislation governing the release of emissions or pollution will need to be submitted for authorisation due to the dust and air pollution generated by trucks, cars, trains and ships. Even though, the application of the permit or license for the release of emissions or pollution will also integrate any emissions during the establishment of construction camp site area, laydown areas, storage facilities, the relocation of stockpiling of bulk and coal from the eastern side of the Port behind the high 700 series berths to the western side of the Port next to the 600 series berths; during the expansion period of the magnetite facility

to the south and the construction of new bulk material handling equipment. But the application will be excluding where the facility, process or activity is included in the list of waste management activities.

A Waste Transfer Station inside the Port will be developed, which will serve as the “nerve centre” for managing general and hazardous waste in the Port. However, the disposal of the dredged material is foretold to be off-shore since there is a potential that hazardous waste is present in the material removed during dredging. Should the dredging material need to be deposited off-shore which will be approved by DEA, there are already several sites have been identified as potential landfill sites near the project area. On the other hand, should there be a potential that hazardous waste is not present in the material removed during dredging, the off-shore disposal authority reverts back to the DEA and an on-shore disposal is approved. Hence why further studies on the impacts affecting bottom-dwelling species in fresh water might be recommended by the DEA. In addition, the competent authority for the issuing of a Waste Management License for the disposal of general waste to land is the KZN DEDTEA. The handling plus storage of hazardous and general waste material generated at any one point in time would not exceed 500m³. The removal or decommissioning of existing infrastructure will be undertaken to accommodate for other infrastructure development for storage and handling of dangerous good of more than 80m³. Due to the magnitude associated functions and activities of the project, in relation to the construction of 32 conveyors totalling 13,084m and a new 142,030m² container handling terminal, the storage that will occur in the containers should not exceed a threshold capacity of more than 500 m². Where the grinding and crushing of material occurs in the operational area, this would not exceed 80,900m² at any given time. Besides, during the capacity expansion programme that, where practical, material will be procured from commercial sources in order to reduce long distance travelling and indirectly reducing emissions. The transportation of dangerous goods in solid form, outside an industrial complex, using funiculars or conveyors should not exceed a throughput capacity of more than 50 tons per day. Likewise, all relocation of the discard coal and bulk stockpile from the western side of the Port next to the 600 series berths to the eastern side of the Port behind the high 700 series berths would be undertaken within the premises and the amount of hazardous waste reused would be less than 900 kg per day.

The port expansion will also result in the demand for additional and expansion of buildings to facilitate various services, therefore, the extension of the existing Ferro Manganese slab by 260m to the east and the construction of a new Ferro Manganese slab of 780m in length to the south of the existing Ferro Manganese slab, will also require a water management license. As a result, any construction or earth moving activities in the sea, an estuary, or within the littoral active zone or a distance of 100 metres inland of the high-water mark of the sea or an estuary will trigger EIA regulations.

The expansion of the Port and recapitalised facilities in the Port of Richards Bay will also involve construction on virgin land, thus contributing to the increase of the development footprint in the area. Since the total land area to be developed and transformed is 2,877 ha (which far exceeds the 20ha limited in terms of the NEMA legislation), the large impacts on ecosystem degradation and habitat destruction, will be taken into consideration during the duration of the project and mitigation measures will be undertaken. Then again pockets of vacant or derelict land may be required for transformation that are smaller than 20ha, for the purpose of a construction camp and site office.

Any removal of significant volumes of minerals in the form of sand, clay, gravel, soil to facilitate the construction of infrastructure and or structures will require an application for a mining permit which will need to be submitted to the Mineral and Petroleum Titles Registration office. In addition, the extension of the Finger Jetty (800 series berths) with 2 new Capesize Coal shipping berths and any activities requiring significant dredging around the Finger Jetty will not exceed the threshold of 10m² in size.

The proposed Expansion Programme of the Port of Richards Bay can be summarised as follows:

- Extension of the existing railway lines with a rail balloon with split off for Ferro-Manganese, a short train arrival yard and a long train arrival yard;
- Construction of new railway siding to the 600 series berths;
- Construction of 2 new Tipplers (i.e. rail unloading equipment);
- Relocation of the break-bulk from the eastern side of the Port behind the high 700 series berths to the western side of the Port next to the 600 series berths;
- Relocation of the discard coal stockpile from the western side of the Port next to the 600 series berths to the eastern side of the Port behind the high 700 series berths;

- Expansion of the magnetite facility to the south and construction of new bulk material handling equipment;
- Extension of the existing Ferro Manganese slab by 260m to the east;
- Construction of a new Ferro Manganese slab of 780m in length to the south of the existing Ferro Manganese slab;
- Upgrading or realignment of existing roads within the Port;
- Construction of a new road-over-rail bridge at the eastern entrance to the Port;
- Construction of 32 conveyors totalling 13,084m;
- Construction of a new 142,030m² container handling terminal;
- Construction of 2 new Capesize Coal shipping berths at the 600 series berths, with associated dredging of a channel to a depth of 19m and 800m turning circle;
- Extension of the Finger Jetty (800 series berths) with 2 new Capesize Coal shipping berths, requiring significant dredging around the existing Finger Jetty;
- Construction of a new 610,000m³ storm water surge dam inside the rail balloon, water pump stations, and upgrading of drains throughout the Port;
- Development of a Waste Transfer Station inside the Port, which will serve as the 'nerve centre' for managing waste in the Port; and
- Disposal of the dredged material off-shore.

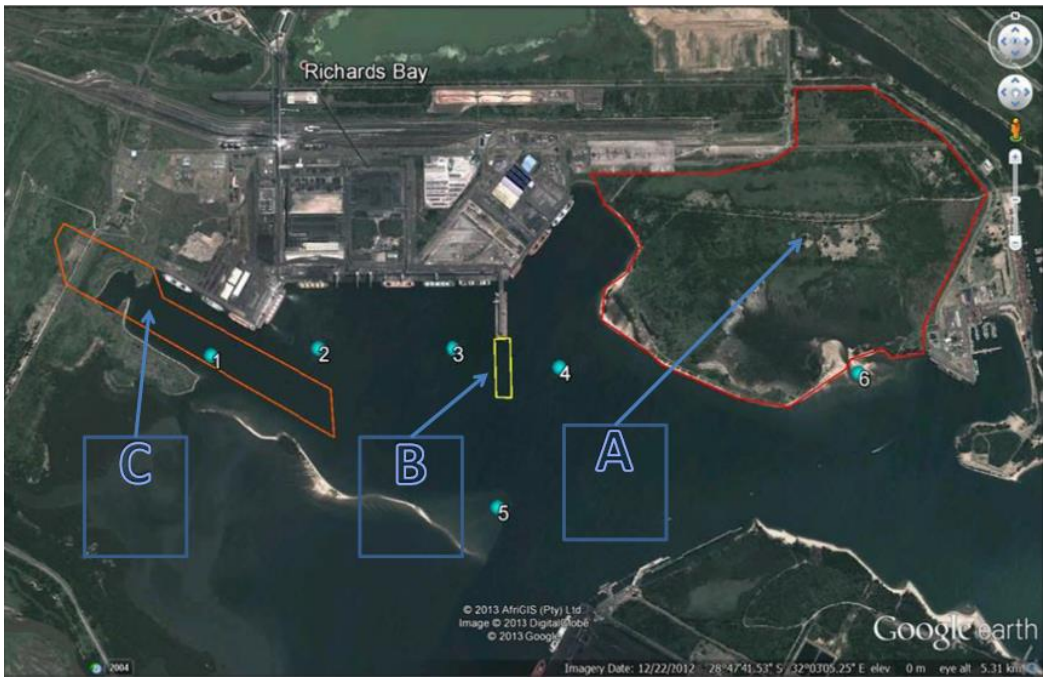

Figure 1: Project Locality A: Rail Balloon, B: Finger Jetty, C: Berth 600 Series Expansion

2.3 Legal Framework

The project must be implemented within the framework of the NEMA and other relevant environmentally related legislation, including the following national acts, provincial ordinances and/or guideline documents (Table 1).

Table 1: List of Applicable Legislation and Guidelines

Legislation	Sections	Relates to
The Constitution Act (No 108 of 1996)	Chapter 2	Bill of Rights
	Section 24	Environmental rights
	Section 25	Rights in property

Legislation	Sections	Relates to
	Section 32	Administrative justice
	Section 33	Access to information
National Environmental Management Act (No 107 of 1998) as amended[1]	Section 2	Defines the strategic environmental management goals, principles and objectives of the government. Applies through-out the Republic to the actions of all organs of state that may significantly affect the environment
	Section 24	Provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment.
	Section 28	Duty of care and remediation of environmental damage. The scheme owner has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care. The duty of care has been amended to include significant pollution or degradation that occurred before the commencement of NEMA that arises or is likely to arise at a different time from the actual activity that caused the contamination or that arises through an act or activity of a person that results in a change to pre-existing contamination.
	Section 30	Control of emergency incidents. Responsible person's duties relating to reporting and remediation actions regarding emergency incidents. A criminal sanction may be imposed on the responsible person for failure to comply with the reporting requirements and obligations to address any emergency incidents.
Environment Conservation Act (No 73 of 1989) and regulations	The Act has been substantially repealed by NEMA. However, there are certain regulations under the Act which are still in operation such as the National Noise Control Regulations.	
National Environmental Management: Waste Act (No 59 of 2008) (NEMWA)[2]	Section 16	General duty in respect of waste management
	Section 17	Reduction, re-use, recycling and recovery of waste
	Section 26	Prohibition of unauthorised disposal of waste.
	Section 27	Littering
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA)	Sections 65-69	These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species
	Sections 71 and 73	These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species.
National Environmental Management: Air Quality Act (No 39 of 2004)[3]	Section 32	Control of dust
	Section 34	Control of noise
	Section 35	Control of offensive odours
	Schedule 2	Ambient air quality standards
Fertilisers, Farm Feeds, Agricultural	Sections 3 to 10	Control of the use of registered pesticides, herbicides (weed killers) and fertilisers. Special precautions must be taken to prevent workers from being exposed to chemical substances in this regard. Workers handling

[1] The NEMA 2010 EIA regulations R543, R544, R545, R546 may be relevant for certain construction and maintenance such as that may need to take place in or close to water resources.

[2] The Listed Activities in terms of the Waste Act should be included as R718 of GG32368 of 3 July 2009, as depending on throughput the effluent treatment plants may require waste licenses.

[3] The National Ambient Air Quality Standards have been published and replace the SANS codes, R1210, GG 32816 of 24 December 2009.

Legislation	Sections	Relates to
Remedies and Stock Remedies Act (No 36 of 1947) and regulations		these remedies must also be registered in terms of the Act.
Conservation of Agricultural Resources Act (No 43 of 1983) and regulations	Section 5, 6	Implementation of control measures for alien and invasive plant species.
National Heritage Resources Act (No 25 of 1999)	Section 35	No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site.
	Section 36	No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA), or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. "Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place.
	Section 38	This section provides for Heritage Impact Assessments (HIAs), which are not covered under the NEMA. The HIA will be approved by the authorising body of the provincial directorate of environmental affairs, which is required to take the provincial heritage resources authorities' comments into account prior to making a decision on the HIA.
Occupational Health and Safety Act (No 85 of 1993) and regulations	General Administration Regulations GN R1449 (Section 7)	Material Safety Data Sheets must be made available at the request of any interested or affected person.
	Section 8	General duties of employers to their employees.
	Section 9	General duties of employers and self-employed persons to persons other than their employees.
National Water Act (No 36 of 1998) and regulations	Section 19	Prevention and remedying the effects of pollution of a water body.
	Section 20	Control of emergency incidents
	Chapter 4	Use of water and licensing.
Hazardous Substances Act (No 15 of 1973) and regulations	Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.	
Minimum requirements for storage, handling and disposal of Hazardous Waste, DWAF guidelines, 1998	Section 10	Temporary hazardous waste storage: time, volume and other requirements.
National Road Traffic Act (No 93 of 1996) and regulations	Section 54	Transportation of dangerous goods.
Fencing Act (No 31 of 1963)	Section 17	Any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5 metres on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions

Legislation	Sections	Relates to
		relevant to the protection of flora.
National Veld and Forest Fires Act 101 of 1998	Chapter 2	Promotes and regulates the formation of fire protection associations which aim to manage and coordinate fire protection and fire services in an area.
	Chapter 4, 5	Organizations are required to make and maintain firebreaks and fire-fighting equipment and personnel should a risk exist that a fire may start or spread from the premises.
DEA Integrated Environmental Management	DEA Integrated Environmental Management Information Series: Environmental Management Plans: DEA Guideline on compiling EMPs.	
SANS 1929	Ambient air quality – limits for common pollutants[4]	
SANS 10103	The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.	
SANS 10128	Bunding of fuel storage tanks.	

2.3.1 Applicable By-Laws

The Local Municipality by-laws that may be applicable to the proposed development are listed in Table 2: Applicable Municipal By-laws

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Table 2: Applicable Municipal By-laws

LOCAL MUNICIPAL BY-LAWS	RELATES TO
uMhlatuze Local Municipality By-Laws	Noise Control By-law, 2010
	Municipal Health By-law, 2010
	Waste Management By-law, 2010
	Fire Safety By-law, 2007
	Roads, Traffic and Safety By-law, 2007
	Water and Sanitation By-law, 2010
	Stormwater Management By-law (Draft)

2.3.2 Guideline Documents

The following guideline documents have been considered during the EIA process:

- Companion to the National Environmental Management Act Environmental Impact Assessment Regulations of 2010, Integrated Environmental Management Guideline Series 5, 2010, Department of Environmental Affairs, Pretoria.
- Public Participation in the EIA Process, Integrated Environmental Management Guideline Series 7, 2010, Department of Environmental Affairs, Pretoria.
- Guideline 5: Assessment of Alternatives and Impacts in support of the Environmental Impact Assessment Regulations, Integrated Environmental Management Guideline Series, 2006, Department of Environmental Affairs, Pretoria.
- South African National Standard – The Application of the National Building Regulations, Part X: Environmental Sustainability, Part XA: Energy Usage in Buildings, SABS Standards Division, 2011. (SANS 10400-XA: 2011).
- DAERD, (2011) Environmental Management Framework for the Richards Bay Port Expansion Area and Industrial Development Zone. Department of Agriculture, Environmental Affairs and Rural Development (DAERD), Pietermaritzburg, South Africa.

[4] Replaced by R1210

- Environmental and Community Interface Report (Document 4653710-RPT-0016 (Rev 1)). Report prepared by Aurecon Pty Ltd on behalf of Transnet, 2012).
- Standards South Africa (2005). Ambient air quality – List of common pollutants. South African National Standard 1929:2005.
- City of uMhlathuze, IDP – Draft Process Plan, 2014-2015.
- Draft Environmental Management Framework (EMF) report for Richards Bay Port Expansion Area and Industrial Development Zone, 2009.

2.3.3 Other Authorisation, Permits and/or Licences Required Prior to Project Commencement

Table 3 provides information on additional activities which may require authorisations / permits / licences from relevant government departments. The Contractor is to ensure that prior to the commencement of works, these authorisations / permits / licences have been obtained.

