

PART 3

PROPOSED RICHARDS BAY CENTRAL INDUSTRIAL AREA

**ENVIRONMENTAL IMPACT ASSESSMENT
PART 3: ENVIRONMENTAL MANAGEMENT PLAN**

August 2010

REPORTS PRODUCED AS PART OF THIS EIA:

- Part 1: Environmental Impact Assessment Report
- Part 2: Specialist Reports
- Part 3: Environmental Management Plan**

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LIST OF ACRONYMS/ABBREVIATIONS

CARA:	Conservation of Agricultural Resources Act
CES:	Coastal and Environmental Services
CIA:	Central Industrial Area
CITES	Convention on International Trade in Endangered Species
CLO:	Community Liaison Officer
CSF:	Co-ordinating Social Facilitator
DAEARD:	Department of Agriculture, Environmental Affairs and Rural Development
DEAET	Department of Economic Affairs, Environment and Tourism
DEA:	Department of Environmental Affairs
DEO	Designated Environmental Officer
DWAF:	Department of Water Affairs and Forestry
DWEA:	Department of Water and Environmental Affairs
EAP:	Environmental Assessment Practitioner
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment
EIR:	Environmental Impact Report
EMP:	Environmental Management Plan
EMS	Environmental Management System
ESO:	Environmental Site Officer
HIV/AIDS:	Human immunodeficiency virus / Acquired Immune Deficiency Syndrome
IEA:	Independent Environmental Auditor
I&APs:	Interested and Affected Parties
KPI:	Key Performance Indicator
NEMA:	National Environmental Management Act 107 of 1998 as amended in 2006
PNCO:	Provincial Nature Conservation Ordinance
PSC:	Project Steering Committee
SAHRA:	South African Heritage Resources Agency
SSC:	Species of Special Concern

1 INTRODUCTION

1.1 Environmental Management Plans

The Bill of Rights – Chapter 2 of the Constitution Act (Act No. 108 of 1996), includes an environmental right (Section 24) according to which, “*everyone has the right to an environment that is not harmful to their health or well being and to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and the sustainable use of natural resources while promoting justifiable economic and social development*”. In addition, Section 28 of the National Environmental Management Act (Act No. 107 of 1998) (NEMA), requires, “*every person causing significant pollution or degradation of the environment, to take reasonable measures to prevent it from occurring, continuing or recurring*”. Therefore, in order to promote effective environmental management throughout the life-cycle of a project, it is important that management actions arising from Environmental Impact Assessments (EIAs) are clearly defined and translated into an Environmental Management Plan (EMP) for the design, construction, operation and/or decommissioning phases of a project.

According to the Western Cape Department of Water and Environmental Affairs and Development Planning (2005), an Environmental Management Plan (EMP) can be defined as, “*an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the project are enhanced*”. The purpose of an EMP is therefore to:-

- Encourage good management practices through planning and commitment to environmental issues;
- Define how the management of the environment is reported and performance evaluated;
- Provide rational and practical environmental guidelines to:
 - Minimise the extent of environmental impacts and to manage environmental impacts and where possible, to improve the condition of the environment;
 - Prevent long-term or permanent environmental degradation.
 - Comply with all applicable laws, regulations, standards and guidelines for the protection of the environment;
 - Provide guidance regarding method statements which are required to be implemented to achieve environmental specifications;
 - Define the corrective actions which must be taken in the event of non-compliance with the specifications of the EMP;
 - Describe all monitoring procedures required to identify impacts on the environment, and;
 - Train employees and contractors with regard to environmental obligations.

EMPs are very important tools in the sound environmental management of projects, provided that the specifications are implemented and the user understands the contents of the report, and the reasons for the implementation of certain specifications.

There are essentially four broad categories of EMPs: Design EMP, Construction EMP, Operational EMP and Decommissioning EMP. The objectives of these EMPs are all the same and include; identifying the possible environmental impacts of the proposed activity, and developing measures to minimise, mitigate and manage the negative impacts while enhancing the positive ones. The difference between these EMPs is related to the different mitigation measures required for the different stages of the project lifecycle. Each category of EMP is discussed in more detail below.

Design EMP: The Design EMP is an integral component of the project life cycle and requires interaction between the design engineers and environmental consultants to ensure that the engineers are aware of the environmental constraints that they must consider and incorporate these into the final design of the project. The format of the design EMP is that of a checklist in nature, to ensure that all specifications are included in the design phase. The design EMP phase

requires ongoing and in-depth discussions between the contractors final design team and the environmental officer. The engineer will have to cost for and be available for ongoing discussions with the environmental officer at all stages of final design.

Construction EMP: The construction phase EMP provides specific environmental guidance for the construction phase of a project where impacts range from those incurred during start-up (e.g. site clearing) to construction activities (e.g. erosion). The Construction EMP consists of both a management system and environmental specifications which contain detailed specifications that need to be undertaken or adhered to by the contractor. Two types of specifications need to be complied with by the contractor namely; standard and specific. Standard specifications apply to all project components and specific specifications outline specific instructions for managing and minimising environmental impacts resulting from the actual activity. The Construction EMP needs to be developed in parallel with the Final Design Stages, and constructive input should be invited from the selected contractor. Sound environmental management is orientated around a pragmatic, unambiguous but enforceable set of guidelines and specifications, and for this reason it is imperative that the contractor, while being bound by the EMP, fully understands it and has had input into its development. Although the contractor tenders on the EMP that has been approved by the relevant authority, it must also be understood that the EMP is a dynamic document that is subject to change.

Operational EMP: The operational phase EMP provides specific guidance related to operational activities associated with a particular development. Operational EMPs are sometimes referred to as Environmental Management Systems (EMS).

Decommissioning EMP: As the final phase in the project cycle, decommissioning may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impacts associated with operational activities. However, depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operations have ceased. Examples of potential residual impacts and risks include contamination of soil and groundwater and old (unserviceable) structures. Decommissioning phase EMPs are typically encountered within extractive industries such as minerals mining and oil and gas exploration and extraction.

It is widely recognised that there is no standard format for EMPs. The format needs to fit the circumstances in which the EMP is being developed and the requirements that it is designed to meet (World Bank, 1999; CSIR, 2002; DEAT 2004b). Additionally, the level of detail in an EMP varies depending on the size of the project as well as the magnitude of environmental impacts. Section 1.2 below provides an overview of the information that needs to be included in the EMP based on current South African legislative requirements.

1.2 Contents of the EMP

The contents of the EMP must be consistent with the requirements as set out in Regulation 34 of the EIA Regulations published as Government Notice No R. 385 in Government Gazette No 28753 of 21 April 2006 in terms of Chapter 5 of the National Environmental Management Act No 107 of 1998 (NEMA).

According to Regulation 34, an environmental management plan must include –

- a) Details of –
 - (i) the person who prepared the environmental management plan; and
 - (ii) the expertise of that person to prepare an environmental management plan;
- b) Information on any proposed management of mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of –
 - (i) planning and design;
 - (ii) pre-construction and construction activities;
 - (iii) operation and undertaking of the activity;

- (iv) rehabilitation of the environment; and
- (v) closure, where relevant.
- c) A detailed description of the aspects of the activity that are covered by the environmental management plan;
- d) An identification of the persons who will be responsible for the implementation of the measures contemplated in paragraph (b);
- e) Where appropriate, time periods within which the measures contemplated in the environmental management plan must be implemented; and
- f) Proposed mechanisms for monitoring compliance with the environmental management plan and reporting thereon.

Provided in the Chapters that follow is the EMP for the proposed establishment of the Richards Bay Central Industrial Area Project, based on the requirements of Regulation 34 of the EIA Regulations (GNR 385) as detailed above.

2 BACKGROUND INFORMATION

Provided below is a brief description of the proposed establishment of the Richards Bay Central Industrial Area Project. Should a more detailed project description be required, the reader should refer to Chapter 2 of *Volume 3: Draft Environmental Impact Assessment Report* (CES, June 2010) of the suite of documents for this project.

2.1 The establishment of the Richards Bay Central Industrial Area (CIA)

The proposed development site is located at the base of the Mhlathuze/Richards Bay Catchment, which quaternary catchment measures about 405 km² (DWAF 2003). The major river in the catchment, the Mhlathuze River, has a mean annual runoff of 938 mill m³/a (DWAF 2003). Current land use in the catchment area is mainly agricultural.

The proposed site is located on the western side of the Central Business District (CBD) of Richards Bay and Alton North (The centre of the study area at 28°44'45.10"S; 32°2'27.61"E). The site is bounded by Guldengracht on the southern side, the MNR231 (Northern Central Arterial) to Mtubatuba on the northern side, the Central Arterial Road reserve parallel to Ceramic Curve on the western side and the west Central Arterial Road reserve parallel to Bullion Boulevard on the eastern side. The proposed development site is a rectangular shape of roughly 135 hectares. It is surrounded by industrial development, both established and ongoing (Figure 2-1).

The proposed development site is 132 hectares in extent and roughly rectangular in shape. It is surrounded by industrial development, both established and ongoing. An overhead powerline traverses the eastern and northern boundaries of the site. There are also a number of buried cables and pipelines which cross the site (Drennan, Maud & Partners 2008). There is an isolated sand blasting business located to the south of the proposed site on the old north-south trending tar road. The site is otherwise undeveloped.

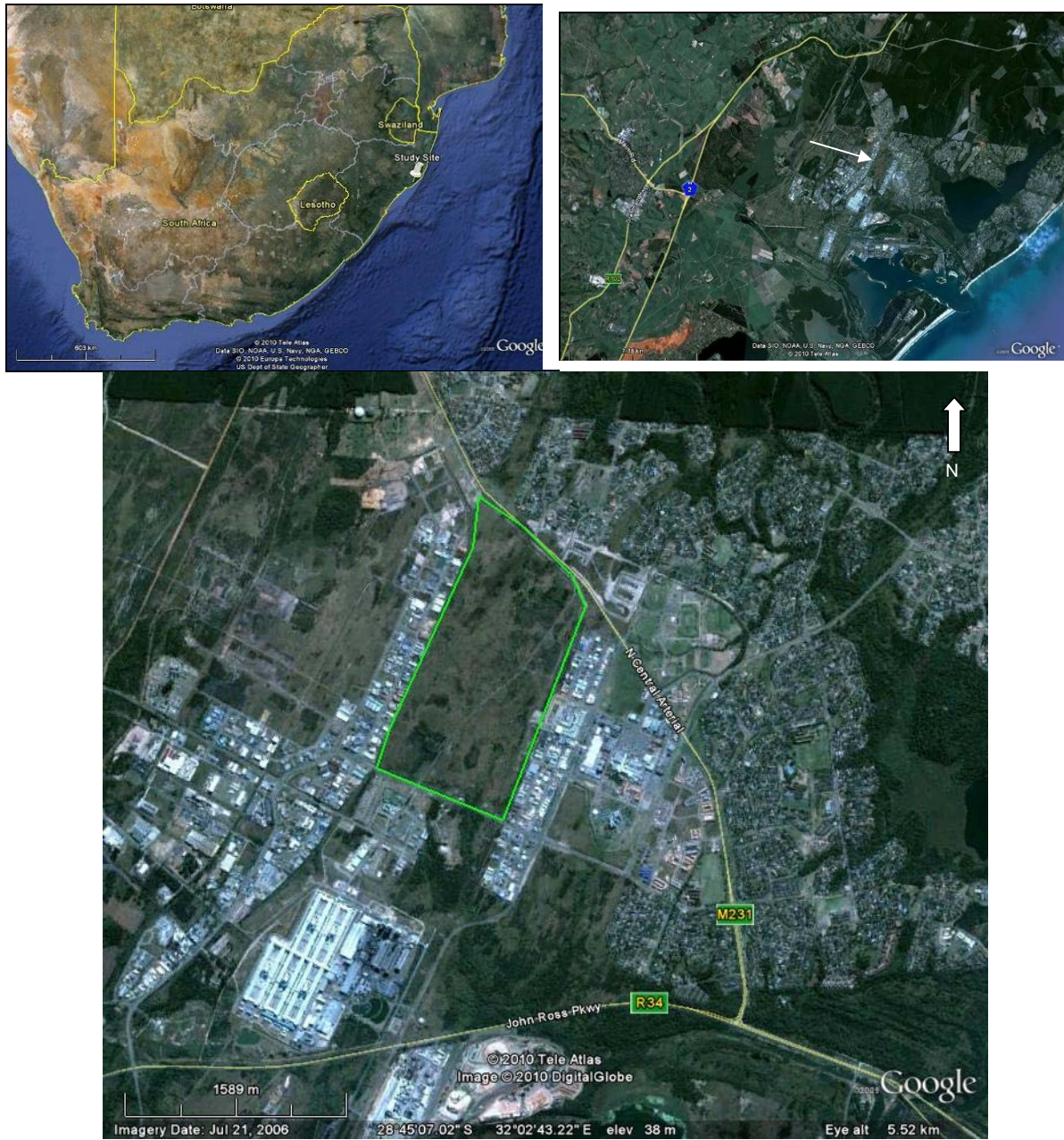


Figure 2-1: Location of the proposed development (green polygon) in relation to Richards Bay

2.2 Development concept

The area is proposed to be developed for a combination of “General Industry”, “Service Industry”, “Limited Commercial”, “Public Car Park” and “Public Open Space”. Figure 2-2 indicates the site layout plan for the proposed Richards Bay CIA.

Apart from the primary infrastructure required for the Richards Bay CIA, there is also a need for auxiliary infrastructure and services. Although the detailed design of the CIA has not yet been finalised, the expected auxiliary infrastructure and services are described in section 2.2.1 below.

2.2.1 Internal Services

Access

Access roads will have a road width of 8m and a reserve of 20m. The local distributor will be 8m wide and have a reserve of 25m. The minimum gradient of all roads will be 0.4%.

Structural design of the roads will depend on geotechnical surveys.

Stormwater Drainage

The bulk municipal stormwater system abutting the CIA comprises the following:

- Western side: Open canal, running parallel to Central Arterial Road Reserve.
- Southern side: Open canal, running parallel to Guldengracht, discharging into Ngodweni Canal on South-Eastern corner.
- Eastern side: Open canal, running parallel to West Central Arterial road reserve, discharging into the Ngodweni Canal.

Drainage canals in the CIA follow the above described stormwater system along the corresponding property boundaries illustrated in Figure 2-1.

There is a possibility for connections to existing pipe reticulation in Krugerrand, and subsequently discharging into the Lake Mzingazi system. These pipes are currently operating at their maximum capacity. If the Mzingazi system is to be utilized, additional pipes will have to be constructed to the road crossing at the MR231 next to the new Police Station, where-after it will discharge into the open canal, running towards Birdwood. Messrs SNA confirmed that the culvert at the road crossing is operating at capacity. Refer to Figure 2-3 for a layout of existing services.

It is proposed that the CIA stormwater system will consist of a minor and major system discharging into the municipal system. The minor system will consist of surface drainage from sites, stormwater connection to each site, stormwater kerb inlets to drain roads and subsurface piped reticulation, as well as open canals. The major system consists of major pipes, open canals, natural wetlands and retention dams as well as culverts. Concrete stormwater pipes ranging in size from 450mm diameter to 1 500mm diameter will be used, and will discharge into open canals which will in turn discharge into retention areas and retention ponds. Refer to Figure 2-4 for the preliminary stormwater layout.

An area of 5,3ha forms a natural depression and is proposed as a retention area for stormwater. The area is naturally approximately 1,5m to 3,5m lower than the rest of the CIA site. It is proposed that three separate retention ponds be constructed to facilitate the catchment of debris and primary purification of water, before being discharged into the watercourse called the Ngodweni Canal.

Four smaller existing quarry excavations abutting Guldengracht will also be converted into retention ponds. The areas measure 0,36ha, 0,26ha, 0,56ha and 0,3ha respectively.

Stormwater from the South-Western portion will discharge into the Guldengracht ponds and open canal and subsequently into the Ngodweni Canal.

Stormwater from the North-Eastern portion will discharge into a new open canal running parallel to the West Central Arterial road reserve, subsequently running through the retention ponds and discharging into the Ngodweni Canal.

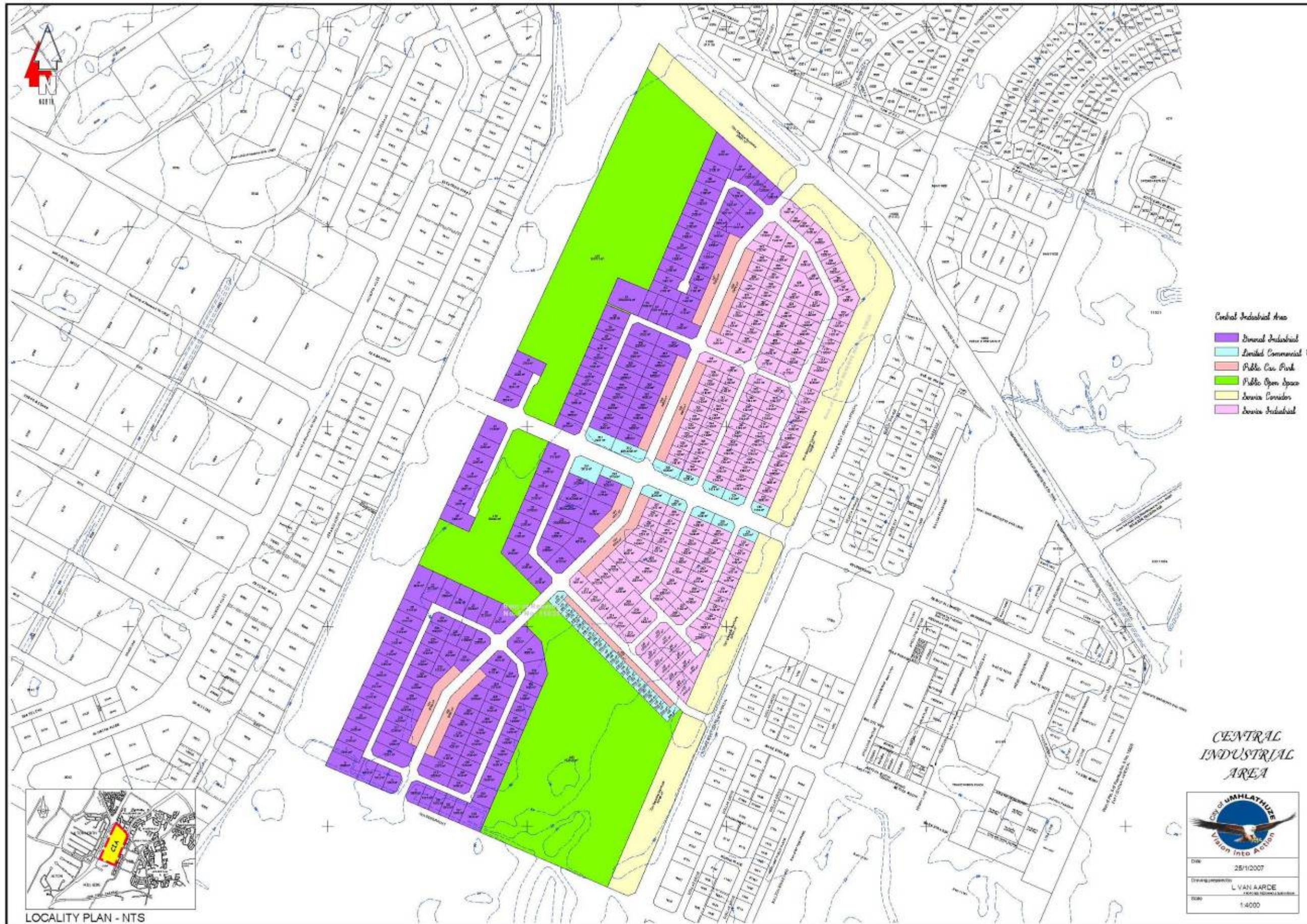
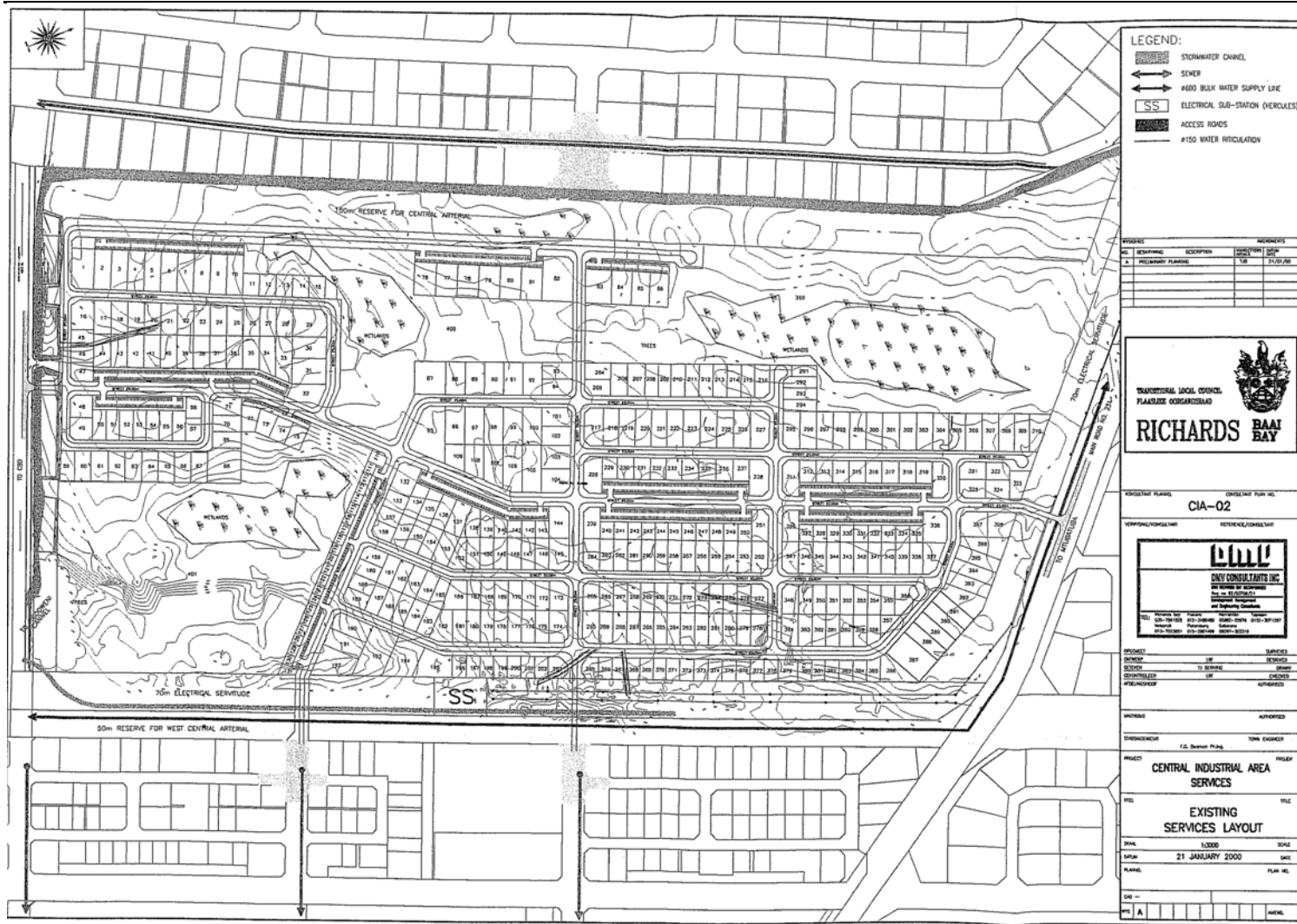