Table 3: Activities that could require an Authorisation / Permit / Licence

ACTIVITY	TYPE OF AUTHORISATION / PERMIT / LICENSE REQUIRED	REQUIRING INSTITUTION
Use of Treated Wastewater (Dust Suppression)	Approval	DOH
Veld and Forest Fire	Requirement for a fire management plan	DAFF
Archaeological and Paleontological Sites and Meteorites	Permit	SAHRA
Destroy, Damage, Deface, Alter, Remove from its original position, Subdivide or Change the planning status of a National Heritage Site	Permit	SAHRA
Commencement of Construction Activities	Notify two weeks before commencement	DEA/ KZN DAEA
Water Use and Management	Permit	DEA/ DWS
Waste Management	Permit	DEA/ KZN DAEA
Mining Rights	Permit	DMR Titles Registration Office/ KZN DAEA/ DEA
Outdoor Advertising of Activities	South African Manual for Outdoor Advertising Control	DEA/ KZN DAEA/ LM
Site Establishment Sewage Disposal	Approval	LM/ KZN DAEA
Site Establishment Storm Water & Pollution Control	Separate report	LM/ KZN DAEA
Fuel Storage	Permit	DEA/ KZN DAEA /LM
Hazardous Material Storage and Transportation	Approval	DEA/ KZN DAEA / DOT
Other Hazardous Substances	Permit	DEA/ KZN DAEA
Project Commencement	Notify	Transnet SOC/KZN DAEA/ DEA
Land Use outside site	Special consent approval	LM/ KZN DAEA
Detail Design (Water, Wastewater, Site Design)	Approval	LM/ KZN DAEA

2.4 Objectives of the EMPr

The main objective of the EMPr is to ensure the implementation of environmental practices that are aimed at the best form of environmental protection. The aim is to ensure that the Employer takes the reasonable measures to protect the environment and to remedy impacts to the environment as required by the Duty of Care introduced by NEMA Section 28. The EMPr draws the Employer's attention to the monitoring, auditing and corrective actions needed during implementation of the project. Therefore, the other objectives[5] of the EMPr are to:

- Avoid, minimise or correct the disturbance of ecosystems and loss of biodiversity.
- Avoid, minimise or correct pollution and degradation of the environment.
- Avoid or minimise waste, to reuse or recycle waste where possible and to dispose of waste in a responsible manner.
- Apply a risk-averse and cautious approach.
- Anticipate and prevent negative impacts on the environment and on people's environmental rights. Where impacts cannot be prevented, such impacts must be minimised and mitigated.

2.5 Scope of the EMPr

The EMPr outlines the impacts and mitigation measures for the construction of the project. The roles, responsibilities and reporting procedures have been identified in the EMPr. The EMPr also contains a series of environmental specifications designed to avoid, minimise and ultimately manage the potential environmental impacts during construction and ancillary activities. This EMPr is for the construction phase of the project only. The Employer shall be required to compile an EMPr for the operation, maintenance, rehabilitation, decommissioning and closure phases of the project, as and where required.

2.6 The Continuous Improvement Approach

The Environmental Management Review (EMR) provides a mechanism where this EMPr is able to correspond with the ISO 14001 Environmental Management System (EMS) requirements. The EMR correlates similar requirements between the two to ensure integration. The EMR will provide a comparative review on how effectively the EMPr is being implemented on site, in terms of EMS requirements. The approach adopted for this EMPr is derived from the Deming Cycle, a cycle of continuous improvement entailing the reiterative actions of plan, do, check and act.

2.6.1 Plan

Achieving the targets depends on compliance with this EMPr and the legislative requirements that underpin it.

2.6.2 Do

Throughout construction, the Contractor will be required to develop and maintain a quality management system designed to ensure that best management practices are implemented during day-to-day construction of the power line. Such a quality management system should include at least the following information:

- Construction procedures.
- Location and extent of associated infrastructure.
- Associated activities, such as the transportation of people and equipment.
- Resources and experience required (staffing).
- Materials and equipment to be used.
- Management actions.
- Human resources used.
- Construction monitoring activities.
- Emergency/disaster incident and reaction procedures.
- Rehabilitation procedures and continued maintenance of the impacted environment.

[5] As defined by the National Environmental Management Act (No. 107 of 1998).

Including these information topics in the Contractor's procedures and/or guideline documents will ensure that aspect-specific environmental management (based on this EMPr) forms an integral part of the projects management. It is therefore important for the Contractor to integrate the environmental management requirements into the construction activities by way of set procedures that are set out in its QMS.

The incorporation of the how and what will ensure the Contractor understands what is required of it and that it allows systems to be put in place to ensure that the execution thereof is monitored. The Contractor should also develop a programme for monitoring aspect-specific indicators in terms of the targets provided in the EMPr.

2.6.3 Check

A system of assessing monitoring results has been developed to check on the Contractor's environmental management performance. Continuous assessment facilitates proactive management of environmental issues. Mitigation measures can then be successfully implemented on an on-going basis to keep environmental indicators within their target thresholds. Moreover, the assessment system also enables the assessment of the efficacy of the EMPr. Regular auditing of environmental performance is prescribed to prove and preserve accountability in a legislative context.

2.6.4 Act

The assessments and monitoring of the results and findings of the regular audits must be documented within a reporting system. Precautionary mitigation measures and corrective actions will be prescribed and instructions will be given in order to carry these out in the field. The findings of monitoring and auditing programmes can also be used to update the EMPr. Although the EMPr is a project-specific document, it is dynamic and should be updated regularly to address the changing circumstances of the project.

2.7 Institutional and Functional Arrangements

The institutional and functional arrangements indicate the role players and institutional linkages involved in the project. The organisational structure identifies and defines the responsibilities and authority of the various entities involved in the project. All instructions and official communications regarding environmental matters will follow the organisational structure below.

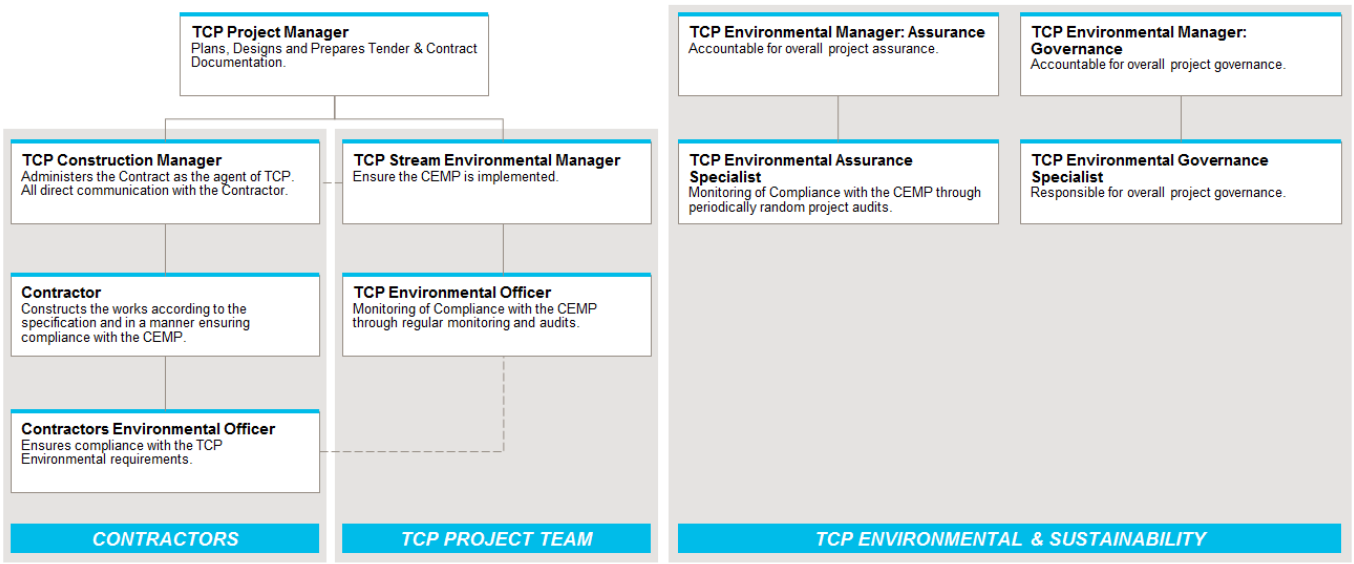

Figure 2: Project Organisational Structure

3. Roles and Responsibilities

3.1 Key personnel

3.1.1 TCP Project Environmental Manager (PEM)

The TCP PEM will be responsible for ensuring that the EMPr and EA are complied with during construction. The TCP PEM will report functionally to the TCP Environmental Manager: Governance and Compliance and relevant Project Manager. The specific tasks during the construction stage will include:

- Liaison with the authorities in consultation with the TCP Environmental Manager Governance and Compliance.
- Preparation of the PES.
- Tender evaluation, development of environmental criteria and adjudication thereof.
- Review all reports from the Environmental Specialist/Officer, including sign off on Method Statements.
- Conduct any environmental incident enquiries.
- Identify, with support from the TCP Construction Manager, the need for corrective or remedial measures with regard to proposed works.
- Ensure induction material includes project appropriate environmental issues.
- Approve training programmes and other awareness initiatives.
- Coordinate or facilitate internal environmental audits.
- Prepare environmental monitoring protocols (if monitoring to be done by Environmental Specialist and not an outside consultant).

The TCP PEM may delegate part or all of these responsibilities to the TCP Environmental Officer (EO), based on the merits of the particular project at hand.

3.1.2 TCP Construction Manager

The TCP Construction Manager has overall responsibility for environmental management on site which includes the implementation of the EMPr, CEMP, SES, PES, permits and licenses and reports to the Project Manager. The TCP Construction Manager is supported by the TCP PEM. The specific environmental tasks during the construction phase will include:

- Reviewing the monthly reports compiled by the TCP EO.
- Communicating directly with the Contractors.
- Issuing non-conformance notification to Contractors that do not comply with the requirements of the EMPr and associated requirements or documents, including EA, EMP, permits and licenses.

3.1.3 TCP Environmental Specialist: Assurance

The role of the TCP Environmental Specialist: Assurance is essentially the same as that of an Environmental Control Officer (ECO) but with some additional responsibilities. In instances where the EA requires an independent ECO, an outside consultant will be contracted to undertake the environmental audits of the project. The TCP Environmental Specialist functionally reports to the TCP Environmental Manager: Assurance, and provides mainly quality assurance with respect to the implementation of the overall environmental governance framework during construction. The TCP Environmental Specialist will conduct audits on projects periodically. The scope of these audits will include conformance to the TCP Environmental Governance Framework as well as legal compliance.

3.1.4 TCP Environmental Officer

The TCP EO reports functionally to the TCP Construction Manager and TCP PEM and is responsible for conducting the tasks required to ensure that the EMPr including permits and licenses are implemented on the construction site.

The TCP EO will conduct the following tasks:

- Ensure that environmental issues receive adequate attention in the site induction training.
- Prepare and conduct awareness training (e.g. posters, tool box talks, and signage).
- Conduct monthly observation & inspections and audit of all work places.
- Monitor the Contractor's compliance with the EA, EMPr, and any permits and licences on site.
- Conduct monthly observations and environmental audits of all Contractors and work areas.
- Ensure that all environmental monitoring programmes (sampling, measuring, recording etc when specified) are carried out according to protocols and schedules.
- Measurement of completed work (e.g. areas topsoiled, re-vegetated, stabilised etc.).
- Maintain site documentation related to environmental management (permits, EMPr, method statements, EA, reports, audits, monitoring results, receipts for waste removal etc.). Documentation to be maintained on the relevant site Document Control System.
- Attendance at scheduled SHE meetings and project coordination meetings.
- Inspect and report on environmental incidents and check corrective action.
- Keep a regular photographic record of all environmental incidents.
- Implementation of environmental-related actions arising out of the minutes from scheduled meetings.
- Management of complaints register.
- Review and Sign off Method Statements prepared by the Contractor(s).
- Audit Environmental Method Statements.
- Collate information received, including monitoring results into a monthly report to the Construction Manager showing progress against targets.
- The compilation of the Project Environmental Management File.

The key deliverables will include the compilation of:

- Project Start-Up Checklist.
- Monthly inspection/environmental audit report.
- Monitoring results.
- Site close-out reports.
- Incident reports.
- Environmental Incident Register.
- Environmental Non-Conformance Register.
- Complaints Register.
- Method Statements Register.
- Hazardous Substances Register.
- Site Close Out Inspection.

3.1.5 Contractor's Environmental Officer

The Contractor will appoint an Environmental Officer (EO) whose role is to ensure implementation of the EMPr, CEMP, SES, PESand EA, where applicable. The Contractor will submit the name and CV of the EO as well as an Environmental Management Plan (EMP) detailing roles and responsibilities with their tender submission. This will be for TCP's approval and no work can commence on site if this has not been done.

The Contractor's EMP will include, but not be limited to:

- Description of environmental management responsibilities of the Contractor's Project Manager, Contractor's Site Manager and the Contractor's EO.
- Organisational Environmental Policy.
- Environmental Method Statements.
- This EMPr.

The Contractor's EO will liaise with the TCP EO on site. It will be the responsibility of the Contractor's EO to ensure that all work is conducted according to approved Environmental Method Statements and that the roles and responsibilities as set out in this document are fulfilled. The Contractor's EO tasks will include:

- Daily, weekly and monthly inspections of the work area(s) as per schedule or authorise through written instruction by TCP PEM or EO. The Contractor is referred to Annexure A for an example of the items that will need to be inspected and which items will be audited by the TCP EO.
- Prepare activity/aspect based Environmental Method Statements.
- Identify local, provincial and national environmental legislation that applies to the Contractor's activities.
- Monitor compliance with the EMPr, CEMP, SES, PES and Environmental Method Statements.
- Ongoing Environmental Awareness Training of the Contractor's site personnel.
- Reporting, investigating and recording of any environmental incidents caused by the Contractor or due to the Contractor's activities, including their sub-contractors.
- Close out of environmental incidents.
- Attendance at all SHE meetings and induction programmes, and toolbox talks where possible.
- Waste Management.
- Ensure that environmental signage and barriers are correctly placed.
- Taking required corrective action within specified time frame.

The Contractor's EO will be expected to submit daily, weekly and monthly checklists to the TCP EO.

Should the Contractor's EO change from that person identified during either tender stage, or construction period, the Contractor will submit a CV of a replacement EO for approval by the TCP EO and TCP Construction Manager. No work can proceed until the replacement EO has been approved.

All instructions that relate to the EMPr will still be given to the Contractor via the TCP Project Manager. In an emergency situation, however, the TCP EO may give an instruction directly to the Contractor. Environmental management of the site will be an item on the agenda of the monthly site meetings, and the TCP EO will attend these meetings. If at any time the TCP Project Manager is uncertain in any way with respect to an environmentally related issue or any specification in the EMPr, he will consult with the TCP PEM.

The Contractor will comply with the requirements of the EMPr and abide by the TCP Construction Manager's instructions regarding the implementation of the EMPr. The Declaration of Understanding must be signed, and a signed copy must be submitted to the TCP Construction Manager prior to the start of construction.

4. EMPr Implementation

4.1 Availability of the EMPr

Copies of the EMPr will be available at the site offices of the Contractor and on-site.

4.2 Environmental Management Plan

The Contractor is required to submit an Environmental Management Plan (EMP) with his Tender Documents. The EMP should describe the relevant roles and responsibilities and how potential environmental risks will be assessed and managed including the monitoring and recording thereof. These will be used to establish a Contractor's competency and experience of preventing and managing potential environmental impacts.