Figure 2-2: Proposed layout of Richards Bay CIA

Part 3: Environmental Management Plan



LEGEND:

- STORMWATER CHANNEL
- SEWER
- #600 BULK WATER SUPPLY LINE
- ELECTRICAL SUB-STATION (HERCULES)
- ACCESS ROADS
- #150 water reticulation symbol"/> #150 WATER RETICULATION

SYMBOLS	DESCRIPTION	DATE
1	REVISION	21/01/00
2	PRELIMINARY PLANNING	21/01/00



PROJECT PLAN: CIA-02



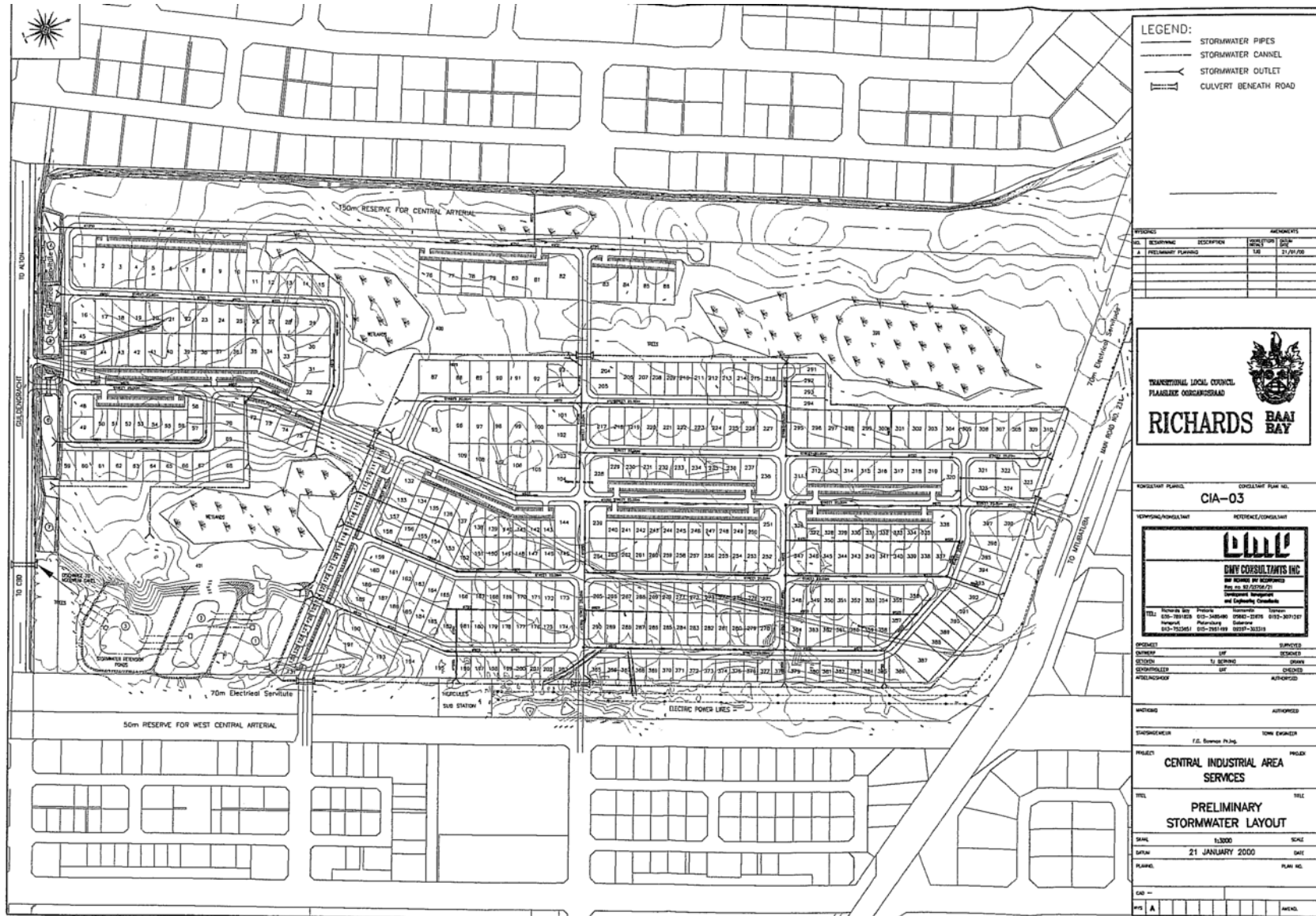
PROJECT	SERVICES
DESIGNED	DESIGNED
CHECKED	CHECKED
APPROVED	APPROVED

DATE: 21 JANUARY 2000

PROJECT	TITLE
CENTRAL INDUSTRIAL AREA SERVICES	EXISTING SERVICES LAYOUT
DATE: 21 JANUARY 2000	SCALE: 1:3000
DATE: 21 JANUARY 2000	DATE: 21 JANUARY 2000
DATE: 21 JANUARY 2000	DATE: 21 JANUARY 2000

Figure 2-3: Existing services layout

Part 3: Environmental Management Plan



LEGEND:

- STORMWATER PIPES
- STORMWATER CANAL
- STORMWATER OUTLET
- CULVERT BENEATH ROAD

NO.	REVISION	DESCRIPTION	DATE	BY
1	A	PRELIMINARY PLANNING	10	21/01/00

PROJECT: TRANSMUTATIONAL LOCAL COVENANT
PLANNING: RICHARDS BAY

CONCEPT PLAN NO.: CIA-03

ENGINEER/CONSULTANT: **ENVIRONMENTAL CONSULTANTS**
ENVIRONMENTAL CONSULTANTS
ENVIRONMENTAL ENGINEERS
AND ENGINEERING CONSULTANTS
 100 ROSS STREET, PORT ELIZABETH, SOUTH AFRICA
 TEL: 031-261-1234 FAX: 031-261-1234
 MOBILE: 082-999-1234
 E-MAIL: info@enviro-consultants.co.za

PROJECT	DATE	STATUS
DESIGNED	10	DESIGNED
CHECKED	10	CHECKED
APPROVED	10	APPROVED

PROJECT: CENTRAL INDUSTRIAL AREA SERVICES
TITLE: PRELIMINARY STORMWATER LAYOUT
SCALE: 1:3000
DATE: 21 JANUARY 2000
PLAN NO.:

Figure 2-4: Preliminary stormwater layout

Sewage

The hydraulic design of the sewage reticulation system will be designed to the standards as set out in the “Guidelines for the Provision of Engineering Services and Amenities in Township Developments”.

The figures for the determination of sewer flow from light industrial townships were taken from the Johannesburg Metropolitan Council guidelines. Estimated flow for light industrial is 15 000 litres per day per hectare, plus 12% with a peak factor of 2.

Possible connections to the main sewer system include the following:

Eastern side: Existing drawings indicate a planned future extension of the Mark Strasse trunk sewer into the site to drain the sewage from the planned CIA. As-Built drawings indicate that sewer pipes in Krugerrand, Mark Strasse and Guldengracht are operating near their maximum design capacity. A new trunk sewer will therefore have to be constructed for the CIA from the extension of Mark Strasse to the Nkoninga Gravitation Trunk Sewer. It could not be confirmed whether the Nkoninga Trunk Sewer would accommodate the additional flow. As-Built information indicated that it was designed to operate near maximum capacity without the additional sewer from the CIA. Discussions with relevant officials indicated that the sewer was currently under-utilized.

Western side: Sewer pipes servicing Ceramic Curve are operating near their design capacity. The trunk sewer runs from the corner of Chloor Kring and Alumin Allee to the Alton Main Sewer and Alton Macerator station.

Sewage will gravitate towards the south-eastern corner of the site with a connection to the proposed new bulk sewer at the extension of Mark Strasse. Sewers will range from 150mm to 400mm diameter and will be buried between 0.8m to 4.0m below natural ground level.

The maximum manhole spacing will be limited to 100m to facilitate ease of maintenance.

Water reticulation and supply

The calculation of water demand was based on an estimate of 398 erven with a daily requirement of 4 000 litres per erf. A minimum peak factor of four has been used and fire flow of 25 litres per stand.

Fire hydrants will be a maximum of 120m apart and will be connected to the main reticulation grid.

The water distribution system will form a looped grid pattern with pipes ranging from 150mm to 350mm in diameter. Each erf will be supplied with a separate connection and water meter. The CIA water reticulation system will be connected to the municipal bulk main at the access to Guldengracht Street in the first phase and subsequently at the access to MNR231 in subsequent phases.

Solid waste

The uMhlathuze Municipality will collect solid waste from individual erven on a weekly basis and the proposed development does not include a centralized site for temporary storage of solid waste. Adequate provision for most industrial waste has been made in the Municipality’s strategic waste plans.

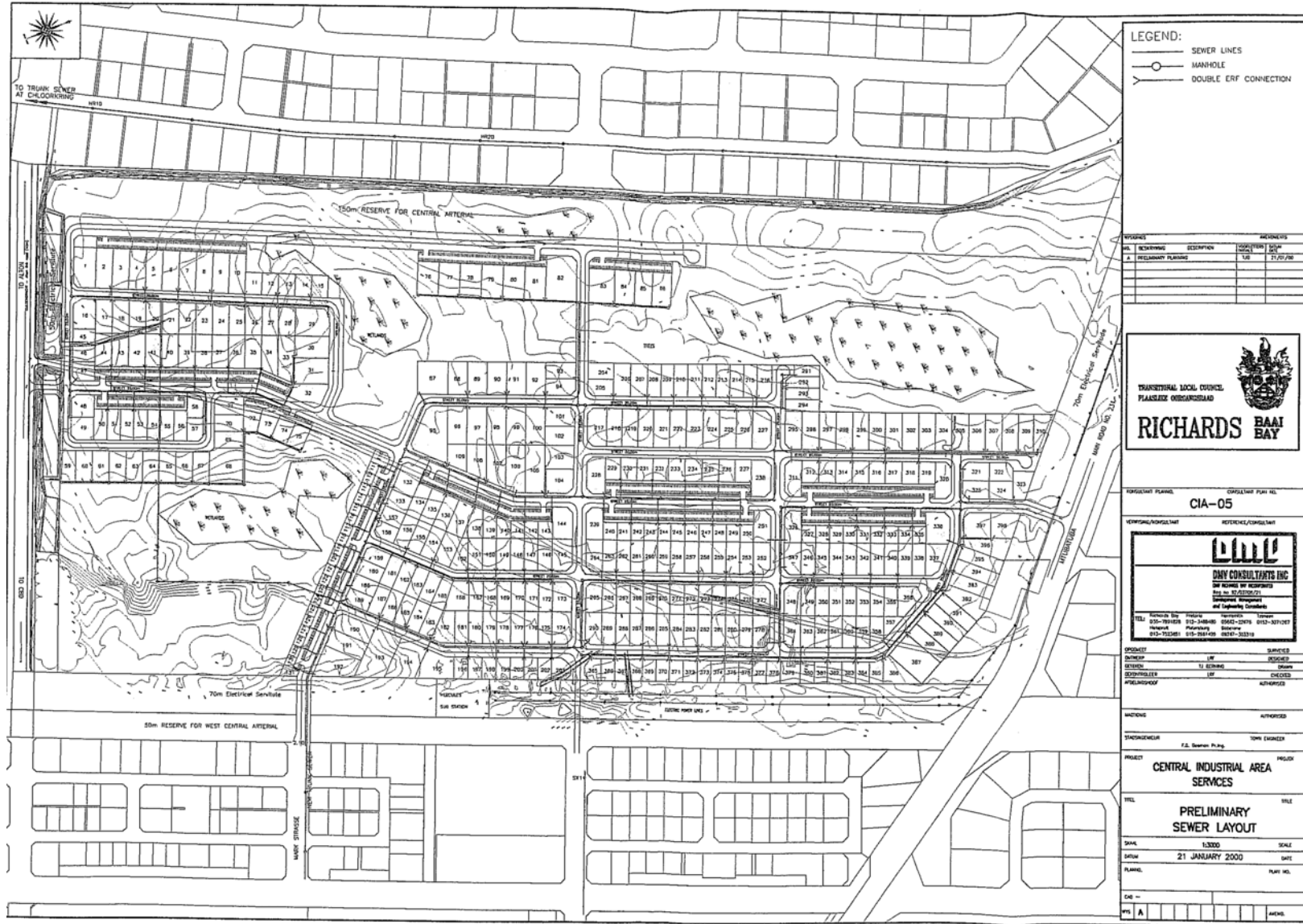
Electricity

Two 11kV cables will be installed from the existing Scorpio 132kV substation, running on either side of an existing 70m electrical servitude towards the existing Hercules 132kV substation. From there, two 11kV cables would be installed on either side of the proposed extension of Krugerrand through the CIA towards the proposed CIA 11kV substation, and further following the existing road network through Alton towards the proposed Andros 11kV substation (note that the construction of the proposed Andros substation and the link towards the existing Phoenix Substation is not to be covered in this application - it is being addressed as a separate exercise).

A link would also be provided running through the proposed CIA from the proposed extension of Mark Strasse towards the proposed CIA 11kV substation.

The map also shows the existence of two cables on either side of the proposed extension of Krugerrand, as well as a cable running through the omnibus servitude of a few erven. Where necessary, a servitude would be registered to protect these existing cables.

Part 3: Environmental Management Plan



LEGEND:
 SEWER LINES
 MANHOLE
 DOUBLE ERF CONNECTION

NO.	REVISION	DESCRIPTION	DATE	BY
1	A	PRELIMINARY PLANNING	1/15/2000	...

PROPOSAL PLAN NO. CIA-05

RICHARDS BAY
 TRANSITIONAL LOCAL COUNCIL
 FLAKSLEKKE ØKONOMISKE

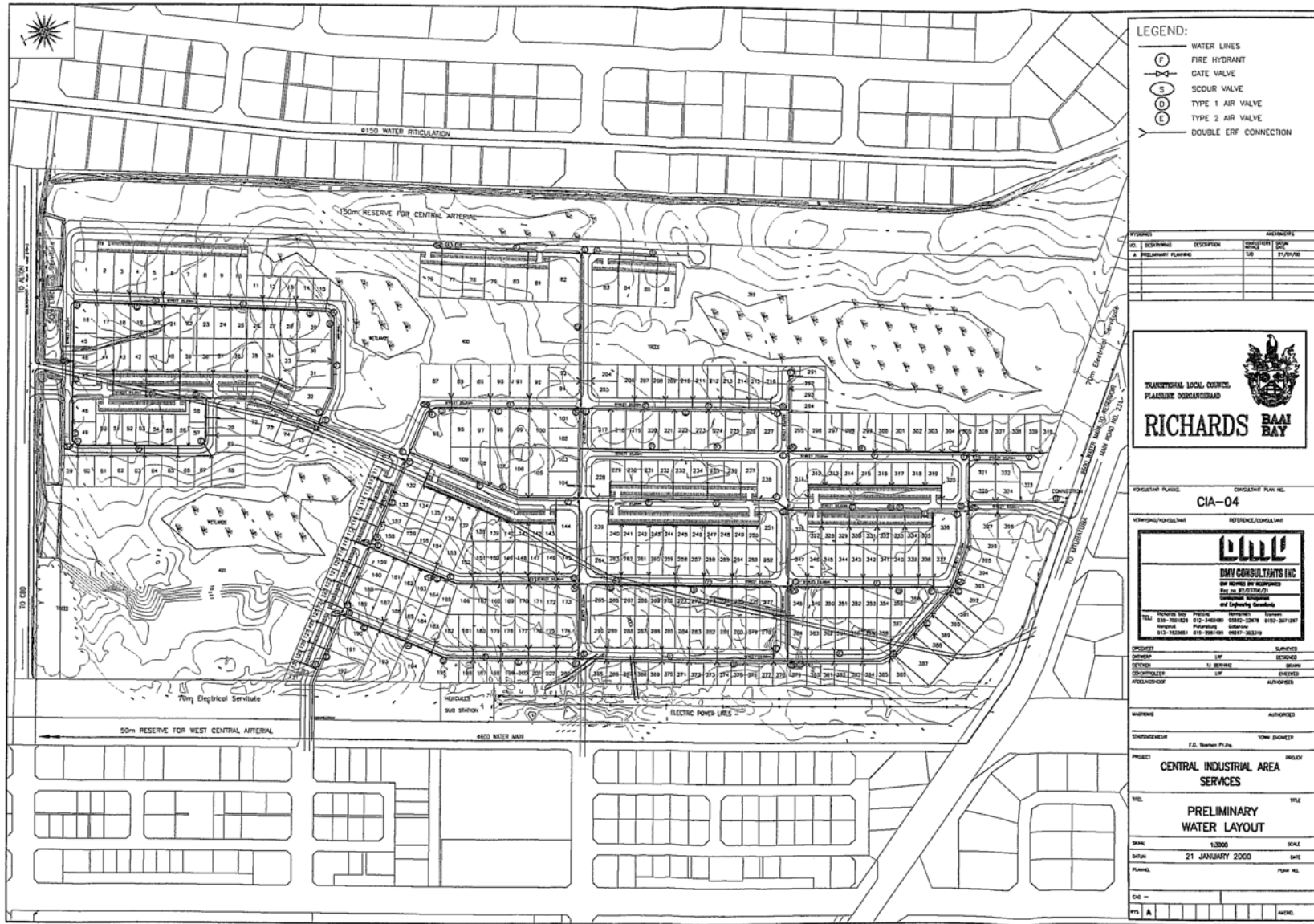
DMV CONSULTANTS INC.
 101 KENNEDY BLVD. #100
 SCARBOROUGH, ONTARIO M1V 1Z1
 TEL: (416) 291-1111 FAX: (416) 291-1112
 WWW.DMVCONSULTANTS.COM

DESIGNED BY	DATE	REVISION	DATE
1/15/2000	1/15/2000	0001	1/15/2000

PROJECT: CENTRAL INDUSTRIAL AREA SERVICES
SITE: PRELIMINARY SEWER LAYOUT
 SCALE: 1:3000
 DATE: 21 JANUARY 2000
 SHEET: 1 OF 1
 PLAN NO.:

Figure 2-5: Preliminary sewer layout


Part 3: Environmental Management Plan




LEGEND:

- WATER LINES
- ⊕ FIRE HYDRANT
- ⊘ GATE VALVE
- ⊙ SCOUR VALVE
- ⊖ TYPE 1 AIR VALVE
- ⊖ TYPE 2 AIR VALVE
- ⊕ DOUBLE ERF CONNECTION

NO.	DESCRIPTION	QUANTITY	DATE
1	PRELIMINARY PLANNING	1	21/01/2000


RICHARDS BAA BAY
 TRANSNATIONAL LOCAL EXPERTS
 PEASBLOEM OORSGANISASIE

PROJECT PLAN NO. **CIA-04**
 CONSULTANT REFERENCE/CONSULTANT

DMV CONSULTANTS INC
 101 ROBINSON ROAD #12-01/02/03
 SINGAPORE 119074

DESIGNED BY	CHECKED BY	DATE
W. J. VAN DER MERWE	W. J. VAN DER MERWE	21/01/2000

PROJECT: **CENTRAL INDUSTRIAL AREA SERVICES**
 TITLE: **PRELIMINARY WATER LAYOUT**
 SCALE: 1:2000
 DATE: 21 JANUARY 2000
 PLAN NO.

Figure 2-6: Preliminary water reticulation layout



Figure 2-7: Preliminary electricity layout

2.3 Development Context within planning

2.3.1 uMhlathuze Municipality Spatial Development Framework (SDF)

The municipality's Spatial Development Framework (SDF), published in February 2007, designates the proposed development site as Proposed Development Site 1 (Figure 2-8).

The SDF also highlights the local air quality conditions which in February 2007, indicated that significant portions of Richards Bay fell within a health risk area as a result of poor air quality.

2.3.2 uMhlathuze Municipality Integrated Development Plan

There have been a few studies done on the Richards Bay area and the opportunities and constraints governing development within the uMhlathuze municipality. One such study is the Environmental Management Framework for the Richards Bay Port Expansion Area and Industrial Development Zone. This study describes all aspects of the area with regards to opportunities for development. In addition to this, the uMhlathuze Environmental Services Management Plan describes all of the catchment areas in the municipality and defines areas that should be set aside for conservation, and those that should be set aside for conservation in order to preserve the functionality of the environment as well as allowing for development in the area.

Although plans such as these are not legislated, they do give an idea of the constraints and opportunities, and of what areas need to be conserved to avoid high impacts of developments on drainage among other things. Included in these reports are maps showing various aspects of the development. The development plan gives all proposed development areas within the municipality (Figure 2-8), highlighted in red, the proposed Central industrial Area is labelled 1 in the map. The wetland map (Figure 2-9) is taken from the Environmental Management Framework for the Richards Bay Area and Industrial Development Zone and shows the study area (circled in red) and the surrounding area. Wetland systems are very sensitive to change (Thornhill & van Vuuren 2010). The uMhlathuze Environmental Services Management Plan gives areas that should be designated as conservation and corridor zones (Figure 2-10).