4.3 Environmental Method Statements

Environmental Method Statements are written submissions by the Contractor to the TCP Construction Manager and/or EO describing:

- The proposed activity, setting out the plant, equipment, materials, labour and method the Contractor proposes using to carry out an activity.
- Transportation of the equipment to and from site.
- How the equipment/ material will be moved while on site.
- How and where material will be stored.
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur.
- Timing and location of activities.
- Description of potential positive and negative environmental impacts and how they will be managed.
- Compliance/ non-compliance with the Standard Environmental Specification and any other statutory and best practice standards.
- Monitoring and reporting requirements.
- Any other information deemed necessary by the TCP Construction Manager.

The Contractor will compile Activity/Aspect-based Environmental Method Statements for all activities proposed. The Environmental Method Statements will enable the potential positive and negative environmental impacts associated with the proposed construction activity to be identified and mitigation measures put in place. All method statements must be signed by the Contractor, thereby indicating that the works will be carried out according to the methodology described therein.

Activities may only commence once the Environmental Method Statements have been approved by the TCP EO and TCP Construction Manager. In some instances local authorities may also need to approve the method statements. This will be highlighted in the Project Environmental Specification (PES), when applicable.

All changes to the original Environmental Method Statements must be approved by the TCP EO and TCP Construction Manager prior to implementation. The Contractor will also be required to re-sign the amended Environmental Method Statement.

To enable timely approvals, the Environmental Method Statements will be submitted to the TCP Construction Manager and TCP EO for review two weeks prior to the intended date of commencement of the activity, or as directed by the TCP Construction Manager.

Where changes to the work methodology are proposed, Environmental Method Statements must be amended accordingly and signed off by all relevant parties as indicated above. This Environmental Method Statements must contain sufficient information

and detail to enable the TCP Construction Manager and the TCP EO to apply their minds to the potential impacts of the works on the environment. The Contractor will also need to thoroughly understand what is required of him/her in order to undertake the works.

The initial Environmental Method Statements required for submission and approval are listed in the environmental specifications. Others may be requested by the TCP Construction Manager and TCP EO during the Contract.

An explanatory example of an environmental method statement on the pro forma method statement sheet to be completed has been included as Annexure B.

4.4 Environmental Incidents and Non-Conformances

In the event of an environmental incident, the Contractor will follow the ensuing procedure:

- Step 1: Immediately take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons.
- Step 2: Notify the TCP EO in writing including the following information: the nature of the incident and initial classification; substances involved with quantities; initial measures taken to minimise impacts; causes of the incident; measures taken and proposed to avoid the reoccurrence of the incident.
- Step 3: Include the incident on the TCP Environmental Incident Register (ENV-FAT-0015).
- Step 4: Undertake clean-up procedures.
- Step 5: Remedy the effects of the incident.
- Step 6: Assess the immediate and long-term effects of the incident on the environment and on public health.

In the event of any Level 1 or 2 environmental incidents, the Contractor's EO must complete a TCP Environmental Incident Report (ENV-FAT-0016).

In the event of any Level 1 or 2 environmental incidents, the TCP EO will:

- Ensure that an Incident Flash Report (FAC-FAT-0005) has been compiled and that it contains the necessary information.
- Ensure that the Contractor has complied with Sections 6.1 and 6.2 of TCP Occurrence Reporting and Investigation Procedure (HAS-P-0002).
- Report, record, investigate and analyse the incident as specified in Sections 6.3 to 6.5 of HAS-P-0002 and communicate the required action plans to be implemented to the TCP Construction Manager as specified in Section 6.6 of the afore-mentioned procedure.

An environmental incident is classified under four levels: 1, 2, 3 and 4. They are defined as follows:

4.4.1 Level 1 Environmental Incident

An incident or sequel of incidents, whether immediate or delayed, that results or has the potential to result in:

- A significant impact on the physical or biological environment (air, ground, water and habitat) with extensive or long term impairment of ecosystem function or surface and ground water resources.
- An inconvenience/ disturbance/disruption/annoyance (including odour, dust, noise, traffic problem, loss of water supply) of a long duration or with a long term impact on interested and affected parties. A release of material (gas, liquid, solid) or energy that will cause chronic illness, permanent lost time injury, fatality or extensive property damage experienced by interested and affected parties.
- Irreparable damage to highly valued structures and sacred locations.
- Public or national / international media outcry.
- Instances where inspections undertaken by or for the regulator to check legal compliance, were found to be outside the permitted limits and have resulted in prosecution.

- Any incident with NEMA section 30(1) – and/or NWA section 20(1) reporting requirements (In the even where all administrative requirements have been complied with and the incident has been closed out by the authorities, it may be re-classified as a Level 2 environmental incident).

Where the environmental impact of a Level 2 environmental incident is still present 120 days after occurrence, the incident will be reclassified as a Level 1 incident.

NOTE: *A Level 1 environmental incident usually should be reported to the authorities, usually result in a significant pollution and may entail risk of public danger. Level 1 environmental incidents usually cause an irreversible impact even with the involvement of long-term external intervention i.e. expertise, best available technology, remedial actions, excessive financial cost etc.*

4.4.2 Level 2 Environmental incident

An incident or sequel of incidents, whether immediate or delayed, that results or has the potential to result in:

- A moderate impact on the physical or biological environment (air, ground, water or habitat) with limited impairment of ecosystem function and/or surface and ground water resources.
- An inconvenience disturbance/ disruption/annoyance (including odour, dust, noise, traffic problems, loss of water supply) of moderate or with medium effect on interested and affected parties.
- A release of material (gas, liquid, solid) or energy that causes severe but reversible illness, non-lost time injury or moderate property damage experienced by interested and affected parties.
- Damage to rare structures of cultural significance or significant infringement of cultural values / sacred locations.
- Attention from local media or widespread complaints.
- Instances where inspections undertaken by or for the regulator to check legal compliance have been outside the permitted limits and an official pre-directive or directive was issued.
- Inability of the Contractors to close out corrective actions in an NCR without proper reason.

Where the environmental impact of a Level 3 environmental incident is still present 3 days after occurrence, the incident will be reclassified as a Level 2 incident.

NOTE: *A Level 2 environmental incident may be reported to the authorities, can result in significant pollution, or my entail risk of public danger. The impact of Level 2 environmental incidents should be reversible within a short to medium term with or without intervention.*

4.4.3 Level 3 Environmental incident

An incident or sequel of incidents, whether immediate or delayed, that results or has the potential to result in:

- A minor impact on the physical or biological environment (air, ground, water or habitat), with no significant or long-term impairment to the ecosystem function or surface/ground water resources.
- An inconvenience / disturbance / disruption / annoyance (including odour, dust, noise, traffic problems, loss of water supply) of short duration and with no long-term effect on the employees and the community.
- A release of material (gas, liquid, solid) or energy that has the potential to cause illness, or that causes short term discomfort or reversible health effect to interested and affected parties.
- Isolated complaints by interested and affected parties.
- Instances where inspections undertaken taken by or for the regulator to check for legal compliance, have been outside the permitted limits and a non-compliance notice was issued.
- Blatant negligence of the EMPr leading to the issuing of an NCR.

NOTE: *A Level 3 environmental incident is not reportable to authorities, should not result in pollution and may not have a risk of public danger. The impact of Level 3 environmental incidents should be insignificant immediately after occurrence and/or once-off intervention on the day of occurrence.*

4.4.4 Level 4 Environmental incident

A minor incident with lesser significance that did not necessarily result in damage or injury but that had the potential to cause damage to the environment, including:

- Could result in service disruption with a lesser significance.
- Did not necessarily result in damage.
- Had the potential, under different circumstances, to cause major damage to the environment.

or:

- Instances where inspections undertaken internally by TCP to check for conformance with the TCP Environmental Governance Framework have been outside the required limits (e.g. an environmental compliance score of less than 80%).

4.4.5 Non-Conformances

A non-conformance may be issued to the Contractor by the TCP Construction Manager and TCP EO where:

- The incident response procedure described above (including administrative requirements) were not successfully implemented; or
- There are repeated incidents because of inadequate environmental practices on site;
- Documentation required to comply with the EMPr is not prepared or maintained adequately on site; or
- Any non-compliance with the requirements of the EA and EMPr are identified.

4.5 Documentation and Records

The TCP EO will ensure that the Contractor's EO is supplied with all required/applicable documents listed in the TCP Contents for Contractors Environmental Files (ENV-LIS-0001). This Document has been included as Annexure A.

The Contractor's EO will complete and maintain copies of all documents and records listed in Annexure A and ensure that these documents and records are kept up to date.

The Contractor's EO will submit these documents to the TCP EO on a monthly basis except where documents have remained unchanged in which case written notification to this effect must be provided to the TCP EO.

Once the TCP EO has conducted a site closure inspection and notified the Contractor that site closure will be granted, all documents described above must be handed over to the TCP EO after which a Site Closure Certificate (ENV-FAT-0021) will be issued.

NOTE: *All documents/records are to be retained for a period of 10 years. In the event of environmental documentation/record being lost before receiving a Site Closure Certificate, the Contractor will be penalised according to the specifications laid down in the relevant project-specific NEC contract.*

5. Main Actions required by the Contractor to comply

5.1 Prior to commencement

The TCP Project Manager must ensure that the requirements below are requested of the Contractor in the Project Construction Contract Document, the Letter of Appointment and any other relevant correspondence with the Contractor prior to the start of works, as relevant.

5.1.1 Declaration of Understanding (DoU)

The Declaration of Understanding in the Contractor's Guideline Document will be signed and provided by the Contractor as part of his Tender Document. The signed DoU is a written confirmation by the Contractor that the requirements of the EMPr are understood and will be complied with for the duration of their works on site.

The pro forma DoU to be signed by the Contractor has been included as Annexure C.

5.1.2 Appointment of Contractor's EO

The Contractor will appoint an EO or assign to a competent person roles and responsibilities for environmental management during construction. The Contractor will forward details of the appointment to the TCP Construction Manager and TCP PEM for their review and approval. Should the Contractor's EO or the person originally assigned with responsibilities for environmental management change from that person identified during either the Tender stage, or the construction period, the Contractor will submit the details of such appointment or assignment for the TCP Project Manager's approval. No work will proceed until the new EO is assigned or appointed.

The pro forma appointment letter for the EO to be appointed by the Contractor has been included as Annexure D.

5.1.3 Environmental Management Plans and Method Statements

Where relevant, an EMP and Environmental Method Statements, to meet the requirements of the EMPr, will be provided by the Contractor as part of their Tender. Required method statements will be specified in the Quality Criteria of the tender. These include, but are not limited to, the following where applicable:

Table 4: Method Statements

Method Statement	Key information required	Target
Site Establishment and Layout	– Site establishment methodology – Site layout drawing – Gates and fencing – Aesthetics and housekeeping – Laydown areas – Workshops – Wash bay	No damage to existing gates and fences. All gates equipped with locks to prevent unauthorised access. No complaints about open gates. No complaints from landowners No damage to private property No unplanned disturbance to construction related activities.
Cement Mixing / Concrete Batching / Bentonite Mixing / Soilcrete mixing	– Mixing and batching methodology – Plant drawings – Monitoring of stockpiles, materials, water etc.	All cementitious mixing to occur within demarcated localities. No indiscriminate spoiling of cementitious products in non-designated areas. No impacts upon receiving water resources.
Water Management	– Grey water management – Sewerage water management – Industrial waste water management – Storm water/runoff management – Water monitoring	All waste water must be monitored and comply with regulatory requirements. Storm water must be managed to ensure no environmental degradation occurs.

Method Statement	Key information required	Target
Dust Management	– Dust generating activities – Weather influences – Dust management strategies – Dust monitoring	No complaints from I&APs. Dust emissions must be monitored and comply with regulatory requirements.
Environmental Monitoring	– Monitoring of dust, noise, water etc.	Compliance with regulatory requirements: • Dust: NEM AQA Air Quality Regulations; • Noise: NEM: AQA Air Quality Regulations; and • Water: NWA Water Quality Guidelines. Ensure no incidents or accidents occur which negatively impact upon the surrounding environment.
Erosion control	– Erosion controls to be implemented across the site – Corrective actions for occurrence of erosion	Slopes > 1:1 must have additional anti-erosion mechanisms. No evidence of erosion. No evidence of disturbance outside of project area.
Fire	– Fire breaks – Fire extinguishers – Hot works – Policy on open fires	Zero (0) fires.
Fuel storage and Refuelling	– Bulk fuel storage – Bulk fuel storage schematics – Bowsers (refuelling and storage) – Jerry Can (refuelling and storage)	All refuelling to occur within designated areas. All hydrocarbons to be contained within approved bunded facilities. Identified staff to undergo suitable spill clean-up training.
Heritage	– Archaeological finds – Heritage resources	No damage to heritage structures, unless proof of consultation with a heritage specialist and approval from the SAHRA is in place. Records of chance finds must be kept. Where chance finds are unearthed, proof of work being stopped immediately and proof of consultation with a heritage specialist and the SAHRA must be kept on site.
Noise	– Limits to be adhered to – Monitoring information	Noise levels shall be monitored to ensure they comply with regulatory requirements. Noise generating activities shall not increase by more than 7dB above ambient noise levels. No complaints relating to noise from the I&APs.
Rehabilitation	– . Areas identified for rehabilitation	Reinstatement of areas affected through construction related activities. The final placement of layers of soil on disturbed areas must match the pre-construction profile or as prescribed on construction drawings.

Method Statement	Key information required	Target
Solid and Liquid Waste Management	– Implement measures to reduce, monitor and manage waste generation, whilst maximising recycling efficiency. – The method statement must reflect the principles of integrated waste management as contained within the NEM: WA. – Hazardous and general waste management measures – Recyclable waste management	Ensure all waste products are disposed of at a registered waste landfill site designed to cater for said waste product. Proof of waste generated, reused, recycled and disposed of, including disposal certificates, must be kept on site. Contain all waste within approved designated areas and stored in marked containers. Containers of hazardous waste and waste oils must be stored in a bunded, covered area. No evidence of contamination by waste. Bins provided at regular intervals. No evidence of litter.
Earthworks	– Manage the removal and stockpiling of subsoil during the contract for use during rehabilitation.	Soil horizons (stockpile separately). Stockpiles should not be higher than 2 m. Stockpiles will be kept free of alien invasive species. No stockpiles shall be located outside of areas indicated in the construction diagrams.
Traffic	– Minimise the impacts and extent of construction related traffic on the surrounding road network and environment, whilst maximising road user safety.	No accidents or incidents. No complaints from the public. Proof of notification of landowner for closure of access roads. Alternative access roads always provided at partial road closures and other traffic disruptions. Compliance with regulatory requirements.
Training	– Foster construction related skills transfer, environmental awareness, health and safety awareness, and materials and equipment skills.	Proof of training provided, including training materials that meet the requirements of the AECOM Project Manager. Proof of attendance of staff at training. Records of training evaluation results. Results must reflect that training has been effective.
Wash Areas	– To ensure plant and equipment used on site are kept clean whilst containing and preventing the release of potential contaminants into the receiving environment.	No contamination of the receiving environment through the washing and cleaning of equipment and plant. Compliance with regulatory requirements.
Hazmat	– Storage of Hazmat – Transportation of Hazmat – Use of Hazmat – MSDS	No contamination of the environment through use of hazardous materials.
Flora and Fauna	– Procedure when encountering protected flora – Procedure for removal of all flora during clearing activities – Fauna protection measures	No damage to protected species. Safe translocation of encountered fauna

Method Statement	Key information required	Target
Site Closure	– Temporary (during holidays) and permanent closure procedures – Removal of site infrastructure – Removal of plant and equipment	Temporary site closure without incidents. Permanent site closure where all infrastructure, plant and equipment is removed without incident.

Emergency construction activity Environmental Method Statements may also be required. The activities requiring Environmental Method Statements cannot commence if they have not been approved by the TCP Construction Manager and PEM or EO.

5.1.4 Environmental Induction

The Contractor will ensure that all management, foremen and the general workforce, as well as all sub-contractors, suppliers and visitors to site have attended the Environmental Induction Programme prior to commencing any work on site. Where new personnel commence work on site during the construction period, the Contractor will ensure that these personnel also undergo the Induction Programme and are made aware of the environmental specifications on site. The Contractor must ensure that all of their personnel understand the requirements of the EA and EMPr as relevant tom their scope of work.

5.2 During the Construction Period

5.2.1 Copy of the EMPr and familiarisation thereof

A copy of the EMPr and EA will be available on site and the Contractor will ensure that all the personnel on Site (including sub-contractors and their staff) as well as suppliers, are familiar with and understand the specifications contained in these documents.

5.2.2 Site clean-up for Closure

Retention moneys will not be paid until a Site Closure Inspection (conducted by the TCP EO) has taken place and signed off by the TCP Construction Manager and PEM together with the Site Closure Certificate.

6. Environmental Inspections and Audits

6.1 Environmental Inspections and Audits

Environmental inspections and audits are conducted using five basic techniques:

- Interviews with Contractor's staff including sub-contractors and suppliers.
- Document checks.
- Observations.
- Monitoring.
- Measurement and verification.

This document sets out the areas and aspects of the construction site that will be inspected or audited, the frequency of such audits, the auditor and auditee. It should be noted that these lists are not exhaustive and that each site will have specific issues that will need to be audited. For each construction project, the auditor and auditee are as follows:

Table 5: Audit Frequency

Place	Inspector/Auditor	Auditee	Inspection/audit frequency
Work places	Contractor's EO	Contractor's Team	Daily/Weekly Inspection
Construction site	TCP EO	Contractor's EO	Monthly Audit
Construction site (entire area)	Environmental Specialist: Assurance	Entire Project	As required

6.2 Work Places Inspection

The Contractor's EO will be required to conduct weekly inspections of all work places for which the Contractor is responsible, including but not limited to the following:

- Contractor's camp, recreational and canteen facilities.
- Material lay down areas.
- Liquid and solid waste storage facilities (general, hazardous, recycling and scrap).
- Workshops.
- Oil traps.
- Wash bays.
- Construction work area.
- Spray Booths.
- Haul roads.
- No-go areas.
- Storm water drains.
- Any other construction area for which the SHE Officer is responsible.

At each of these sites, the Contractor's EO will be required on a daily basis to check for the following, where relevant:

By observation:

- Litter.
- Separation of solid waste as per system.
- Hydrocarbon spills.
- Effectiveness of dust control measures.
- Illegal washing out of containers in drains.
- Wash bay drainage systems are working.
- Correct usage of drip trays.

- Effectiveness of oil separators.
- Water use and wastage.
- Pollution of rivers and sea.
- Provision and use of toilet facilities.
- Any other illegal activities.

By document check:

- Removal of oil for recycling as per schedule.
- Removal of packaging as per agreements with suppliers.
- Removal of hazardous waste by specialist Contractors as per schedule.
- Correct placement of environmental signage and posters.
- Document board listing emergency numbers, hazmat info sheets, etc.

The following records must also be kept up to date (information must include that of sub-contractors where relevant):

- Fuel consumption for entire contract measured in litres (including plant, generators, other equipment, vehicles etc.).
- Electricity consumption for entire contract measured in Watt hours.
- Quantities of general waste submitted for recycling measured in kilograms.
- Quantities of general waste disposed of to landfill measured in kilograms.
- Quantities of hazardous waste submitted for recycling measured in kilograms.
- Quantities of hazardous waste disposed of to landfill measured in kilograms.
- Water consumption, including water used for construction and human consumption measured in litres.

6.3 Construction Site Audit

The TCP EO will be required to conduct monthly inspections of the entire construction site, which may involve more than one Contractor and may include, but not be limited to the following:

- Entire site.
- Fencing.
- Environmentally sensitive areas.
- Contractor's camp, recreational and canteen facilities.
- Material lay down areas.
- Scrap yard.
- Workshops.
- Oil traps.
- Wash bays.
- Sewage plant.
- Quarries and borrow pits used for fill and construction material.
- Spoil dumping areas.
- Solid waste disposal areas.
- Liquid waste disposal areas.
- Bioremediation site.
- Area for the temporary storage of hazardous waste.
- Fuel depot and hydrocarbon storage areas.
- Construction work area.
- Concrete batching plant.
- Spray booths.
- Haul roads.
- No-go areas.
- Storm water drains.

- And any other construction areas not listed

At each of these sites, the TCP EO will be required to check for the following, where relevant:

By observation:

- Litter.
- Separation of solid waste as per system.
- Hydrocarbon spills.
- Use of bunding, hard standing and other protection measures.
- Illegal dumping.
- Effectiveness of dust control measures.
- Illegal washing out of containers in drains.
- Wash bay drainage systems are working.
- Correct usage of drip trays.
- Effectiveness of oil separators.
- Illegal use of tracks and off-road driving in no-go areas.
- Correct procedures are followed for topsoil removal and stockpiling.
- Effectiveness of erosion protection measures.
- Excess noise and vibration.
- Water use and wastage.
- Pollution of rivers and sea.
- Provision and use of toilet facilities.
- Any other illegal activities.

By document check:

- All receipts for the collection of old oil, general recycled waste and hazardous waste.
- Correct placement of environmental signage and posters.
- Document board listing emergency numbers, hazmat info sheets, etc.
- Complete and accurate record of Contractor's Environmental File.

By measurement:

- Amount of water used by each Contractor (where practical).
- Amount of topsoil removed and stockpiled.
- Amount of land stabilisation completed.
- Area re-vegetated.
- Amount of waste recycled, sent to scrap yard or disposed in dump.
- Amount of material treated in the bioremediation site.

By monitoring:

- Effectiveness of dust control systems.
- Effectiveness of pollution control systems.
- Effectiveness of rehabilitation and re-vegetation programmes.
- Effectiveness of erosion control methods.
- Effectiveness of noise control barriers.

A site-specific inspection checklist will be provided to the TCP EO prior to site establishment.

6.4 Construction Site and Documentation Compliance Audit

The TCP Environmental Specialist: Assurance will conduct quarterly audits of the entire construction site and documentation system, which may include, but not be limited to the following:

- Site entrance.
- No-go areas.
- Environmentally sensitive areas.
- All work areas.
- Liquid and solid waste storage facilities.
- All workshops.
- Refuelling depots.
- Contractor's camp area and lay down place.
- Any other place which needs to be audited.

By observation:

- Litter.
- Liquid and solid waste storage facilities.
- Hydrocarbon spills.
- Use of bunding, hard standing and other protection measures.
- Illegal dumping.
- Effectiveness of dust control measures.
- Illegal washing out of containers in drains.
- Wash bay drainage systems are working.
- Correct usage of drip trays.
- Effectiveness of oil separators.
- Illegal use of tracks and off-road driving in no-go areas.
- Correct procedures are followed for topsoil removal and stockpiling.
- Effectiveness of erosion protection measures.
- Excess noise and vibration.
- Water use and wastage.
- Pollution of rivers and sea.
- Provision and use of toilet facilities.
- Any other illegal activities.

By document check:

- Complaints register is available and up to date.
- Method Statements are filed correctly and up to date.
- All environmental permits are available.
- Copy of the EA is available on site.
- Copies of the EMPr are available on site.
- Copies of all daily, weekly inspections and audits, monthly reports, minutes, incident reports and corrective action reports are filed correctly.
- Copies of all close-out reports are available.
- The monitoring programme is being adhered to and the monitoring results are no more than one month late.
- Chains of custody for samples can be provided on request.
- Sampling protocols are followed.
- Emergency numbers and procedures are clearly displayed.
- Photographic record.
- Records of Environmental Awareness Training of Contractor's staff.

- Any other documentation necessary to ensure effective environmental management of the site.

By verification (if necessary):

- Spot samples to check water quality (e.g. storm water runoff).
- Map/plan measurements to check areas disturbed/re-vegetated.
- Check dust collection buckets are working.
- Check oil separators.
- Any other aspect which gives cause for concern.

By interview:

- TCP EO.
- Contractor's EO.
- Contractor's staff at random.

A specific site audit protocol will be formulated prior to the first audit and sent to the TCP PEM two weeks in advance of the quarterly audit.

6.5 Environmental Performance Criteria

The Contractor will be required to achieve the minimum requirement for environmental audits. The standard/minimum requirement for all environmental audits is 80% and where a compliance score of less than 80% has been achieved, non-conformance reports (NCRs) will be issued to the Contractor.

7. Summary of Impacts and Aspects

All construction activities will be limited to the construction site, lay-down areas and construction site office / yard. All activities outside these areas need to be approved by the TCP Project Manager prior to the commencement of construction works. All interactions between the Contractor and I&APs will be via the TCP Project Manager. The Contractor may not enter into agreements with I&APs or undertake work on private property in lieu of favours, payment or any other means where either party may benefit from the activities / permissions of the other party. If the Contractor requires changes to the construction programme, these must be communicated via the TCP Project Manager to the affected I&APs.

The identification and summarisation of impacts and risks associated with construction related activities are set out in this section.

7.1 Construction: Direct Impacts

The direct impacts from construction will only be for the duration of the construction phase and should be limited to daylight hours. During the construction phase, overall activity within the project area will be increased.

The Contractor's site office shall be located within the development footprint, or on a site appropriately zoned and/or authorised for such use by a competent authority and approved by the EM. The Contractor shall select a location that has easy access and which has already been cleared or disturbed by previous human activity (e.g. previous construction camps or stockpile areas). All construction activities, materials, equipment and personnel will be restricted to within the area specified. Site camp selection and establishment shall comply with the contract specifications. The Contractor(s) will need to comply with all security measures detailed by the Employer.

The impacts from the construction of the proposed development will only be for the duration of the construction phase and should be limited to the specified hours for the construction activities. During the construction phase, overall activity within the project area will be increased. The identified possible environmental impacts during a feasibility study for the proposed Capacity Expansion of the Port were as follows:

- Dredging to facilitate the construction of new berths at the 600 series berths. The impact of the dredging would be as a result of the increase in turbidity as well as a possible disturbance in the flow dynamics of the area.
- Impact on the habitat of the sand spit and the mud and sand flats.
- Damage to the biophysical environment as a result of the construction of the new rail infrastructure and upgrading of existing rail infrastructure such as clearing of land, crossing of water courses and disposal of contaminated ballast.
- Impact as a result of spillages or waste contamination on the marine environment and fresh water sources.
- The social impacts of the proposed Capacity Expansion of the Port include the potential increase in noise and air pollution as a result of the proposed rail loop.

7.1.1 Noise Pollution

Activities during construction phase, such as the extension of the Port's railway into the rail balloon area has been identified as the only area with high significant noise impact on the residential and various commercial surrounding areas. However, any potential impacts associated with construction will be temporary and the Contractor will develop a line of communication where complaints could be lodged/ registered. In addition to the mitigations in place, the Contractors will also ensure that the I&APs will be informed of any operational times that may be of sensitive to receptors and made aware of this communication line. The complaints register will be checked weekly by the SHE and audited every month by the Contractor's EO.

7.1.2 Air Pollution

Other activities during construction, such as driving on gravel roads, the clearing of vegetation and construction of roads generate windblown dust. And in order to determine any potential contamination and pollution impacts, the Contractor's EO must ensure that the current dust mitigation methods and monitoring must remain in place. The monitoring programme must be

updated and up to record with monitoring occur during the construction phase since the records of the dust monitoring program that has been operational at the site since 2008 until March 2012. Furthermore, the Contractor's EO must also update and check the public complaints registers and an internal register. The Contractor will source all building materials locally to reduce emissions of transportation and support the local economy.

7.1.3 Dredging Impacts

The dredging to facilitate the construction of the new 600 series quays berths will result in the increase in turbidity and disturbance in the flow dynamics. Turbidity and total suspended solids concentrations in the water column over the mudflats are frequently higher compared to other areas of the Bay. Ecological consequences of changes in turbidity from dredging will affect ecological sensitive areas, as excessive suspended particulate matter, especially sediment, may adversely affect the feeding rate of invertebrate filter feeders, reducing their growth and productivity. It has been postulated that the foraging success of seabirds (and by implication estuarine birds) may be affected by turbid water. The Contractor(s) will need to formulate a dredging compliance monitoring plan which should include the non-compliance project conditions drafted in the EA from the DEA. The TCP Project Manager is responsible for conducting near field turbidity measurements to establish the distribution of suspended sediments around the area.

7.1.4 Biodiversity Impacts

The proposed development through the implementation of any of the three preferred options in the Richards Bay harbour could impact on the environment and particularly sensitive habitats. The impact of the development through, for example dredging, for the construction of new berths at the existing 600 series berths and the southern bank of the area opposite the 600 series berths, where the proposed construction is envisaged, would have a detrimental impact on the mudflats, and mangroves. The loss and degradation of mudflats and adjacent sandbanks, which sustain a high biodiversity, is of concern, both from a point of view of reduction of biodiversity, as well as the loss of the functional value of these areas in terms of nutrient processing and assimilation. The undeveloped area west of the Mzingazi Canal would be under threat should the development of the rail loop be undertaken. Over and above the ecological impact of such a development, the social impact on the community of Richards Bay and the surrounding areas should also be considered.

7.1.5 Fresh Water and Sediment Contamination

The 500 series berth site is highly transformed and polluted. Currently, dredged material is being filtered into sand and silt. Sand is being deposited on the beaches of Richards Bay, and silt is disposed of at an offshore disposal site for which an annual permit is required from the DEA. Also, findings indicated that the sediments located in the two stations of Inner Basin 2 and two other stations in the Inner Basin 3 cannot be disposed offshore due to the concentrated of copper and/or chromium, which exceeds Level II of the SA Sediment Quality Guidelines. However, sediments found within the Richards Bay Coal Terminal (RBCT) Basin and Mudflat area have no limitations to the offshore disposal, as no metal concentrations where found in the sediments. The Richards Bay Port receives fresh water through the following dredged canals, viz. Bhizolo Canal and Manzamnyama Canal, which flow into the port and disperse on the mud and sand flats in the south-western area. The Contractor is responsible for the collation and interpretation of dredging activities occurring, therefore, will need to filter the dredging material and separate the sand from the slit at the source, since the sand will be deposited on the beaches. Thus, consideration must be given during the infrastructure design phase as to where surface runoff (storm water) from quay surfaces will be discharged, therefore, affecting the surface runoff into 'dead-end basins', where water exchange with the greater Richards Bay is poor, will increase the probability for water and sediment quality impairment.

7.1.6 Waste Impacts

During the construction phase, material will need to be stored at the construction camp sites. Anticipated impacts at the laydown area during the construction activities include the contamination of soil and watercourses (including groundwater, fresh water and storm water) with possible spillages from hazardous substances at the construction camp sites. Skips and 210 litres drums are placed randomly on site for storage of waste. Disposal of dredging spoils at sea, if not carefully planned, can be damaging to the marine environment - affecting aquatic life. Discolouration of near shore water could result in adverse effects on beach

recreation and tourism. However, potential impacts that are associated with the disposal of dredged material at the on-shore disposal sites include the loss of agricultural soil. During breakages of conveyor belts, spillage of raw material may occur resulting in mixed waste or contamination. Waste or contamination can also be caused by poor maintenance of the conveyor belts. The Contractor's SHE and EO are responsible for conducting inductions and toolbox talks on such impacts. Include a recycling and storage area for office waste. The project has included a development of a Waste Transfer Station inside the Port, which will serve as the "nerve centre" for managing waste in the Port; and disposal of the dredging material offshore. The Contractor will conduct a hazardous material surveys during the refurbished or extension of the buildings.