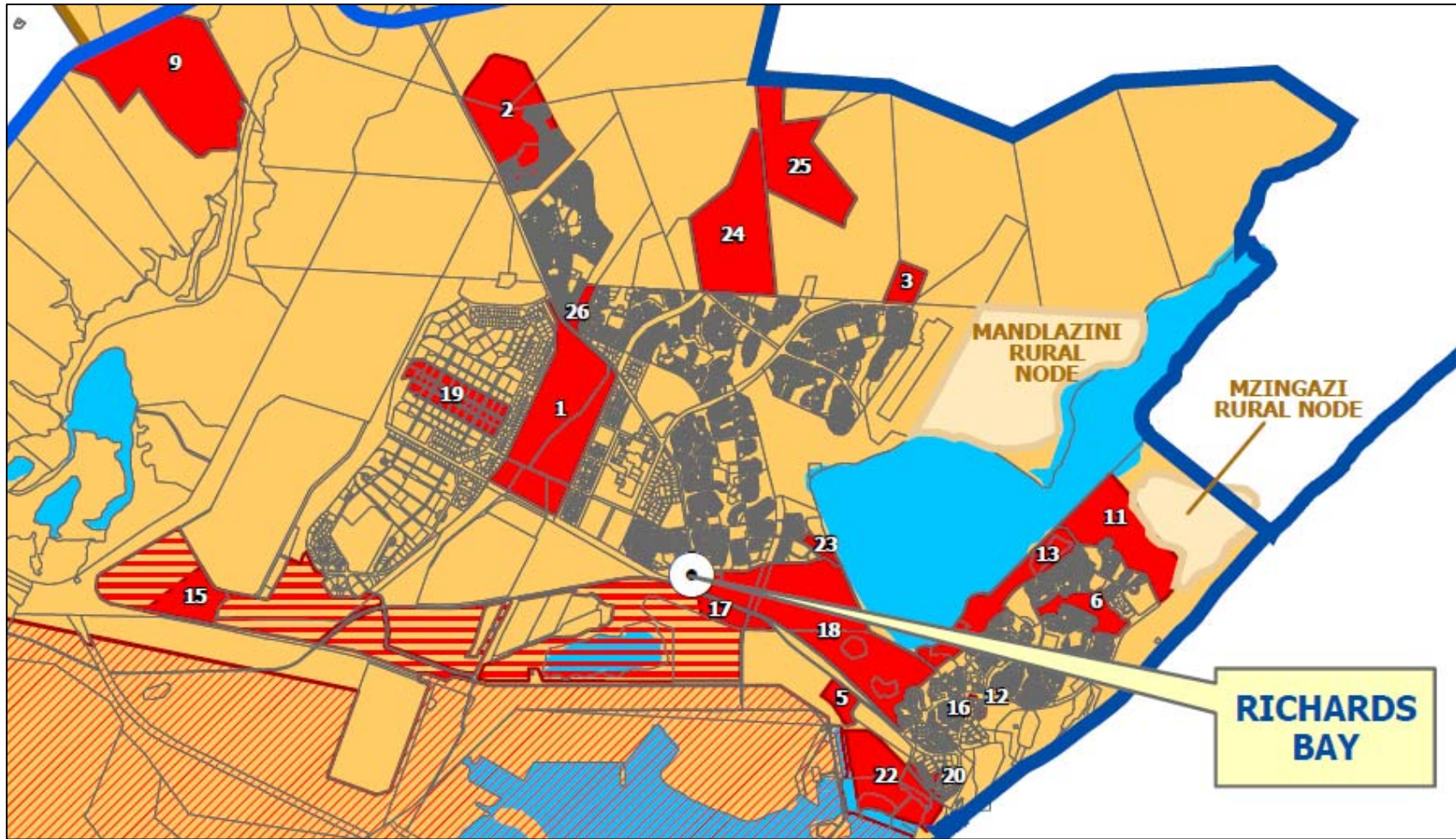


Figure 2-8: Portion of the uMhlathuze Municipality Development Plan showing the location of the proposed development (Proposed Development Site 1)

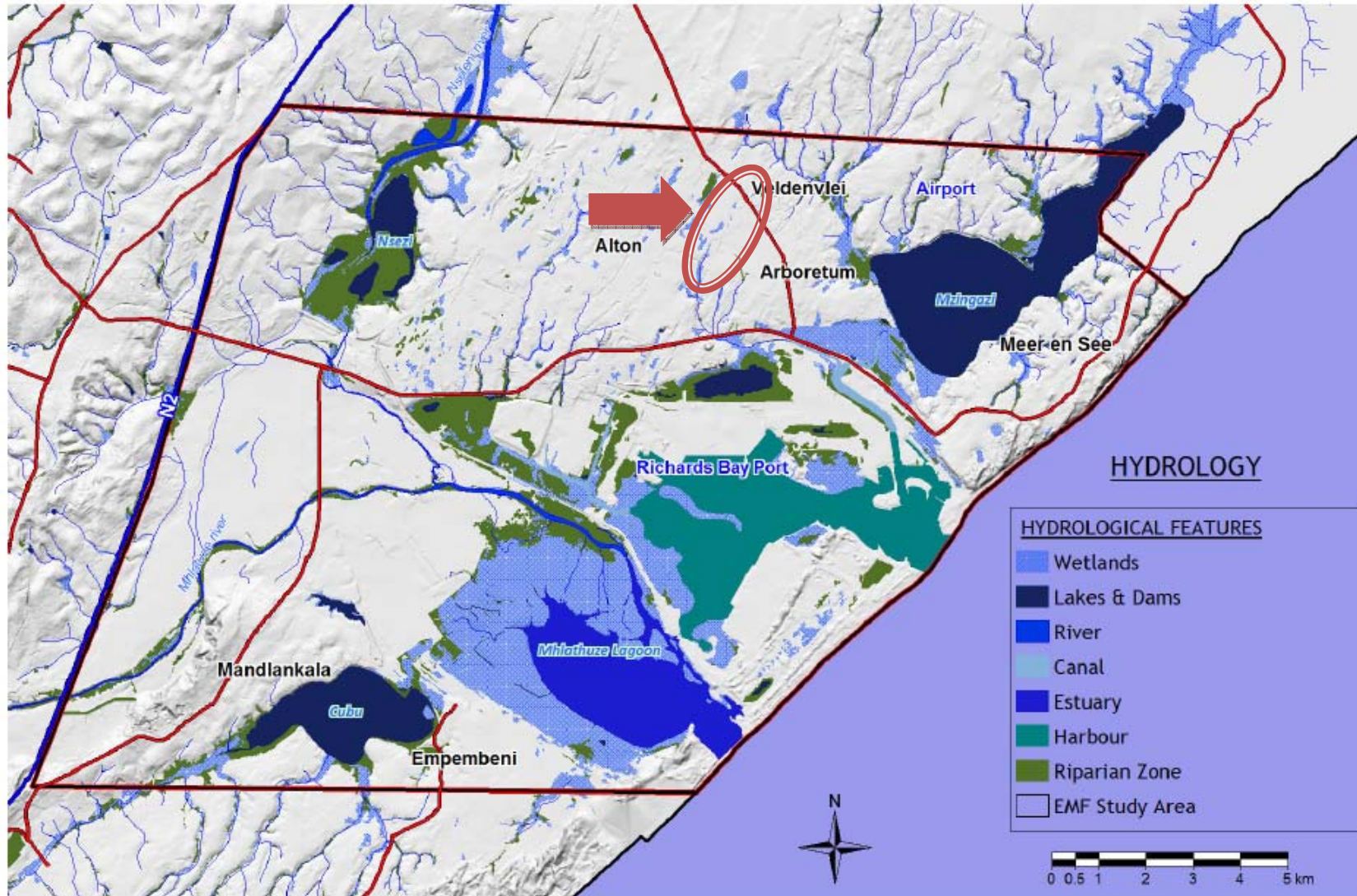


Figure 2-9: Wetlands of the study site (shown with an arrow) as well as the surrounding Richards Bay area. (Source: Thornhill & van Vuuren 2010)

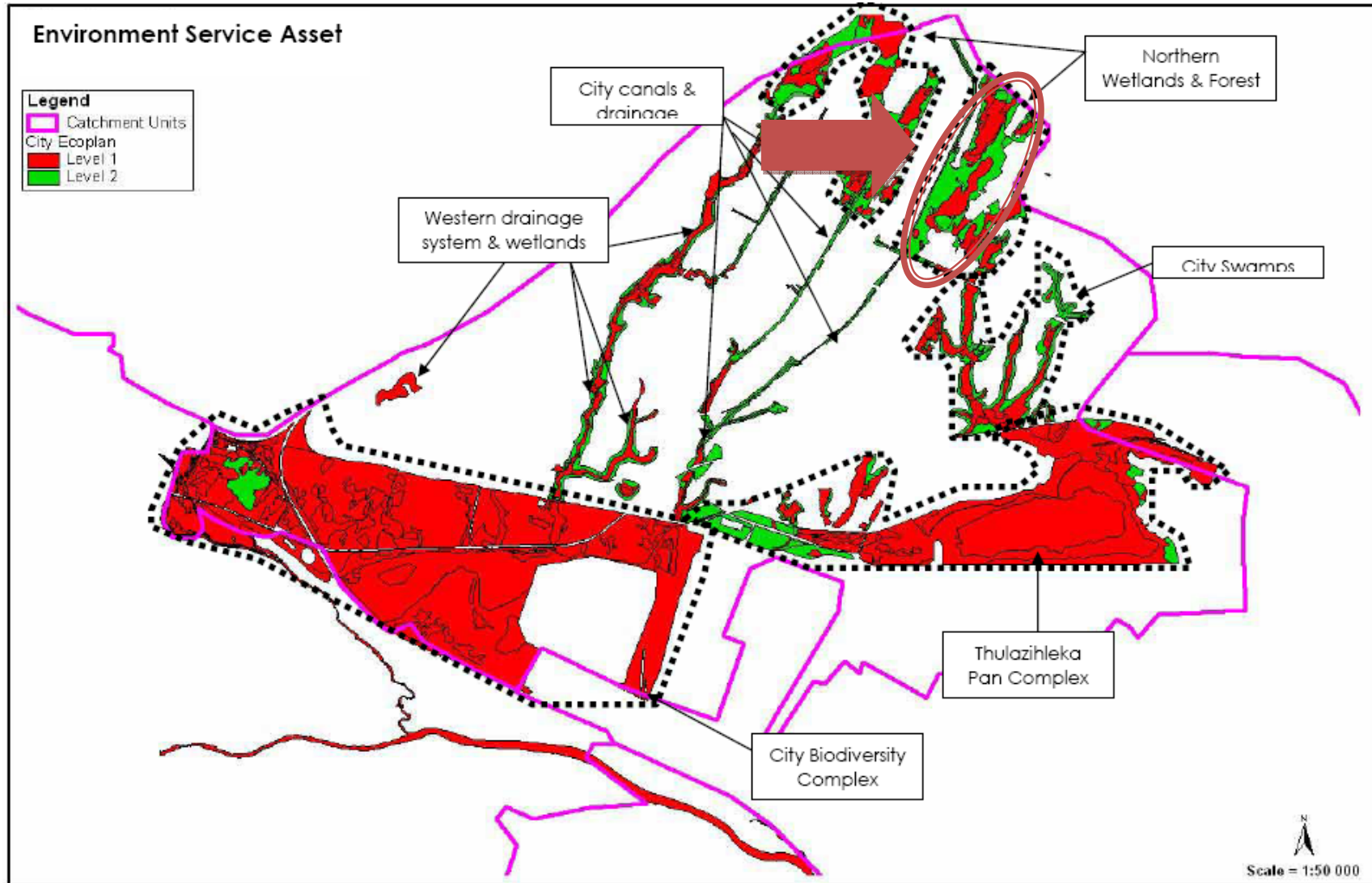


Figure 2-10: Portion of the uMhlatuze Environmental Services Management Plan showing the proposed development site (red arrow) and the designation of the wetland areas as Open Space Linkages/Buffers (shown in green) and Conservation Zone (shown in red)

2.4 Brief overview of the Environmental Assessment Process Followed

In accordance with the requirements of the National Environmental Management Act (Act No 107 of 1998) (NEMA), and relevant EIA regulations made in terms of this Act and promulgated in April 2006 (Government Notice No 385), and listed activities under (Government Notice Nos 386 and 387), the proposed establishment of the Richards Bay Central Industrial Area Project was subject to a full Scoping and Environmental Impact Assessment (EIA).