7.1.7 Heritage Impacts

The only protected formally protected landscape of Richards Bay Nature Reserve is located on the northern banks of the Mhlatuze River Estuary falls outside the study area for this Port Expansion application and should not be disturbed during the course of any project related activities as this site is declared as a Grade I National Heritage Site in terms of the National Heritage Resources Act, 25 of 1999 (NHRA). Even though, the site is considered highly sensitive paleontological significant, no structures older than 60 years are present within the site. This means development of the port may lead to complete destruction of the fossil material and/or restrict access to fossiliferous beds in the future. Since any piece of palaeontological evidence is crucially important for our understanding the past biodiversity and modelling of future environmental changes. Should any cultural, historical and/or paleontological significance remains be uncovered/ disturbed during the construction phase of any project related activities, the Contractor or sub-contractor shall prepare and implement a procedure to ensure monitoring (that will form part of the method statement) is conducted regularly and no demolition takes place.

7.1.8 Turbidity Modelling Impacts

The model results have been analysed and presented in a manner suitable to inform the impact assessment undertaken in the Marine Ecology specialist studies (MER, 2013, Cyrus 2014a,b), as well as additional impacts considered in the report.

In terms of visual impacts it is the visibility of sediment plumes that are of concern. The plumes may be visible at the dredge spoil disposal site and will be visible around the dredger in the port. Further offshore there is predicted to be discoloration of the surface waters over a fairly extensive region (Figure 6.4), the duration being up to approximately 50% of the time both in the immediate vicinity of the dredge spoil disposal site and extending 2 km or more both to the SW and NE. It is however expected that the discoloration of the surface waters will decrease significantly when dredge spoil disposal operations cease. Significantly elevated turbidity in the surface layers would only be expected during storm conditions. The discoloration of nearshore waters due to the dredging operations is predicted not too exceed 10 days in a season. The discoloration (> 10 mg/ℓ) of the surface waters at the entrance to the Mhlatuze estuary and the port entrance is predicted to be minimal and not exceed 5 days per season.

7.1.9 Ecological impacts associated with elevated turbidity

In summary, the turbidity levels expected within the Port of Richards Bay are quite modest compared to those observed during the Berth 306 capital dredging programme. The model predictions suggest that there will be little potential impact beyond the actual areas being dredged. In contrast, the model prediction in the offshore zone indicates higher levels of turbidity than were measured during the Berth306 dredge spoil disposal operations. As noted above this could be partially due to the fact that the dredging rates assumed in the modelling study or could simply be that the model simulations tend to overestimate water column turbidity in this offshore domain. One of the reasons for this could be the fact that the actual critical shear stresses for re-suspension are significantly higher than those assumed in the modelling. Samples from the dredge spoil disposal site during the Berth306 monitoring indicated that the sediments were more cohesive "Weerts, pers. Comm.) than on would have anticipated from physical properties alone. Underestimating the critical shear stresses of re-suspension in the model would lead to an overestimate of water column turbidity in the offshore domain.

7.1.10 Ecological impacts associated with distribution of contaminated sediments and smothering effects

The model simulations, having been run for only 6 weeks post-dredging is not able to inform the long term rehabilitation of the dredge spoil disposal site. Van den Bossche *et al*. (2007) have however evaluated the changes that occurred between the immediate post-dredging bathymetric survey in January 2006 and a further post-dredging survey undertaken in July 2007.

The results seem to indicate no major loss of sediments from the dredge spoil site over this period. Rather there was erosion (-6 m) of one of the two dredge spoil disposal mounds generated during the Berth306 capital dredging. The eroded material however largely was re-distributed to be deposited in close proximity of the original dredge spoil mound rather than moved far away from the site. Most of the eroded material accumulated offshore (+2m) closer to the existing reefs in the area.
The changes occurred over an 18 month period and one could assume a continued rate of change in the intervening period between July 2007 and present. One should be careful in making such an assumption as the period between January 2006 and July 2007 included the occurrence of one of the largest storms (accompanied by very high waves and spring tides)ever experienced in the region. Itmay therefore have been that the changes observed occurred in a single event of a magnitude that is unlikely to re-occur soon.

7.2 Construction Camp Sites

The placement of the construction camp/site office will be on previously used construction sites, however, the specific site has not yet been identified. This is where the Contractor employees shall be accommodated. No placement of a construction camp outside of these boundaries to accommodate construction workers or activities shall be allowed.

7.3 Operational Phase Impacts

The impacts associated with the operation will include noise, air pollution, health and safety, general and hazardous substance storage, waste, contamination and emergency incidents.

7.3.1 Stockpiles of the break-bulk and discard coal

During the relocation of the break-bulk and discard coal stockpile to/from the eastern side of the Port behind the high 700 series berths and the western side of the Port next to the 600 series berths, there have been significant source of contamination associated with the Port activities that might result in spillage of metal ore fragments and scrap metal flakes during vessel loading. The sources of contaminant metals to Richards Bay will be identified, reduced and controlled by the TCP EO and Contractors. Toolbox talks and inductions will be conducted in the 600 and 700 series berths located in the Inner Basin complex.

7.3.2 Storm Water Contamination

Any materials accidentally spilled on quay surfaces into Richards Bay will be discharged via surface run-off into ‘dead-end basins’, where water exchange with the greater Richards Bay is poor, will increase the probability for water and sediment quality impairment, plus the cause of significant metal contamination of sediment in Inner Basins 1, 2 and 3. Ideally, surface runoff from quays should be diverted to pond storage dam where the water will be treated and reused to facilitate the settlement of particulate material and the overflow then discharged to the Bay. However, the ponds may not be feasible, but it might be possible to construct particulate matter settlement systems within the storm water reticulation system and the storm water design to consider settlement ponds as storm water discharge could impact on ecology and dredging as the DEA could refuse open water discharge. The magnitude of metal contamination in some parts of these basins is such that the DEA may prohibit the unconfined open water disposal of dredged sediment. Alternatively, the TCP EO and the Contractor’s EO could be responsible for ensuring that the water column profiles for the Inner Basins 1 and 3 are not disturbed further, by restricting the exchange of water between ‘dead-end’ basins and the greater Richards Bay unless the source/s of contaminants in the canal catchment are identified and controlled, although it is improbable that all sources will be identified and/or entirely controlled. The Contractor and Employer must monitor the surface runoff, as it is an important vector for the introduction of materials accidentally spilled on quay surfaces into Richards Bay and resulting in metal contamination of surface sediment in the proposed expansion footprint.

7.3.3 Air quality

It is recommended that the changes in operational activity be accurately assessed and the resultant increases in emissions be modelled. This applies specifically to increased Particulate and SO_2 emissions resulting from increased ship traffic into the port. However, there are no recommendations for the previously mentioned negative impact. Alternatively, the reduction of CO_2 footprint in ports and terminals is possible only through a cleaner energy mix and through reduced energy consumption using some of the following technology indicated below:

- Electric AC Drive Technology.
- VSG (Variable Speed Generator) Technology.
- Hybrid Technology with energy storage and recirculation.

Efficiency and operability of equipment have direct impact on the environment. By employing eco efficient technology they will serve as solutions in the reduction of handling operations, improvement of operation efficiency, reduction of emissions and energy savings.

7.3.4 Socio-economic

The capacity expansion of the Port of Richards bay would have a significant socio-economic impact on the province of KwaZulu-Natal as well as South Africa. This is illustrated through the estimated changes in economic metrics caused by the changes in final demand. However, the greatest project value would have the greatest socio-economic impact due to constant returns to scale. As a result the greater the output required during the construction phase, the greater the demands on the industries that produce the required inputs.

Given that there is very little variance in the socio-economic effects of the respective expansion options, it is acknowledged that the focus of the selection of the go-forward case pertain to issues such as commercial aspects, operational efficiency and constructability.

7.4 Risk Assessment

The below risk assessment identifies potential risks and uses qualitative measures to estimate the consequences or impact of the event, together with the estimate of its likelihood.

Each potential hazard was investigated to determine the consequence and likelihood of the hazard occurring. A simple assessment of L (Low), M (Medium) and H (High) was used for the assessment consequence. The occurrence potential of each hazard was also assessed using the simple assessment of L (Low), M (Medium) and H (High).

Table 6: Predicted Level of Risk

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
A (almost likely)	L	M	H	H	H
B (likely)	L	M	H	H	H
C (moderate)	L	M	H	H	H
D (unlikely)	L	L	L	M	H
E (rare)	L	L	L	M	M

Table 7: Aspects, Impacts and Controls associated with the Construction Phase

System Element	Aspect	Impacts	Risk
Aesthetics	Nuisance factor through construction related activities	Dust generation Noise generation Visual impact	High
Dust	Unprotected surfaces	Dust generation	Low
Earthworks	Contaminated spoil	Ecological off-site impacts of contamination	Low
Erosion	Construction related works that require excavations	Unstable embankments along work phase and groundwater seepage	High
Fauna and flora	Alien invasive plant control and removal	Spread of alien invasive plants.	Low
Fire	Restricting activities with a high fire risk	Loss of infrastructure, property or life.	Low
Hazardous substances	Containment of hazardous waste and spills	Soil and groundwater contamination	High
	Accidental hydro carbon spillage		
	Uncontrolled use of hydrocarbons	Uncontrolled fires	High
Heritage	Excavation of soils	Impact on artefact materials	Low
		Damage to chance finds	
Land use	Damage to utility services	Disruption to service	Medium
	Topsoil destabilisation and loss	Incorrect storage and rehabilitation	Low
	Open trenches	Safety of personnel and affected property owners	
		Works resulting in excess dust, noise and erosion.	Medium
	Contractors Camp	Unauthorised placement of camp	
	Flora and fauna	Disturbance	
Noise	Impact on aesthetics	Increase in noise levels than 7dB above ambient noise levels	Low
Rehabilitation	Not completing rehabilitation works after soil disturbance activities	Loss of species diversity	Low
		Dust generation	
Soil	Incorrect removal and storage of soil profiles	Poor vegetation regrowth	Low
	Soil loss	Wind and water erosion	
Traffic	Temporary road works	Delays, detours and restricted access	Low
	Dust entrainment	Impacts relating to health and safety	
	Noise	Impacts relating to health and safety	
	Poor or incorrectly maintained plant	Hydro carbon spill	Medium
Training	Lack of and / or incorrect training	Potential injuries and / or loss of life and / or property	Low
Waste	Incorrect use, handling, storage and disposal of hydro carbons	Release of hydro carbons in the receiving environment	Medium
	Waste management	Incorrect disposal of waste	Low
		Inefficient resource utilisation	
	Collection of waste across construction footprint	Pollution of the environment through *inter alia* incorrect disposal	
Water	Stabilisation of soil stockpiles	Increased erosion and sedimentation of water resources	Low
	Incorrect re-internment of backfill	Water erosion	
	Ecological functioning of water courses	Potential of hydro carbon leakages and increased sedimentation levels into watercourses due to vehicular movement	Medium

8. Transnet General Standards for Environmental Management

8.1 Site Planning and Establishment

The Contractor shall establish his construction camps, offices, workshops, staff accommodation and any other facilities on the site in a manner that does not adversely affect the environment. These facilities must not be sited in close proximity to sensitive areas.

8.1.1 Site plan

Before the onset of construction, the Contractor shall submit to the TCP Construction Manager for his approval, plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the Contractor proposes to put in place. The Site Plan must as a minimum include but not be limited to:

- Detailed layout of the construction works areas including access roads, site offices, material laydown areas, temporary stockpile areas and parking areas.
- Detailed locality and layout of all waste storage and handling facilities for litter, kitchen refuse and workshop-derived effluents.
- Proposed areas for the stockpiling of topsoil and excavated spoil material.
- Demarcation of the construction footprint including areas not to be disturbed by the development.
- Location of sewage and sanitary facilities at the site offices and staff accommodation and at all localities on the site where there will be a concentration of labour. Sanitary arrangements should be to the satisfaction of the Construction Manager.

The site offices should not be sited in close proximity to steep areas. It is recommended that the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles be located as far away as possible from any watercourse as possible.

8.1.2 Identification and establishment of suitable access routes/roads

Existing access routes to the construction/works areas must be used as far as possible. The building of access roads must be restricted to within the development footprint to prevent unnecessary disturbance of the surrounding environment. Access tracks must be maintained in a good condition at all times during construction to minimise erosion and dust generation.

8.1.3 Demarcation of site limits

Prior to the commencement of construction, the actual site to be developed must be clearly demarcated by means of highly visible barriers such as fences and orange snow netting. Vegetation within the demarcated zone may be cleared. Disturbance of vegetation outside of the demarcated development footprint is not permitted.

All plant, material and equipment required for construction must be located within the designated areas. Laydown areas must be clearly demarcated within the site limits. No activities are allowed outside of the demarcated development footprint.

8.1.4 Eating Areas

The Contractor is responsible for providing temporary shade areas within the works area to ensure that workers do not leave the site to eat during working hours. Refuse bags must be provided at all established eating areas.

8.1.5 Effluent Management

All effluent water from site shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water courses (streams, rivers, pans dams etc.). Only domestic type wastewater shall be allowed to enter the designated system.

8.2 Sewage and Sanitation

The Contractor is responsible for providing adequate sanitary facilities to all workers on site and for enforcing the proper use of these facilities. Safe and effective sewage treatment will require one of the following sewage handling methods: septic tanks, dry-composting toilets such as “enviro-loos”, or the use of chemical toilets which are supplied and maintained by a suitably qualified sub-contractor.

The type of sewage treatment will depend on the location of the site and the surrounding land uses, the duration of the contract and proximity (availability) of providers of chemical toilets. The waste material generated from these facilities shall be serviced on a regular basis.

Toilets and latrines shall be easily accessible and shall be positioned within walking distance from wherever employees are employed on the works. Use of open areas (i.e. the veldt) shall not, under any circumstances, be allowed.

Outside toilets shall be provided with locks and doors and shall be secured to prevent them from blowing over. The toilets shall also be placed outside areas susceptible to flooding and high winds. The Contractor shall arrange for regular emptying of toilets and shall be entirely responsible for enforcing their use and for maintaining such facilities in a clean, orderly and hygienic condition to the satisfaction of the TCP Construction Manager.

The Contractor shall ensure that there are separate toilet facilities for male and females on site at a ratio of one facility for every 10 employees.

8.3 Waste Management

Waste is grouped into “general” or “hazardous”, depending on its characteristics. The classification determines handling methods and the ultimate disposal of the material.

General waste to be expected during construction includes the following:

- Trash (waste paper, plastics, cardboard, etc.) and food waste from offices, warehouses and construction personnel.
- Uncontaminated construction debris such as used wood and scrap metal.
- Uncontaminated soil and non-hazardous rubble from excavation or demolition.

Hazardous waste means any waste that contains organic or inorganic elements or compounds that may, owing to its inherent physical, chemical characteristics, such as toxic, ignitable, corrosive, carcinogenic or other properties or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

The Contractor shall classify all wastes expected to be generated during the construction period.