In terms of the EIA process, all reports generated from the environmental studies form part of a series of documents for the project. *Volume 1: The Final Scoping Report* (CES, July 2010) identified potentially significant environmental impacts and was the first report in the series. *Volume 3: The Draft Environmental Impact Assessment Report* (CES, July 2010) has investigated potentially significant environmental issues and recommended appropriate mitigation measures.

This Environmental Management Plan (EMP) interprets the findings of the Scoping Report and EIR, and prescribes project-specific specifications to be achieved. In addition to the requirements of Regulation 34 of GNR 385, this EMP is based on the principles of Integrated Environmental Management (IEM) and is intended to culminate in the adoption of an Environmental Management System (EMS) based on the ISO 14001 international standards.

3 DEVELOPMENT AND SCOPE OF THE EMP

3.1 Details and Expertise of the Environmental Assessment Practitioner

3.1.1 Details of the EAP

Dr Kevin Whittington-Jones (*EAP and Report Reviewer*)

Kevin holds a PhD in Environmental Biotechnology and has been involved in integrated waste management, environmental management and bioremediation since 1998, when he joined the Department of Biotechnology, Rhodes University. He currently holds the position of Director at CES. His professional interests include climate change risk, integrated waste management, sanitation, and technology & sustainability assessment. Dr Whittington-Jones has been involved in a number of industrial EIA projects within South Africa and internationally, both as Project Manager and as a waste management specialist. More specifically, he has conducted specialist waste management studies for the Port of Mossel Bay (South Africa), two heavy mineral mining projects (Egypt and Madagascar), manganese smelters (Kalagadi and Exxaro, both in South Africa), biofuel projects (Sierra Leone and Mozambique), brewery projects (Mozambique) and the Rabai Power Station (Kenya). From 2004 – 2009 Kevin held the position of Senior Lecturer in the Rhodes Investec Business School where he was responsible for the development and co-ordination of the environmental management electives of the MBA programme. He is still actively involved intraining and research related to environmental business risk and technology assessment.

Coastal & Environmental Services (CES) were commissioned by the applicant, uMhlathuze municipality to prepare an Environmental Management Plan (EMP) that seeks to comply with the EIA regulations. In fulfilment of this requirement, provided below are the details of CES:

Coastal and Environmental Services
 Physical Address: 67 African Street, Grahamstown, 6139
 Postal Address: P.O. Box 934, Grahamstown, 6140
 Telephone: +27 466222364
 Email: info@cesnet.co.za

In addition to the above, CES wishes to point out the expertise of the project team that prepared this EMP, which includes CES as a consulting firm and this team's members.

3.1.2 Expertise of Coastal and Environmental Services

CES is a specialist environmental consulting firm. Established in 1990, and with offices in Grahamstown and East London, we primarily specialise in assessing the impacts of development on the natural, social and economic environments. CES' core expertise lies in the fields of strategic environmental assessment, environmental management plans, environmental management systems, ecological/environmental water requirements, environmental risk assessment, environmental auditing and monitoring, integrated coastal zone management, social impact assessment and state of environment reporting. In addition to adhering to all relevant national legislative requirements, which we are often required to review and summarise for specific projects, acquisition of equity funding from the majority of financial institutions demands that developments must meet certain minimum standards that are generally benchmarked against the Policy and Performance Standards of the International Finance Corporation and the World Bank Operational Directives and Policies. The quality of our work has been acknowledged by international lenders such as the World Bank and the International Finance Corporation.

Provided below are short *curriculum vitae* (CVs) of each of the project team members involved in the preparation of the Environmental Management Plan (EMP) for the proposed Waainek Wind Energy Project. Table 3-1 that follows provides the details of the specialists that provided input into this EMP as per the specialist studies undertaken as part of the EIR Phase.

3.1.3 Other members of the project team

Ms Leigh-Ann de Wet (Project Manager and Report Production)

Environmental Consultant\Botanical Specialist: Leigh-Ann holds a BSc (Botany and Entomology) as well as a BSc (Hons) and MSc in Botany from Rhodes University. She conducts vegetation sensitivity assessments, in turn to aid and guide developments and thereby minimising their impacts on sensitive vegetation.

Table 3-2: The Specialists involved in the Richards Bay CIA Project EIA Phase

Specialist Study	Affiliation	Name of Lead Specialist(s)	Contact Details
Heritage	Umlando: Archaeological Tourism and Resource Management	Mr. Gavin Anderson	P.O. Box 102532, Meerensee 3901
Wetland	Coastal and Environmental Services	Mr. Bill Rowlston	67 African Street, Grahamstown 6139
		Mrs Sandy van der Waal	
Ecological	Coastal and Environmental Services	Prof. Roy Lubke	67 African Street, Grahamstown 6139
		Ms. Leigh-Ann De Wet	

3.2 Scope of the Richards Bay CIA Project EMP

The purpose of this EMP is to ensure “good environmental practice” by taking a holistic approach to the management of environmental impacts during the construction and operation of the proposed Richards Bay CIA Project. This EMP therefore sets out the methods by which proper environmental controls are to be implemented by the applicant and his nominated contractor based largely on the mitigation measures recommended in the specialist reports and the EIR. However, where necessary, these methods have been expanded upon and additional issues addressed in order to ensure that all environmental aspects are appropriately considered and monitored. The duration over which the contractor’s controls shall be in place cover the construction period of the project as well as the limited time after contract completion defined by the General Conditions of Contract, and the project specifications, as the defects notification period.

Due to the nature of the proposed development i.e. the preparation of land within an existing industrial development zone for subsequent occupation by a variety of commercial and industrial activities, this draft EMP is focused on the design and construction phases. As the precise nature of activities on the site after the initial preparation is unknown at this stage, the portion of the EMP covering the operational phase is limited and relatively generic. This gap should be filled by the development of operational EMPs for all individual future developments on the site. Similarly, as the site is likely to be in use as part of the industrial development zone for decades, a detailed decommissioning EMP has not been included in this volume but will need to be developed closer to the time of decommissioning.

Design specifications from an environmental point of view were taken into consideration in the detailed EIR Phase during which, the Environmental Assessment Practitioner (EAP) and Specialist Consultants provided input with regards to possible mitigation measures to reduce environmental impacts.

The provisions of this EMP are binding on the contractor during construction period. They are to be read in conjunction with all the documents that comprise the suite of documents for this contract (refer to Section 3.3). In the event that any conflict occurs between the terms of this EMP and the project specifications or Environmental Authorisation (formerly termed ‘Record of Decision’) once/if issued, the terms herein shall be subordinate.

This EMP has been designed to suite the particular activities and needs of the proposed Richards Bay CIA Project, and incorporates the following:

- General construction mitigation measures;
- Specific project mitigation measures;

The EMP therefore identifies the following:

- Construction activities that will impact on the environment.
- Broadly, operational activities that will impact on the environment.
- Specifications with which the contractor shall comply in order to protect the environment from the identified impacts.
- Actions that shall be taken in the event of non-compliance.

It is important to note that the EMP is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specification. Any substantial changes shall be submitted to the Contractor, Resident Engineer, uMhlathuze municipality and relevant environmental authorities in writing for approval. It must be emphasised that some changes may have budget and timeframe implications.

3.3 Applicable Documentation

The following environmental documentation is applicable to this project, and should therefore be read in conjunction with this EMP.

- *Establishment of the Richards Bay Central Industrial Area Volume 1: Final Scoping Report* (CES, July 2010).
- *Establishment of the Richards Bay Central Industrial Area Volume 2: Specialist Reports* (CES, July 2010).
- *Establishment of the Richards Bay Central Industrial Area Volume 3: Environmental Impact Assessment Report* (CES, July 2010)

Cognisance of the Environmental Authorisation must be taken once/if it is issued by the KwaZulu Natal Department of Agriculture, Environmental Affairs and Rural Development (DAEARD). Where necessary, this EMP must be amended to comply with this Environmental Authorisation, and submitted to DAEARD for approval.

Other documentation which should be considered includes:-

- All contract documentation applicable.
- All applicable environmental legislation.

3.4 Definitions applicable to the environmental aspects of the project

The definitions contained within this document are for explanatory purposes only. In the event that any conflict occurs between the definitions herein and those contained within the final Contract, those within the Contract shall prevail.

Alien Vegetation: Alien vegetation is defined as undesirable plant growth which shall include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable.

Construction Camp: Construction camp (site camps) refer to all storage and stockpile sites, site offices, container sites, workshops and testing facilities, and other areas required to undertake construction activities.

Environmental Control Officer (ECO): A suitably qualified, site-based and experienced person or entity appointed for the Construction Works, to perform the obligations specified in the environmental authorisation. The ECO shall be the designated responsible person, for implementing any remedial measures as required from time to time and for any authorisations/licences that are required in terms of the service contract. The ECO shall record and communicate environmental issues (as they occur) to the Contractor and maintain records thereof.

The ECO's duties shall include inter alia:

- Confirming that all required environmental authorizations and permits, where necessary, have been obtained from the relevant authority(ies);
- Monitoring all activities relating to the project, on a daily basis (or as agreed), for compliance with the provisions of the environmental authorisation, environmental legislation and recommendations of the EMP;
- Conducting annual environmental performance audits in respect of the activities undertaken relating to the project

Environment: Environment means the surroundings within which humans exist and that could be made up of:-

- The land, water and atmosphere of the earth;
- Micro-organisms, plant and animal life;
- Any part or combination of (i) and (ii) and the interrelationships among and between them; and
- The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Aspect: An environmental aspect is any component of a contractor's construction activity that is likely to interact with the environment.

Environmental Authorisation (formerly known as, Record of Decision): A written statement from the relevant environmental authority, with or without conditions, that records its approval of a planned undertaking to build or upgrade a section of road and the mitigating measures required to prevent or reduce the effects of environmental impacts during the life of a contract.

Environmental Impact: An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

Environmental Impact Assessment: The process of examining the environmental effects of a proposed development. The assessment requires detailed/specialist studies of significant issues that have been identified during the environmental scoping.

Environmental Management Plan: An environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced.

Environmental Management System: The internationally accepted and recognized environmental management system (EMS) which enables companies, organizations and operations to systematically manage, prevent and reduce environmental problems and associated costs. In terms of ISO 14001 and EMS is defined as, *"that part of the overall management system includes organizational structure, planning activities, responsibilities, procedures, processes and resources for developing, implementing, reviewing and maintaining the environmental policy."*

Environmental Policy: A statement by the organisation of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets.