Examples of typical construction waste which could be expected on the site and how they should be classified are indicated in the following table:

Table 8: Example of Waste Classification

Waste	Hazardous	General
Aerosol Containers	X	
Batteries, Light Bulbs, Circuit Boards, etc.	X	X
Clean Soil		X
Construction Debris Contaminated by Oil or Organic Compounds	X	
Domestic Waste		X
Empty Drums (depends on prior use)	X	X
Empty Paint and Coating Containers		X
Explosive Waste	X	

Waste	Hazardous	General
PCB Waste	X	
Rubble (Not Contaminated by Oil or Organic Compounds)		X
Waste Cable		X
Waste Plastic		X
Waste Paint and/or Solvent	X	
Waste Oil	X	
Waste Concrete		X
Waste Containing Fibrous Asbestos	X	
Waste Timber		X
Sewerage Sludge	X	
Scrap Metal		X
Chemically-Derived Sanitary Waste	X	

A hierarchical control approach to waste management is encouraged. Waste should preferably be managed in the following order of preference:

- Avoidance: using goods in a manner that minimises their waste components.
- Reduction: reduction of the quantity and toxicity of waste generated during construction.
- Re-use: removing an article from a waste stream for use in a similar or different purpose without changing its form or properties.
- Recycling: separating articles from a waste stream and processing them as products or raw materials.
- Recovery: reclaiming particular components or materials, or using the waste as a fuel.
- Treatment: processing of waste by changing its form or properties in order to reduce toxicity and quantity.
- Disposal: burial, deposit, discharge, abandoning or release of waste.

The Contractor is responsible for the removal of all waste from site generated through the Contractor's activities. The Contractor shall ensure that all waste is removed to appropriate licensed waste management facilities. (For the identification of an appropriate facility, the following source may be utilised: www.sawic.org.za). The Contractor shall manage hazardous waste anticipated to be generated by his operations as follows:

- Characterise the waste to determine if it is general or hazardous.
- Obtain and provide an acceptable container with correct classification label.
- Place hazardous waste material in allocated container.
- Inspect the container on a regular basis as prescribed by the Contractor's waste management plan.
- Track the accumulation time for the waste.
- Haul the full container to the disposal site.
- Provide documentary evidence of proper disposal of the waste.

The Contractor's EO will work in conjunction with the Contractor's construction safety and industrial hygiene personnel to create a Hazardous Materials Management Program. This program will establish the necessary protocol for proper handling and removal of hazardous materials on the site.

Information on each hazardous substance will be available to all persons on site in the form of Material Safety Data Sheets (MSDS). Training and education about the proper use, handling, and disposal of the material will be provided to all workers handling the material. The Contractor's EO must be informed of all activities that involve the use of hazardous substances to facilitate prompt response in the event of a spill or release.

The Contractor shall manage general waste that is anticipated to be generated by operations as follows:

- Determine if waste is non-hazardous and obtain containers for waste storage.
- Notify waste hauler when container is full so that it can be removed and replaced with an empty.

- No littering is allowed on site. In the event where staff mobility is high, refuse bags will be made available by the Contractor.
- Provide documentary evidence of proper disposal of waste.

The Contractor shall recycle general waste (as far as practically possible) that is anticipated to be generated by its operations as follows:

- Obtain and label recycling containers for the following (whichever relevant) and locate them within temporary office building and trailers:
  - *Office Waste.*
  - *Aluminium.*
  - *Steel.*
  - *Glass.*
  - *Ferrous Metals.*
  - *Non Ferrous Metals.*
  - *Waste Timber.*
- Establish recycled material collection schedule.
- Arrange for full bins to be hauled away.

Spent batteries, circuit boards, and bulbs, while non-hazardous, require separate storage, special collection and handling.

No burning, burying or dumping of waste of any kind will be permitted. The Contractor shall quantify all waste disposed of, whether general or hazardous (including waste disposed of by any sub-contractors) and keep record of these quantities on site.

8.4 Workshops, equipment maintenance and storage

All vehicles and equipment must be kept in good working order to maximise efficiency and minimise pollution. Maintenance, including washing and refuelling of plant on site must be done at designated locations at workshop areas. These designated areas must be agreed with the TCP Construction Manager and TCP EO. The Contractor must ensure that no contamination of soil or vegetation occurs around workshops and plant maintenance facilities. All machinery servicing areas must be bunded. Drip trays should be used to collect used oil, lubricants and other during maintenance. Drip trays must be provided for all stationary plant. Washing of equipment should be restricted to urgent maintenance requirements only. Adequate wastewater collection facilities must be provided.

8.5 Vehicle and Equipment Refuelling

8.5.1 Stationary/Designated Refuelling

No vehicles or machines shall be serviced or refuelled on site except at designated servicing or refueling locations. No oil or lubricant changes shall be made except at designate locations, or in case of breakdown or emergency repair.

The Contractor shall store fuel and oil at a secure area, which shall be bunded to contain 110% of the total volume within the bund and designed with an impervious layer or liner or paved surface to prevent spillage from entering the ground.

The Contractor shall provide details of its proposed fuel storage and fuelling facility to the TCP EO for approval. The design shall comply with the regulations of the National Water Act (Act 36 of 1998) (NWA), the Hazardous Substances Act (Act 15 of 1973), the Environment Conservation Act (Act 73 of 1989), and the Occupational Health and Safety Act (Act 85 of 1993) (OHSA), mainly the Construction and Hazardous Chemical Substances Regulations.

8.5.2 Mobile Refuelling

In certain circumstances, the refuelling of vehicles or equipment in a designated area is not a viable/practicable option and refuelling has to be done from a tank, truck or container moved around on site. In such circumstances, the Contractor may request approval from the Construction Manager to conduct mobile refuelling subject to the following control measures:

- Secondary containment equipment shall be in place. This equipment shall be sized to contain the most likely volume of fuel that could be spilt during transfer.
- Absorbent pads or drip trays are to be placed around the fuel inlet prior to dispensing.
- Mobile refuelling units are to be operated by a designated competent person.
- The transfer of fuel must be stopped prior to overflowing. Fuel tanks or refuelling equipment on vehicles may only be filled to 90% carrying capacity.
- Mobile fuelling tanks must be stored in an area where they are not susceptible to collisions. The fuel storage area must be located away from drainage channels.
- Mobile refuelling operations shall not take place within 15 meter of any residential buildings, or 7.5 meter from other structures, property lines, public ways or combustible storage.
- All mobile refuelling tanks are to be properly labelled and fire extinguishers shall be located near the fuel storage areas. These extinguishers must be of a suitable type and size.

8.6 Spill Response

The Contractor shall have adequate spill response materials/equipment on site which must be aligned with the volumes of hazardous substances used on site and the risk of pollution to sensitive environmental attributes.

The Contractor shall provide details for approval by the TCP Construction Manager of its spill response plan in the event of any spills of fuel, oils, solvents, paints or other hazardous materials. The plan will show measures to be taken in removing contaminated material from site and demonstrate complete removal of contamination.

The Contractor shall instruct construction personnel on the following spill prevention and containment responsibilities:

- Immediately repair all leaks of hydrocarbons or chemicals.
- Take all reasonable means to prevent spills or leaks.
- Do not allow sumps receiving oil or oily water to overflow.
- Prevent storm water runoff from contamination by leaking or spilled drums of oil or chemicals.
- Do not discharge oil or contaminants into storm water or sewer systems.

If a spill occurs on land, the Contractor must:

- Immediately stop or reduce the spill.
- Contain the spill.
- Recover the spilled product.
- Remediate the site.
- Implement actions necessary to prevent the spill from contaminating groundwater or off-site surface water.
- Dispose of contaminated material to a location designated thereto.

Any spill to water has the potential to disperse quickly; therefore, the spill must be contained immediately using appropriate containment equipment.

If a spill to water occurs, the Contractor must:

- Take immediate action to stop or reduce the spill and contain it.
- Notify the appropriate on-site authorities.
- Implement actions necessary to prevent the spread of the contamination by deploying booms and/or absorbent material.
- Recover the spilled product.

- Properly dispose of spilled material.

8.7 Spray Painting and Sandblasting

Spray painting and sandblasting should be kept to a minimum. All painting should, as far as practicable, be done before equipment and material is brought on site. Touch-up painting is to be done by hand painting or by an approved procedure. A Method Statement shall be submitted to the TCP EO for approval.

The relevant Contractor will inform his/her EO of when and where spray painting or sandblasting is to be carried out prior to commencement of work. The Contractor's EO will monitor these activities to ensure that adequate measures are taken to prevent contamination of the soil.

If the area is in confined or high (elevated) areas, a protection plan must be issued for approval.

8.8 Dust Management

Material in transit should be loaded and contained within the load bin of the vehicle in such a way as to prevent any spillage onto the roads and the creation of dust clouds. If necessary, the load bin of the vehicle shall be covered with a tarpaulin to prevent dust.

Dust is to be controlled on unpaved access roads and site roads using sprayed water. The Contractors are responsible for managing dust generated as a result of their activities.

Some dust control measures which are normally applied during construction are presented in this section for inclusion by the Contractor in his Dust Control Method Statement:

- Operate vehicles within speed limits, where no speed limit has been specified the limit shall be 20km/h.
- Wash paved surfaces within the construction area twice a week.
- Minimise haulage distances.
- Apply water to gravel roads with a spraying truck when required.
- Environmentally friendly soil stabilisers may be used as additional measures to control dust on gravel roads and construction areas.
- Dust suppression measures will also apply to inactive construction areas. (An inactive construction site is one on which construction will not occur for a month or more).
- Construction material being transported by trucks must be suitably moistened or covered to prevent dust generation.
- Minimise disturbance of natural vegetation during right-of-way construction (e.g. transmission lines and erection of fences) to reduce potential erosion, runoff, and air-borne dust.
- Implement a system of reporting excessive dust conditions by construction personnel (as instructed through Environmental Awareness Training).

Water for dust control shall only be taken from approved sources.

8.9 Storm water and Dewatering Management

The Contractor shall be aware that, apart from runoff from overburden emplacements and stock piles, storm water can also be contaminated from batch plants, workshops, vehicle wash-down pads, etc., and that contaminants during construction may include hydrocarbons from fuels and lubricants, sewerage from employee ablutions and excess fertiliser from rehabilitated areas, etc.

The Contractor shall take note that discharges to controlled waters such as the sea, rivers, groundwater, or to sewerage systems are controlled under South African Water Legislation. The following specific measures are required:

- Temporary drainage must be established on site during the construction period until permanent drainage is in place. The Contractor is responsible for maintaining the temporary drainage in their areas. The Contractor must provide secondary drainage that prevents erosion.
- Contractors must employ good housekeeping in their areas to prevent contamination of drainage water.
- The Contractor shall clear stagnant water.
- The Contractor shall ensure that no contaminated surface water flows off-site as a result of the Contractor's operations. Silt traps shall be constructed to ensure retention of silt on site and cut-off ditches shall be constructed to ensure no runoff from the site except at points where silt traps are provided. The Contractor shall be responsible for checking and maintaining all silt traps for the duration of the project.
- If applicable, the Contractor shall be responsible for collection, management, and containment within the site boundaries of all dewatering from all general site preparation activities. The dewatering water shall be contained within the site boundaries by sequentially pumping or routing water to and from sub-areas within the site as the construction activities proceed. No discharge/dewatering to off-site land or surface water bodies will be allowed.
- On-site drainage shall be accomplished through gravity flow. The surface drainage system shall consist of mild overland slopes, ditches, and culverts. The graded areas adjacent to buildings shall be sloped away with a 5% slope. Other areas shall have a minimum slope of 0.2% or as otherwise indicated.
- Ditches shall be designed to carry a 25-year storm event with velocities in accordance to minimise erosion. Erosion protection shall consist of suitable stabilising surfaces in all ditches.
- Culverts shall be designed to ensure passage of the 50-year storm peak runoff flow.

8.10 Erosion Control

Both structural and non-structural (vegetative) erosion control measures will be designed, implemented, and properly maintained in accordance with best management practices which will include the following:

- Scheduling of activities to minimise the amount of disturbed area at any one time.
- Implementation of re-vegetation as early as feasible.
- Limiting construction traffic and/or avoidance thereof on access roads and areas to be graded to the extent feasible at drainage ditches.
- Compacting loose soil as soon as possible after excavation, grading, or filling.
- Using silt fences, geo-textiles, temporary rip-rap, soil stabilisation with gravel, diversionary berms or swales, small sedimentation basins, and gravelled roads to minimise transport of sediment.
- Implementing the erosion and sedimentation control plan and ensuring that construction personnel are familiar with and adhere to it.
- Managing runoff during construction.

The Contractor shall be responsible for checking and maintaining all erosion and sedimentation controls.

8.11 Rehabilitation

The Contractor (and sub-contractors) shall rehabilitate the entire site upon completion of work. A rehabilitation plan will be submitted to the TCP Construction Manager for approval at least six weeks before completion. The following are critical issues to be included in the rehabilitation plan:

- Details of soil preparation procedures including proposed fertilisers or other chemicals being considered for use.
- A list of the plant species that will be used in the rehabilitation process. Note that these should all be indigenous species, and preferably species that are endemic to the area. The assistance of an appropriately qualified botanist should be sought in developing this list.
- Procedures for watering the planted areas (frequency of watering, methodology proposed, etc).
- An indication of the monitoring procedures that will be put in place to ensure the successful establishment of the plants (duration and frequency of monitoring, proposed criteria for declaring rehabilitation as being successful).
- Procedures for the prevention of the establishment and spread of alien invasive species.

8.12 Noise Management

- Keep all equipment in good working order.
- Operate equipment within its specification and capacity and don't overload machines.
- Apply regular maintenance, particularly with regards to lubrication.
- Operate equipment with appropriate noise abatement accessories, such as sound hoods.
- Sensitive social receptors shall be notified of any excessive noise-generating activities that could affect them.
- Ensure that the potential noise source will conform to the South African Bureau of Standards recommended code of practice, SANS 10103:2004, so that it will not produce excessive or undesirable noise when released.
- All the Contractor's equipment shall be fitted with effective exhaust silencers and shall comply with the South African Bureau of Standards recommended code of practice, SANS 10103:2004, for construction plant noise generation.
- All the Contractor's vehicles shall be fitted with effective exhaust silencers and shall comply with the Road Traffic Act, (Act 29 of 1989) when any such vehicle is operated on a public road.
- If on-site noise control is not effective, protect the victims of noise (e.g. ear-plugs) by ensuring that all noise-related occupational health provisions are met (OHSA).

8.13 Protection of heritage resources

8.13.1 Archaeological Sites

If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The Contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the engineer of such a discovery. The South African Heritage Resources Agency (SAHRA) is to be contacted and will appoint an archaeological consultant. Work may only resume once clearance is given in writing by the archaeologist.

8.13.2 Graves and middens

If a grave or midden is uncovered on site, or discovered before the commencement of work, all work in the immediate vicinity of the graves/middens shall be stopped and the TCP Construction Manager informed of the discovery. SAHRA should be contacted and in the case of graves, arrangements made for exhumation and reburial. The undertaker will, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred.

8.14 Fire prevention

Fires shall only be allowed in facilities or equipment specially constructed for this purpose. A firebreak shall be cleared and maintained around the perimeter of the camp and office sites. All conditions incorporated in the requirements of the OHSA shall be implemented.

8.15 Water Protection and Management

No water shall be abstracted from any water resource (stream, river, or dam) without the express permission of the Construction Manager. Such permission shall only be granted once it can be shown that the water is safe for use, that there is sufficient water in the resource to meet the demand, and once permission has been obtained from the Department of Water and Sanitation in accordance with the requirements of the National Water Act (Act 36 of 1998).