External Auditor: A suitably qualified and experienced independent expert as per the required auditor qualifications (ISO 14012).

Independent Environmental Consultant: A suitably qualified and experienced independent environmental consultant (IEC) appointed by the Engineer to perform the obligations specified in the Contract. The IEC shall provide reports to the regulatory authority, the Engineer and any other parties as specified by the regulatory authority.

Interested and Affected Party: Refers to an interested and affected party contemplated in section 24(4)(d) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and which in terms of that section includes –

- a) *Any person, groups of persons, organization interested in or affected by an activity, and;*
- b) *Any organ of state that may have jurisdiction over any aspect of the activity.*

ISO 14001 Environmental Management System (ISO 14001): The internationally accepted and recognised Environmental Management System as reflected in the document SABS ISO 14001: 1996.

Method Statement: A written submission by the Contractor in response to the Specification or a request by the Engineer, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the IEC when requesting the Method Statement, in such detail that the IEC is enabled to assess whether the Contractor's proposal is in accordance with the EMP and associated specifications.

Mitigate: The implementation of practical measures to reduce the adverse impacts, or to enhance beneficial impacts of a particular action.

No-Go Area: Areas where construction activities are prohibited.

Pollution: According to the National Environmental Management Act, No. 107 of 1998, pollution can be defined as, *“Any change in the environment caused by (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being 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”*

Rehabilitation: To re-establish or restore to a healthy, sustainable capacity or state.

Site: The area in which construction is taking place.

Species of Special Concern: Those species listed in the Rare, Indeterminate, or Monitoring categories of the South African Red Data Books, and/or species listed in Globally Near Threatened, Nationally Threatened or Nationally Near Threatened categories (Barnes, 1998).

Threatened species: Threatened species are defined as: a) species listed in the Endangered or Vulnerable categories in the revised South African Red Data Books or listed in the Globally Threatened category; b) species of special conservation concern (i.e. taxa described since the relevant South African Red Data Books, or whose conservation status has been highlighted subsequent to 1984); c) species which are included in other international lists; or d) species included in Appendix 1 or 2 of the Convention of International Trade in Endangered Species (CITES).

Topsoil: The top 100mm of soil and may include top material e.g. vegetation and leaf litter.

Wetland: As defined by the NEMA: "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 land in normal circumstances supports or would support vegetation adapted to life in saturated soil."

4 ENVIRONMENTAL POLICY

4.1 Environmental Policies and Guidelines

4.1.1 Environmental Policy

The Development Planners and Construction Contractor are required to compile an environmental management policy, which must consider the following:

- The Contractor's mission, vision and core values;
- Guiding principles;
- Requirements of, and communication with interested and affected parties (I&APs);
- The need to work towards continual improvement;
- The obligation to prevent pollution and ecological degradation;
- The importance of coordination with other organisational policies (e.g. quality, occupational health and safety, etc.);
- Reference to specific local and/or regional conditions; and
- A commitment to compliance with relevant environmental laws, regulations, by-laws and other criteria to which the Contractor subscribes.

The policy, once approved by uMhlathuze Municipality, must be communicated to all employees and contractors (and sub-contractors) of the Contractor, and made available to the public, if requested.

4.1.2 Environmental Objectives and Targets

In order to meet the commitments detailed within the environmental policy, as well as those included within the environmental specifications of this EMP, the Contractor shall develop environmental objectives and targets. The objectives and targets shall conform to, and comply with, the following criteria:

- The objectives and targets shall constitute the overall goals for environmental performance identified in the environmental policy and strategy.
- When establishing objectives and targets, the Contractor shall take into account the identified environmental aspects and associated environmental impacts, as well as the relevant findings from environmental reviews and/audits.
- The targets must be set to achieve objectives within a specified timeframe.
- Targets should be specific and measurable.
- When the objectives and targets are set, the Contractor must establish measurable Key Performance Indicators (KPIs). These KPIs will be used by the Contractor as the basis for an environmental performance evaluation system and can provide information on both the environmental management and the operational systems. Objectives and targets shall apply broadly across the Contractor's operations, as well as to site-specific and individual activities.
- Objectives and targets shall be reviewed from time to time in view of changed operational circumstances and/or changes in environmental legal requirements, and shall also take into consideration the views of interested and affected parties (I&APs).

All objectives and targets must be supplied to the Independent Environmental Consultant or ECO for review and use during audits, as would be prescribed in the conditions of the Environmental Authorisation, if the project is approved.

4.2 Legislative Framework

Construction must be according to the best industry practices, as identified in the project documents. This EMP, which forms an integral part of the contract documents, informs the contractor as to his duties in the fulfilment of the project objectives, with particular reference to the

prevention and mitigation of environmental impacts caused by construction activities associated with the project. The Contractor should note that obligations imposed by the approved EMP are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

4.2.1 Statutory and Other Applicable Legislation and Standards

The Contractor shall identify and comply with all South African national and provincial environmental legislation, including associated regulations and all local by-laws relevant to the project. Key legislation currently applicable to the design, construction and implementation phases of the project must be complied with. The list of applicable legislation provided below is intended to serve as a guideline only and is not exhaustive:-

- The Constitution of the Republic of South Africa Act 108 of 1996
- Environment Conservation Act 73 of 1989
- National Environmental Management Act 107 of 1998
- National Environmental Management: Protected Areas Act 57 of 2003
- National Environmental Management: Biodiversity Act 10 of 2004
- National Forests Act 43 of 1983
- National Water Act 36 of 1998
- Conservation of Agricultural Resources Act 43 of 1983
- National Veld and Forest Fire Act 101 of 1998
- Hazardous Substances Act 15 of 1973
- National Heritage Resources Act 25 of 1999
- Atmospheric Pollution Prevention Act 45 of 1965
- National Environmental Management: Air Quality Act 39 of 2004
- National Environmental Management: Waste Management Act 59 of 2008
- Mineral and Petroleum Resources Development Act 28 of 2002
- Health Act 63 of 1977
- Occupational Health and Safety Act 85 of 1993
- White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity
- All relevant provincial legislation, Municipal by-laws and ordinances.

The following permit requirements would be relevant to the proposed project:

- Permit for the removal of protected plants on the site;
- Approval from the South African Heritage Resources Agency (SAHRA) on cultural issues;
- Health permits for sanitation (Provincial health authorities)
- Blasting permit – obtained from the Department of Mineral Resources (DMR), if required;

The Contractor shall establish and maintain procedures to keep track of, document and ensure compliance with environmental legislative changes.

4.2.2 Environmental Standards

All applicable environmental standards will be adhered to.

5 ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS

5.1 Management Structure

In line with this EMP, the Contractor must prepare a document clearly outlining and demonstrating the environmental responsibilities, accountability and liability of the Contractor's employees. The Contractor should assign responsibilities for the following:

- Reporting structures.
- Actions to be taken to ensure compliance.
- Overall design, development and implementation of the EMP.
- Documenting the environmental policy and strategy.
- Implementing the EMP in all stages/phases of the project.
- All the aspects which require action under the other core elements and sub-elements of the EMP.

All official communication and reporting lines including instructions, directives and information shall be channelled according to the organisation structure.

5.2 Roles and Responsibilities

5.2.1 uMhlathuze Municipality

uMhlathuze municipality is the applicant and shall therefore be the entity monitoring the implementation of the EMP and compliance with the authorisation. However, if uMhlathuze Municipality appoints a Contractor to implement the project and hence implement the proposed mitigation measures documented in this EMP on their behalf, then the successful contractor's responsibilities are outlined in Section 5.2.2 that follows.

5.2.2 Contractor

The successful Contractor shall:

- Be responsible for the finalisation of the EMP in terms of methodologies which are required to be implemented to achieve the environmental specifications contained herein and the relevant requirements contained in the environmental authorisation, if issued by DEA;
- Be responsible for the overall implementation of the EMP in accordance with the requirements of Innowind and the environmental authorisation, if issued by DEA;
- Ensure that all third parties who carry out all or part of the Contractor's obligations under the Contract comply with the requirements of this EMP;
- Sign the Pro-Forma: Protection of the Environment (attached as Annexure A).
- Be responsible for obtaining any environmental permits (refer to Section 4.2.1) which are required for the design, construction and operation of the Richards Bay CIA Project.
- Ensure that the appointments of the ECO and DEO are subject to the approval of uMhlathuze Municipality.

5.2.3 Environmental Control Officer

For the purposes of implementing the conditions contained herein, uMhlathuze Municipality shall appoint an Environmental Control Officer (ECO) for the contract. The ECO shall be the responsible person for ensuring that the provisions of the EMP as well as the environmental authorisation are complied with during the construction period. The ECO will be responsible for issuing instructions to the contractor and where environmental considerations call for action to be taken. The ECO shall submit regular written reports to uMhlathuze municipality, but not less frequently than once a month. There shall be an approved ECO on the site at all times. It may be necessary to have more than one ECO.

The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the EMP and conditions of the environmental authorisation by the Contractor. The ECO's duties in this regard will include, *inter alia*, the following:

- Ensuring that all the environmental authorisations and permits required in terms of the applicable legislation have been obtained prior to construction commencing.
- Reviewing and approving construction method statements with input from the Engineer, where necessary, in order to ensure that the environmental specifications contained within the construction contract are adhered to.
- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Keeping accurate and detailed records of all activities on site.
- Keeping a register of complaints on site and recording community comments and issues, and ensuring that the correct actions are/were taken in response to these complaints.
- Ensuring that the required actions are undertaken to mitigate the impacts resulting from non-compliance.
- Reporting all incidences of non-compliance to the Contractor as well as the uMhlathuze Municipality.
- Monitoring and verifying that the EMP, Environmental Authorisation and Contract are adhered to at all times and taking action if specifications are not followed.
- Monitoring and verifying that environmental impacts are kept to a minimum.
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel on site.
- Ensuring that activities on site comply with all relevant environmental legislation.
- Ordering the removal of, or issuing spot fines for person/s and/or equipment not complying with the specifications of the EMP and/or environmental authorisation.
- Undertaking a continual internal review of the EMP and submitting any changes to uMhlathuze Municipality and/or DEA (in case of major changes) for review and approval.
- Conducting annual environmental performance audits in respect of the activities undertaken relating to the project. The ECO shall also submit compliance audit reports to DEA, in accordance with the requirements of the environmental authorisation. Such reports shall be reviewed by uMhlathuze Municipality, prior to submission.
- Keeping a photographic record of progress on site from an environmental perspective.
- Recommending additional environmental protection measures, should this be necessary.
- Providing report back on any environmental issues at site meetings

The ECO must have:

- A good working knowledge of all relevant environmental policies, legislation, guidelines and standards;
- The ability to conduct inspections and audits and to produce thorough, readable and informative reports;
- The ability to manage public communication and complaints;
- The ability to think holistically about the structure, functioning and performance of environmental systems; and

- Received professional training, including training in the skills necessary to be able to amicably and diplomatically deal with the public as outlined in bullet point one above.
- Proven competence in the application of the following integrated environmental management tools:
 - * Environmental Impact Assessment.
 - * Environmental management plans/programmes.
 - * Environmental auditing.
 - * Mitigation and optimisation of impacts.
 - * Monitoring and evaluation of impacts.
 - * Environmental Management Systems.