Water for human consumption shall be available at the site offices and at other convenient locations on site. The generally acceptable standard is that a supply of drinking water shall be available within 200m of any point on the construction site.

The Contractor shall keep record of the quantities of water used during construction (including use by sub-contractors), irrespective of the purpose of use.

8.16 Protection of Fauna and the collection of firewood

On no account shall any hunting or fishing activity of any kind be allowed. This includes the setting of traps, or the killing of any animal caught in construction works. On no account shall any animal, reptile or bird of any sort be killed. This specifically includes snakes or other creatures considered potentially dangerous discovered on site. If such an animal is discovered on site an appropriately skilled person should be summoned to remove the creature from the site. Consideration should be given to selection and nomination of such a person prior to site establishment. If no-one is available, training should be provided to at least two site staff members.

The Contractor shall provide adequate facilities for all his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The Contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes.

8.17 Environmental Awareness Training

An Environmental Awareness Program is considered a necessary part of the EMPr. Training of the appropriate construction personnel will help ensure that all environmental regulations and requirements are followed which must be defined in the relevant Method Statement to be prepared by the Contractor.

Objectives of environmental awareness training are:

- Environmental Management – protecting the environment from the effects of construction by making personnel aware of sensitive environmental resources.
- Regulatory compliance – complying with requirements contained in project – specific permit conditions, also complying with requirements in regional and local regulations.
- Problem recognition and communication – training personnel to recognise potential environmental problems, i.e. spills, and communicate the problem to the proper person for solution.
- Liability control - non-compliance with regulatory requirements can lead to personal and corporate liability.

All individuals on the construction site will need to have a minimum awareness of environmental requirements and responsibilities. However, not all need to have the same degree of awareness. The required degree of knowledge is greatest for personnel in the Safety, Health, and Environmental Sections and the least for the manual personnel.

The environmental awareness training programmes should be targeted at the two levels of employment: management and labour. Environmental awareness training programmes need to be formulated for these levels and records of such must comprise:

- A record of all names, positions and duties of staff who received training.
- A summarised version of the training material.

The Contractor shall present environmental awareness programmes on a weekly/bi-monthly basis and keep record of all the environmental related training of the personnel.

The Contractor’s EO may be requested to provide additional training (in a first language) on-site regarding environmental aspects that are unclear to the construction personnel. A translator may be required and requested to assist in this additional training. The cost for the translator will be borne by the Contractor. The Contractor shall implement the training programme at own cost.

8.18 Handling and Batching of Concrete and Cement

- Concrete batching shall only be conducted in demarcated areas which have been approved by the TCP Construction Manager. Such areas shall be fitted with a containment facility for the collection of cement-laden water. This facility

shall be bunded and have an impermeable surface protection so as to prevent soil and groundwater contamination. Drainage of the collection facility will be separated from any infrastructure that contains clean surface runoff.

- The batching facility will not be placed in areas prone to floods or the generation of stagnant water. Access to the facility will be controlled so as to minimise potential environmental impacts.
- Hand mixing of cement and concrete shall be done on mortarboards and/or within the bunded area with impermeable surface or concrete slab.
- Bulk and bagged cement and concrete additives will be stored in an appropriate facility at least 10m away from any watercourses, gullies and drains.
- Waste water collected in the containment facility shall be left to evaporate. The Contractor shall monitor water levels to prevent overflows from the facility. Water can be pumped into sealed drums for temporary storage and must be disposed of as liquid hazardous waste.
- All concrete washing equipment, such as shovels, mixer drums, concrete chutes, etc. shall be done within the washout facility. Water used for washing shall be restricted as far as practically possible.
- Ready-mix concrete trucks are not allowed to wash out anywhere other than in an area designated for this purpose.
- The Contractor shall periodically clean out hardened concrete from the wash-out facility or concrete mixer, which can either be reused or disposed of as per accepted waste management procedures.
- Empty cement and bags, if temporarily stored on site, must be collected and stored in weatherproof containers. Used cement bags may not be used for any other purpose and must be disposed of on a regular basis in accordance with the Contractor's solid waste management system.
- Sand and Aggregates containing cement will be kept damp to prevent the generation of dust.
- Concrete and cement or any solid waste materials containing concrete and cement will be disposed of at a registered disposal facility. Where disposal facilities for general waste are utilised, written consent from the relevant municipality must be obtained.

8.19 Stockpiling, Soil Management and Protection of Flora

- Clearance of vegetation shall be restricted to that which is required to facilitate the execution of the works. Stockpiling may only take place in designated areas indicated on the approved site layout plan. Sensitive areas shall be avoided in this regard.
- The Contractor shall measure the extent of all areas cleared for construction purposes and keep this figure updated.
- Any area to be used for stockpiling or material laydown shall be stripped of all topsoil.
- Vegetation clearance shall occur in a planned manner, and cleared areas shall be stabilised as soon as possible.
- The detail of vegetation clearing shall be subject to the Construction Manager's approval and shall occur in consultation with the TCP EO.
- Stockpiles must be positioned in areas sheltered from the wind and rain to prevent erosion and dispersion of loose materials.
- Stockpiled soil shall be protected by adequate erosion-control measures.
- Soil stockpiles shall be located away from drainage lines, watercourses and areas of temporary inundation.
- Topsoil shall be stockpiled separately from other materials and kept moist.
- Excavated subsoil, where not contaminated, must be used for backfilling and topsoil for landscaping and rehabilitation of disturbed areas.
- Where topsoil has become mixed with subsoil or is not up to the original standard, fertiliser or new topsoil shall be provided by the Contractor.
- Stockpiles (excluding ballast stockpiles) shall not exceed 2m in height unless otherwise permitted by Transnet.
- No vegetation located outside the construction site shall be destroyed or damaged.
- As far as is reasonably practicable, existing roads must be used for access to site and right of way.
- Before site clearance takes place, vegetation surveys will be conducted and protected species identified.
- No protected plant species shall be removed without written consent from the relevant authorities.
- The development of new embankments or fill areas must be undertaken in consultation with the TCP EO.
- No dumping of solid waste or refuse shall be allowed within or adjacent to areas of natural vegetation.

- The Contractor shall identify and eradicate all declared alien and invasive plant species occurring on site.

8.20 Traffic Management

- Vehicles are not permitted to leave access roads. Turning of vehicles should only take place within a clearly demarcated "turn area" located within the approved construction footprint.
- The Contractor must co-ordinate the loading and offloading of material during the construction phase so as to ensure that vehicular movement is in one direction only at any one time and that side-tracks are not created on the site.
- Vehicles should only be parked within designated parking areas as demarcated on the site layout plan

8.21 Transportation of Materials

The Contractor is responsible for ensuring that all suppliers and delivery drivers are aware of procedures and restrictions (e.g. no-go areas) in terms of the EMPr. Material must be appropriately secured to ensure safe passage between destinations during transportation. Loads must have appropriate cover to prevent spillage from the vehicles. The Contractor will be held responsible for any clean-up resulting from the failure to properly secure transported materials.

8.22 Borrow Pits and Quarries

- The Contractor shall make use of commercial suppliers for all rock and sand raw materials.
- The Contractor shall ensure that any supplier is in possession of the required permit/license and keep record of the quantity of material supplied.
- The Contractor will not make direct use of any borrow pits and quarries unless he has obtained written approval from the Construction Manager and Method Statement has been submitted.
- The abovementioned Method Statement will provide the detailed description of the location of the borrow pits and/or quarries and the procedures that will be followed to adhere to any pertinent national or local legislation (e.g. mineral extraction, safety and noise levels).

8.23 Social and Labour Issues

- The criteria for and selection of labourers, sub-contractors and suppliers for the project shall demonstrate preference for the local community and shall be aligned with the criteria set by TCP in appointing the Contractor. The Contractor shall keep records of the identity of all staff.
- Under no circumstances shall the Contractors engage in formal discussions with landowners without prior consent by the Construction Manager.
- No activity on private property shall be allowed without written consent by the relevant landowner.
- Any damage to private property caused by the Contractor during the construction period, shall be repaired to the satisfaction of the Construction Manager.
- The Contractor shall keep record of any complaint raised during the construction period relating to the Contractor’s activities.
- No job-seekers shall be allowed on site.

8.24 Energy Management

The Contractor shall measure and keep updated records of the following:

- Electricity consumption (to be measured in Watt Hours)
- Fuel consumption (to be measured in litres)

8.25 Handling, Storage and Management of Hazardous Substances

- All hazardous materials/substances shall be stored in a secured, designated area that is fenced and has restricted entry.
- All storage shall take place using suitable containers to the approval of the Construction Manager.
- All hazardous liquids shall be located in a secure, demarcated area and an adequate bund wall (110% of the total volume stored) shall be provided. The floor and wall of the bund area shall be impervious to prevent infiltration of any spilled/leaked liquids into the soil.
- No possible spillages or accumulated stormwater within this bunded area will be allowed to be flushed from the bund into the surrounding area. All fluids accumulated within the bunded area shall be removed and disposed of in accordance with Section 3.3.
- Hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure.
- Weigh bills of hazardous substances shall be sourced from suppliers and kept on site for inspection by the TCP EO.
- The Contractor must provide a method statement detailing the hazardous substances that are to be used during construction, as well as the storage, handling and disposal procedures for each substance. Emergency procedures in the event of misuse or spillage that might negatively affect the environment must be specified.

8.26 Environmental Emergency Response

The Contractor's environmental emergency procedures must ensure that there will be an appropriate response to unexpected or accidental actions or incidents that could cause environmental impacts.

Such incidents may include:

- Accidental discharges to water and land.
- Accidental spillage of hazardous substances (typically oil, petrol, and diesel).
- Accidental toxic emissions into the air.
- Specific environmental and ecosystem effects from accidental releases or incidents.

The Environmental Emergency Response Method Statement is aimed at responding to environmental incidents and must ensure and include the following:

- Construction employees shall be adequately trained in terms of incidents and emergency situations.
- Details of the organisation (manpower) and responsibilities, accountability and liability of personnel.
- A list of key personnel and contact numbers.
- Details of emergency services (e.g. the fire department, spill clean-up services) shall be listed.
- Internal and external communication plans, including prescribed reporting procedures.
- Actions to be taken in the event of different types of emergencies.
- Incident recording, progress reporting and remediation measures to be implemented.
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.

The Contractor(s) will comply with the environmental emergency preparedness and incident and accident-reporting requirements, as required by the OHSA, the NEMA, the NWA, and/or any other relevant legislation listed in Table 1.

9. Project Specific Standards for Environmental Management

9.1 Environmental Requirements for Dredging

- Volumes of dredge material
- Methodology
- Dredging methodology
- Monitoring of the dredger itself (trackplots)
- Sediment disposal (even disposal distribution)

9.1.1 Type of Dredger

For the purposes of this study a Cutter Suction Dredger (CSD) or a backhoe dredger (BH) will be recommended to be used.

9.1.2 No-Go Areas

All No-Go Areas to be identified before Dredging can begin.

9.2 Dredge Site Monitoring

9.2.1 Turbidity

The parameters that need to be monitored are turbidity (as NTU) and total suspended solids (as mg/ℓ). While turbidity will be used as the primary measure to ensure compliance of dredging activities with environmental limits imposed by regulatory authorities, the opportunity should be taken whenever possible to obtain concurrent turbidity and suspended solids concentration measurements.

Given the quality of the sediments being dredged, the measurement of contaminants in the water column (i.e. dissolved metals, hydrocarbons) is not considered necessary. However, other parameters such as temperature, salinity, dissolved oxygen concentration and pH should be measured at the same time that turbidity and total suspended solids concentrations are measured. These data, while not required for compliance monitoring, typically provide context for observed ecological effects that may be due to natural variability in water quality rather than the effects of dredging. While the measurement of dissolved inorganic nutrient concentrations may aid the interpretation of these data, such measurements are not deemed necessary.

9.2.2 Dissolved Oxygen

The dissolve oxygen values measured as part of the baseline surveys (CSIR, 2013b) range between just below 6 mg/ℓ to more than 8 mg/ℓ while the percentage saturation of dissolved oxygen concentrations range between approximately 80% to more than 120%. In general the dissolved oxygen concentrations decreased with depth. Bottom water dissolved oxygen concentrations at numerous of the deeper water stations fell marginally below the South African Water Quality Guidelines for Coastal Marine Waters target of 6 mg/ ℓ l that must be met 95% of the time, but exceeded the target of 5 mg/ℓ l that must be met 99% of the time. These observations were for a summer period when stratification effects are the greatest. It is therefore expected that the dissolved oxygen concentrations in the water column, particularly in the deeper waters, generally would exceed those measured in this study, especially in the winter months when the water column is much less stratified or well-mixed. It is only in the late summer months, when stratification could more significant, that one would expect the dissolved oxygen concentrations to be lower in the near bottom waters than those observed during the February 2013 survey.

9.2.3 Water Quality

The CSIR basic water quality survey provided a detailed overview of the water quality of the port and the potential implications for the port expansion programme. The implications of elevated nutrient concentrations from surface runoff and anthropogenic activities raises concerns related to the potential eutrophication of the dead-end Inner Basins 1, 2 and 3 in the proposed Richards Bay Port Expansion programme. The implication for the proposed expansion programme is that if port development further restricts the exchange of water between ‘dead-end’ basins and the greater Richards Bay and anthropogenic nutrient

inputs continue then there is strong possibility that eutrophic conditions may manifest. This will ultimately lead to the development of hypoxia and possibly even anoxia in bottom water and sediment, with a host of associated adverse ecological impacts. Careful consideration must, therefore, be given during the infrastructure design phase for achieving the maximum possible water exchange between 'dead-end' basins and the greater Richards Bay

9.2.4 Heavy Metals

The CSIR Metal contamination of sediment and implications for dredging (technical) report provided a high resolution spatial understanding of metal contamination of sediment, not only in the expansion footprint, but across the port. It has provided much needed insight into the potential ecological implications of dredging of potentially contaminated sediments required for the port expansion. Recommendations were made with regard to mitigation of the current contamination levels and also how to approach the environmental and legal issues related to the dredging of the sediment. The primary issues raised in the report included that the Inner Basin complex contained metal contaminated sediment of anthropogenic origin, more specifically related to port associated activities. The major implications for the proposed Richards Bay Port Expansion programme was the possibility that the DEA may prohibit unconfined openwater disposal of sediment dredged from certain contaminated areas of Inner Basins 2 and 3, where concentrations of some metals exceeded the Level II of the South African sediment quality guidelines.

9.3 Dump Site Monitoring

9.3.1 Sediment Behaviour Monitoring

There are two aspects to monitoring change in benthic habitats, namely potential smothering impacts and changes in the morphology and sediments constituting those habitats (*e.g*. changes in grain size). For example, there could be significant (even medium-term or progressive) changes/impacts in the sea-floor in the areas surrounding the dredge spoil disposal site.
Monitoring associated with dredging needs to be integrated into the full project cycle and includes:

- the development of an appropriate ***environmental baseline*** against which to assess potential impacts;
- measurements in support of ***impact assessment and any associated modelling****;*
- ***compliance monitoring***; and
- monitoring to ***validate and/or verify impact assessment and associated modelling***.

Abiotic monitoring programs required to develop an appropriate environmental baseline and to support robust impact assessment include:

- monitoring of water quality (primarily turbidity and total suspended solids) in the environment(s) likely to be affected by dredging and dredge spoil disposal activities;
- pre- and post-dredging bathymetric surveys of the dredge site(s) and dredge spoil disposal site;
- sediment quality (biogeochemical) characterisation of the dredge site(s) and dredged spoil disposal site prior to dredging; and
- measurements to support modelling studies undertaken as part of the assessment of environmental impacts

The only other mitigation measures are to follow compliance monitoring procedures and management options diligently and to follow the normal due diligence measures associated with dredging (*e.g*. minimisation of lean mixture overboard *etc.*)

9.3.2 Sediment Properties and Benthos Distribution

It is expected that the grain size distribution and organic content of the sediments at and surrounding the dredge spoil disposal site will change. To assess the nature and duration of these changes it is recommended that surficial sediment grab samples of the seafloor within the bathymetric survey areas should be collected on an approximate 0.5 by 0.5 km grid spacing (or spacing of similar nature informed by knowledge of the ecosystem at these sites), and analysed for sand/silt/mud/organic content. (Given the limited quantity of sediments containing toxicants (metals) it is not anticipated that these surficial sediments will need to be analysed for metals. However, following the Precautionary Principle, initial surveys should perhaps measure metal

concentrations in the sediments identified as being of potential concern). This sampling should be conducted in conjunction with the bathymetric surveys, including the pre- and post-dredging surveys.

9.3.3 Water Quality

Sufficient water quality data are available to provide the requisite baselines for turbidity and total suspended solids concentrations (CSIR, 2013b,c) in the water column for use in the dredging and dredge spoil disposal specialist studies in the Port of Richards Bay. The environmental baseline for turbidity and suspended solids developed for the offshore region has associated with it a degree of uncertainty due to observational biases in the historical data used to develop the base line (see Section 3.8.2). The sediment quality of the material to be dredged has been characterised in CSIR (2013a). These data, indicate that a degree of metal contamination in the proposed dredge location albeit on for the surficial sediments. Recommendations have been made in CSIR (2013a) one how to address any residual concerns in this regard. No recent biogeochemical characterisation of the offshore dredge spoil disposal site could be located. Were such a characterisation to exist it is not clear how representative it would be of present condition as the dredge spoil disposal site is used for ongoing disposal of limited quantities maintenance dredging spoil.

9.3.4 Bathymetric Surveys

Generally pre- and immediate post-dredging bathymetric surveys are recommended for dredge disposal sites to monitor sediment erosion and deposition at and in the vicinity of these sites as these provide a good proxy for a number of potential impacts. Such pre-dredging surveys are required for engineering design and planning. Often the post-dredging survey is also required for verification of dredged and dumped volumes. These pre- and immediate post-dredging surveys should, therefore, not be considered as an additional cost attributable to environmental monitoring requirements alone. Such “in-“ and “out-surveys” have been undertaken for previous dredging programmes for developments within the Port of Richards Bay.
Thus, it is recommended here that immediate post-dredging bathymetric surveys be undertaken of the dredge disposal sites, including an area within 1 km surrounding the areas where disposal and sand sourcing has actually taken place. Ideally a second post-dredging survey needs to be undertaken to assess the sediment mobility and associated bathymetric changes. This survey should take place approximately 12 months after the completion of the immediate post-dredging survey

9.4 Post Dredging Monitoring

Thus, it is recommended here that immediate post-dredging bathymetric surveys be undertaken of the dredge disposal sites, including an area within 1 km surrounding the areas where disposal and sand sourcing has actually taken place. Ideally a second post-dredging survey needs to be undertaken to assess the sediment mobility and associated bathymetric changes. This survey should take place approximately 12 months after the completion of the immediate post-dredging survey.

9.5 Mangroves and Sandflats

During first phase development, issues related to minimizing impacts on the remaining habitats on the site will need to be considered and relevant measures implemented. This would include implementation of measures to prevent contaminated storm water runoff, including that from the proposed surge dam, from entering the intertidal mangroves and ending up on the intertidal sandflats. Measures to implement a buffer zone between developmental activities and the remaining habitat should be considered.

9.6 Vegetation and Wetlands

During specialist investigations it was determined that threatened and protected plant and tree species were present on site. The Contractor is to undertake a search and rescue programme prior to construction commencement in all areas of their operations (including access roads and temporary fencing areas). The plant species listed in Table 7 have a high likelihood of occurring on site.

Table 9: Protected / threatened plant species and likelihood of site occurrence

Species	Family	Threat Status	Habitat and Ecology	Threats
Adenia gummifera var. *gummifera*	PASSIFLORACEAE	Declining	Forested ravines, forest patches and forest margins, forest scrub, miombo woodland, savanna, dune forest, on stony slopes, termitaria and littoral bush	Used medicinally
Bonatea lamprophylla	ORCHIDACEAE	VU	Forest; deeply shaded areas in coastal dune forest	Harvesting/collecting, habitat loss
Didymoplexus verrucosa	ORCHIDACEAE	VU	Coastal dune forest, grows in leaf litter on forest floor	Habitat loss
Dioscorea sylvatica	DIOSCOREACEAE	VU	Wooded and relatively mesic places, such as the moister bushveld areas, coastal bush and wooded mountain kloofs	Over-exploitation due to medicinal use
Disperis johnstonii	ORCHIDACEAE	NT	Forest, savanna; *Brachystegia* woodland, forest patches, usually in shelter of rocks	Potentially threatened by coastal development, subsistence agriculture, informal settlements and alien plant invasion
Elaeodendron croceum	CELASTRACEAE	Declining	Forest; margins of coastal and montane forests	Used medicinally
Eulophia speciosa	ORCHIDACEAE	Declining	Various habitats including sand dunes, bushveld, thornveld and montane grasslands	Harvesting for the medicinal plant trade and habitat loss
Kniphofia leucocephala	ASPHODELACEAE	CR	Wetlands in low lying coastal grassland, in moist, black, sandy clay soil	Transformation of grasslands by urban development, commercial forestry plantations, commercial sugarcane and subsistence farming
Kniphofia littoralis	ASPHODELACEAE	NT	Coastal grassland, moist depressions, not usually in permanently waterlogged soils	Habitat loss due to agriculture, forestry and urban expansion

The trees species listed in Table 8 were recorded on site and are protected according to the National Forests Act, 1998 (Act 84 of 1998). The removal or damage of these trees would require a licence. In addition, mangrove species are protected under Sections 15(1) and 15(3) of the National Forests Act 1998 (Act no 84 of 1998), which includes *Bruguiera gymnorrhiza* and *Rhizophora mucronata*.

Table 10: Protected tree species occurring on site

Species	Common name	Family
Ficus trichopoda	Swamp fig	MORACEAE
Barrintonia racemosa	Powder-puff tree	LECYTHIDACEAE
Bruguiera gymnorrhiza	Black mangrove	RHIZOPHERACEAE
Mimusops caffra	Coastal red milkwood	SAPOTACEAE
Rhizophora mucronata	Red mangrove	RHIZOPHERACEAE
Sideroxylon inerme subsp. *inerme*	White milkwood	SAPOTACEAE

The Contractor is also to take note that The National Forests Act (No 84 of 1998) controls the management of forestry in the country and aims to promote the sustainable utilisation of forests for environmental, economic and educational purposes. By definition mangroves are classified as natural forests and as such a licence is required for the removal or harvesting of trees. Therefore any mangrove harvesting at Richards Bay Harbour and other such forests identified would be illegal and subject to a fine or imprisonment.

10. Associated Forms

The list of applicable environmental forms and templates will be maintained by TCP's Document Management Department, and these are revised as and when required.

11. Records

All environmental records/documents generated during the construction phase of the project will be managed in terms of the TCP Document Management Procedure for records retention.

12. Annexures

Annexure A: Contents for Contractor's Environmental File

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CONTENTS FOR CONTRACTOR'S ENVIRONMENTAL FILE

PROJECT NAME:		**DOCUMENT NO:**	
PROJECT NO:		**DATE:**	
CONTRACTOR:		**CONTRACT NO:**	

The following documents must be incorporated into the Contractors Environmental File

No	Item Description	Document No	Tick
1.1	Transnet Safety, Health, Environmental and Quality – Risk Management Policy Statement dated 03 April 2011.		
1.2	Transnet Capital Projects Safety, Security, Health, Environmental Management and Quality Policy dated 2 March 2012.		
1.3	Transnet Capital Projects Construction Environmental Management Plan (CEMP) as supplied to Contractor by TCP	ENV-STD-0001	
1.4	Transnet Capital Projects Standard Environmental Specification (SES) as supplied to Contractor by TCP	ENV-STD-0002	
2	Project Environmental Specification (PES) as supplied to Contractor by Transnet Capital Projects	ENV-FAT-0001	
3	Declaration of Understanding (Signed)	ENV-FAT-0002	
4.1	Contractor's Information	ENV-FAT-0003	
4.2	Contractor's Environmental Policy		
4.3	Contractor's Organogram		
4.4	Contractor's Environmental Management Plan		
4.5	Appointment of Contractors EO and Declaration of Understanding (Including CV and Job Profile)	ENV-FAT-0004	
5	Schedule of Contractor's Construction Plant and Equipment	ENV-FAT-0005	
6	Hazardous Substances Register	ENV-FAT-0006	
7	Emergency Contacts Register	ENV-FAT-0007	
8	List of Interested and Affected Parties	ENV-FAT-0008	
9	Induction Attendance Register	Revision 00-01	
10	Project Start-Up Checklist	ENV-FAT-0022	

ENV-LIS-0001 Rev 1 Page 1

TRANSNET

CONTENTS FOR CONTRACTOR'S ENVIRONMENTAL FILE

11	Site Access Certificate	**ENV-FAT-0010**	
12	Method Statement Register	**ENV-FAT-0011**	
13	Method Statements	**ENV-FAT-0026**	
14	Waste Disposal Register	**ENV-FAT-0012**	
15	Daily Inspection Checklist	**ENV-FAT-0023**	
16	Weekly Inspection Checklist	**ENV-FAT-0024**	
17	Monthly Compliance Audits	**ENV-FAT-0025**	
18	Public Complaints Register	**ENV-FAT-0013**	
19	Record of Formal External Communications	**ENV-FAT-0014**	
20	Incident Register	**ENV-FAT-0015**	
21	Incident Reports	**ENV-FAT-0016**	
22	Non Conformance Register	**ENV-FAT-0017**	
23	Non Conformance Reports	**ENV-FAT-0018**	
24	Awareness/Toolbox Attendance Register (Including Awareness Material)	**Revision 00-01**	
25	Minutes of Monthly SHE Meetings		
26.1	Environmental Site Rules for Visitors	**ENV-GL-0002**	
26.2	Environmental Site Rules for Contractors	**ENV-GL-0003**	
27	Basic Site Procedures	**ENV-GL-0001**	
28	Contractor's Environmental Management File Handover	**ENV-FAT-0020**	
29	Site Closure Inspection Form	**ENV-FAT-0027**	
30	Site Closure Certificate	**ENV-FAT-0021**	

Annexure B: Environmental Method Statement Example

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ENVIRONMENTAL METHOD STATEMENT

MONITORING AND RECORD KEEPING (Describe how the activity will be monitored to ensure that the environmental standards are met, as well as the records to be kept):

1. Weekly Inspections by Contractor EO	Record: Weekly Checklist
2. Monthly audits by Employer EO	Record: Monthly Compliance Audit Checklist
3. Incident Reporting	Record: Environmental Incident Reports including corrective action and NCR's if needed
4. Public complaints	Record: Formal External Communications register
5. Staff Training	Record: Induction training register and templates of DSTI's

DECLARATIONS

CONTRACTOR'S ENVIRONMENTAL OFFICER The work described in this Environmental Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm:

Print Name	Signature	Date

PERSON UNDERTAKING THE WORKS I understand the contents of this Environmental Method Statement and the scope of the works required of me. I further understand that this Environmental Method Statement may be amended on application to other signatories and that Transnet Capital Projects Environmental Manager and Construction Manager will audit my compliance with the contents of this Environmental Method Statement

Print Name	Signature	Date

TCP ENVIRONMENTAL OFFICER The work described in this Environmental Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm:

Print Name	Signature	Date

APPROVING AUTHORITY (i.e. the Employer's Construction Manager)

The works described in this Method Statement are approved.

Print Name	Signature	Date

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ENVIRONMENTAL METHOD STATEMENT

PROJECT NAME: Mahulumbe Formation Rehabilitation

PROJECT NO: 4422 512.003 **DOCUMENT NO: ENV-MS-007**

CONTRACTOR: TCP-RME **DATE: 13/06/2011**

PROPOSED ACTIVITY (give title of method statement and reference number from the CEMP):

4.10 Fire Prevention

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

- The making of fires for heating and cooking purposes on site
- Provision of fire extinguishers to site
- Clearance of vegetation around the perimeter of the camp fence as a fire break

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

- On the Coal line approximately 10 kilometers South-East of Paulpietersburg. Refer to the sketches attached for a detailed layout of the site camp and surrounding areas.

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date: 27/06/2011 End Date: 18/04/2012

DESCRIPTION OF HOW POTENTIAL ENVIRONMENTAL IMPACTS WILL BE PREVENTED OR MANAGED (provide as much detail as possible, including annotated sketches and plans where possible):

- Fires shall only be made in designated areas in facilities specially constructed for this purpose and by the use of adequate equipment
- The fire break around the camp fence will never be wider than 1.5 meters
- All site vehicles will be equipped with fire extinguishers
- Fire extinguishers will be placed at strategic positions as indicated by the site camp layout plan

ENVIRONMENTAL STANDARDS (list the applicable environmental standards to be met):

- Standard Environmental Specifications (ENV-STD-001)
- National Veld and Forest Fire Act No.101 of 1998 (Section 10(2), 12-18, 24-25, 27)
- National environmental Management Act No. 107 of 1998 (Section 30 (3d (i), 10c))
- The Occupation Health and Safety Act

Annexure C: Declaration of Understanding

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DECLARATION OF UNDERSTANDING

PROJECT NAME:		**DOCUMENT NO:**	
PROJECT NO:		**DATE:**	
CONTRACTOR:		**CONTRACT NO:**	

I,

_____ _____

(Name) *(Designation)*

_____

(Representing)

Declare that I have read and understood the contents of the Construction Environmental Management Plan (TCP-EM-CEMP-002) and associated documents for the above mentioned Project and Contract.

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed	Signature	Date
Place		
Witness 1:	Signature	Date
Witness 2:		

ENV-FAT-0002 Rev 1 Page 1

Annexure D: Appointment of Contractor's Environmental Officer

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APPOINTMENT OF CONTRACTOR ENVIRONMENTAL OFFICER & DECLARATION OF UNDERSTANDING

APPOINTMENT OF CONTRACTOR ENVIRONMENTAL OFFICER AND DECLARATION OF UNDERSTANDING	REFERENCE	

We, _____ *(Contractor)*, hereby confirm that

_____has been appointed as Environmental Officer for the duration of Contract

_____, the scope of which entails _____

_____

_____ (Description of scope of works)

_____

I, _____ (Appointed Environmental Officer) declare that I have read and understand the contents of:

- The TCP Construction Environmental Management Plan (CEMP) and Standard Environmental Specification (SES), documentation issued for Contract _____

I, (Appointed Environmental Officer) also declare that I understand my responsibilities in terms of enforcing and implementing the requirements of the Construction Environmental Management Plan, Standard Environmental Specification (SES) and any Project Environmental Specifications (PES) that may be relevant or required for this project.

Environmental Officer CV attached	Y	N	**Environmental Officer Job Description attached**	Y	N
Signed	Signature		**Date**		
Received By (Transnet Projects Environmental Officer)	Signature		**Date**		

ENV-FAT-0004 Rev 1 Page 1