The ECO must be fully conversant with the Environmental Impact Assessment, Environmental Management Plan, Environmental Authorisation (if issued) for the Richards Bay CIA Project and all relevant environmental legislation.

uMhlathuze Municipality shall have the authority to replace the ECO if, in their opinion, the appointed officer is not fulfilling his/her duties in terms of the requirements of the EMP or this specification. Such instruction will be in writing and shall clearly set out the reasons why a replacement is required and within what timeframe.

5.2.4 Traffic Safety Officer

The Contractor shall nominate knowledgeable members of staff on site who shall be the responsible persons for the arrangement and maintenance of all traffic accommodation measures required for the duration of the contract. The Traffic Safety Officer shall liaise with the ECO in order to ensure adequate and appropriate traffic arrangements during the transportation of turbine components.

5.2.5 Independent External Environmental Auditor

An independent external environmental auditor shall be appointed by uMhlathuze Municipality to ensure compliance with the EMP. The intervals at which environmental audits should be undertaken shall be agreed upon by uMhlathuze Municipality, the Contractor, the Engineer, DAEARD and the external auditor. The environmental audit programme should at least include the following:

- A comprehensive environmental audit to be undertaken at the end of the design phase to verify compliance with the EMP, Environmental Authorisation, Contract, and all applicable environmental legislation.
- Comprehensive environmental audits to be undertaken periodically (at least every two months) during the construction phase, to verify compliance with the EMP, Environmental Authorisation, Contract Specifications, and all applicable environmental legislation. An audit report should contain recommendations on environmental management activities which are required to be implemented. The external auditor shall report concurrently to the Contractor and uMhlathuze Municipality.
- A comprehensive environmental audit will be undertaken at the completion of the construction phase for various sections of the wind energy facility, to verify compliance with the EMP and all applicable environmental legislation. An audit report should contain recommendations on environmental management activities which are required to be implemented within the operation and maintenance phases. The external auditor shall report concurrently to the Contractor and uMhlathuze Municipality.
- Periodic environmental audits to be undertaken during the operation and maintenance phases in order to verify on-going satisfactory environmental management performance. These audits must be followed up with appropriate remedial and corrective actions should the audit findings demonstrate any non-conformance or non-compliance with the specifications of the EMP.

- Compile and agree on (together with uMhlathuze Municipality) a template for the ECO monthly reports essentially meaning that an IEA will need to be appointed right at the commencement of the project before construction begins.

5.2.6 Liaison Committee

A liaison committee consisting of a representative from uMhlathuze Municipality, the Contractor, the Engineer, and any other role-player deemed necessary by the members of the committee (the "Liaison Committee") will meet every month to review the progress of the Contract in implementing and complying with its obligations in terms of this EMP.

5.3 Reporting

5.3.1 Administration

Before the contractor begins each construction activity, the Contractor shall give to the ECO and engineer a written method statement setting out the following:

- The type of construction activity.
- Locality where the activity will take place.
- Identification of impacts that might result from the activity.
- Identification of activities or aspects that may cause an impact.
- Methodology and/or specifications for impact prevention for each activity or aspect.
- Methodology and/or specifications for impact containment for each activity or aspect.
- Emergency/disaster incident and reaction procedures.
- Treatment and continued maintenance of impacted environment.

The contractor may provide such information in advance of any or all construction activities provided that new submissions shall be given to the ECO and/or engineer whenever there is a change or variation to the original.

The ECO and/or engineer may provide comment on the methodology and procedures proposed by the Contractor but he shall not be responsible for the contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

5.3.2 Good Housekeeping

The contractor shall undertake "good housekeeping" practices during construction. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

5.3.3 Record Keeping

The engineer and the ECO will continuously monitor the contractor's adherence to the approved impact prevention procedures and the engineer shall issue to the contractor a notice of non-compliance whenever transgressions are observed. The ECO should document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the engineer in the monthly report. These reports shall be made available to DAEARD when requested.

The Contractor shall ensure that an electronic filing system identifying all documentation related to the EMP is established.

A list of reports likely to be generated during all phases of the ay CIA Project is provided below, and all applicable documentation must be included in the environmental filing system catalogue or document retrieval index.

- Final Environmental Impact Assessment Report.
- Environmental Management Plan.
- Final design documents and diagrams issued to and by the Contractor.
- All communications detailing changes of design/scope that may have environmental implications.
- Daily, weekly and monthly site monitoring reports.
- Complaints register.
- Medical reports.
- Training manual.
- Training attendance registers.
- Incident and accident reports.
- Emergency preparedness and response plans.
- Copies of all relevant environmental legislation.
- Permits and legal documents, including letters authorising specific personnel of their duties as part of emergency preparedness teams e.g. fire teams, etc.
- Crisis communication manual.
- Disciplinary procedures.
- Monthly site meeting minutes during construction.
- All relevant permits.
- Environmental Authorisation on the EIA from the DAEARD.
- All method statements from the Contractor for all phases of the project.

5.3.4 Document Control

The Contractor and resident engineer shall be responsible for establishing a procedure for electronic document control. The document control procedure should comply with the following requirements:

- Documents must be identifiable by organisation, division, function, activity and contact person.
- Every document should identify the personnel and their positions, who drafted and compiled the document, who reviewed and recommended approval, and who finally approved the document for distribution.
- All documents should be dated, provided with a revision number and reference number, filed systematically, and retained for a five year period.

The Contractor shall ensure that documents are periodically reviewed and revised, where necessary, and that current versions are available at all locations where operations essential to the functioning of the EMP are performed. All documents shall be made available to the independent external auditor.

5.4 Environment and Health Training and Awareness

The ECO must be conversant with all legislation pertaining to the environment applicable to this contract and must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

The contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. The environmental training should, as a minimum, include the following:

- The importance of conformance with all environmental policies.
- The significant environmental impacts, actual or potential, as a result of their work activities.
- The environmental benefits of improved personal performance.
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures, and with the requirement of uMhlathuze Municipality's environmental management systems, including emergency preparedness and response requirements.
- The potential consequences of departure from specified operating procedures.
- The mitigation measures required to be implemented when carrying out their work activities.
- The importance of not littering.
- The need to use water sparingly.
- Details of, and encouragement to, minimise the production of waste and re-use, recover and recycle waste where possible.
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.
- The procedures which should be followed should a grave be encountered, or unearthed during the construction phase.
- Details regarding fauna and flora of special concern, including protected/endangered plant and animal species, and the procedures to be followed should these be encountered during the construction phase.

In the case of permanent staff, the contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the contractor shall inform the engineer when and how he intends concluding his environmental training obligations.

A training needs analysis shall be conducted by the ECO to identify the appropriate environmental and health training programmes, and the appropriate target groups amongst the employees of the Contractor. The results of the environment and health training needs analysis shall be filed with the environmental records and used to set objectives and targets. Recommended Basic Environmental Education Material is provided in Annexure B.

Environment and health awareness training programmes should be targeted at three distinct levels of employment, i.e. the executive, middle management and labour. Environmental awareness training programmes should contain the following information:

- The names, positions and responsibilities of personnel to be trained.
- The framework for appropriate training plans.
- The summarised content of each training course.
- A schedule for the presentation of the training courses.

The Contractor shall ensure that records of all training interventions are kept in accordance with the record keeping and documentation control requirements as set out in this EMP (refer to Sections 5.3.3 and 5.3.4 above). The training records shall verify each of the targeted personnel's training experience. The ECO shall monitor the records and listed and undertake regular follow ups.

5.5 Emergency Preparedness

The Contractor shall compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to unexpected or accidental actions or incidents that will

cause environmental impacts, throughout the life cycle of the project. Such activities may include, *inter alia*:

- Accidental discharges to water and land.
- Accidental exposure of employees to hazardous substances.
- Accidental veld or forest fires.
- Accidental spillage of hazardous substances.
- Specific environmental and ecosystem effects from accidental releases or incidents.

These plans should include:

- Emergency organisation (manpower) and responsibilities, accountability and liability.
- A list of key personnel.
- Details of emergency services applicable to the various areas along the route that construction components will need to be transported and for the site itself (e.g. the fire department, spill clean-up services, etc.).
- Internal and external communication plans, including prescribed reporting procedures where required by legislation.
- Actions to be taken in the event of different types of emergencies.
- Incident recording, progress reporting and remediation measures required 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.
- Training plans, testing exercises and schedules for effectiveness.

The Contractor shall comply with the emergency preparedness and incident and accident-reporting requirements, as required by the Occupational Health and Safety Act, 1993 (Act No 85 of 1993), the National Environmental Management Act, 1998 (Act No 107 of 1998), the National Water Act, 1998 (Act No 36 of 1998) and the National Veld and Forest Fire Act, 1998 (Act No 101 of 1998) as amended and/or any other relevant legislation.

5.6 Checking and Corrective Action

5.6.1 Performance Indicators and Targets

Performance indicators and targets for compliance with the specifications of the EMP should be agreed upon by uMhlathuze Municipality, the Engineer and the Contractor, and included within the final EMP. Consideration should be given to the implementation of incentive bonuses for employees who look after the environment.

5.6.2 Non-Compliance

Non-compliance with the specifications of the EMP and/or conditions of the environmental authorisation, both of which will be present on-site at all times, constitutes a breach of Contract for which the Contractor may be liable to pay penalties (see Annexure A). The Contractor is deemed not to have complied with the EMP if:

- There is evidence of contravention of the EMP specifications within the boundaries of the construction site, site extensions and haul/access roads;
- There is contravention of the EMP specifications which relate to activities outside the boundaries of the construction site;
- Environmental damage ensues due to negligence;
- Construction activities take place outside the defined boundaries of the site; and/or
- The Contractor fails to comply with corrective or other instructions issued by the Engineer and/or ECO within a specific time period.

The contractor shall act immediately when a notice of non-compliance is received and correct whatever was the cause for the issuing of the notice.

Any non-compliance with the agreed procedures of the EMP is a transgression of the various statutes and laws that define the manner by which the environment is managed therefore any avoidable non-compliance, dependant on severity, shall be reported to uMhlathuze Municipality for further action, prior to contacting the relevant provincial or national authorities.

The engineer's decision with regard to what is considered a violation, its seriousness and the action to be taken against the contractor shall be final. Failure to redress the cause shall be reported to the relevant authority. The responsible provincial or national authorities shall ensure compliance and impose penalties relevant to the transgression as allowed for within its statutory powers.

5.6.3 Monitoring

A monitoring programme will be implemented for the duration of the construction phase of the project. This programme will include:

- Performance Audits: Monthly inspection reports which are performance based compiled by the ECO. This must also incorporate monitoring of compliance issues as well as permits, licenses, the EMP, Environmental Authorisation, and all contract documentation's conditions. These audits can be conducted randomly and do not require prior arrangement with the project manager.
- Compliance Audits: The independent external auditor will initially undertake compliance audits every 2 months. Compilation of an audit report with a rating of the compliance with the EMP and the environmental authorisation. This report will be submitted to the relevant authorities as and when required.

However, it is important to note that the environmental authorisation will specify the duties of the ECO and the frequency of reporting to DAEARD.

The following will also assist with monitoring:-

Complaints Register

The Contractor will ensure that a dedicated Complaints Register is kept on site at all times (see Annexure C). The register will contain the details of the person who made the complaint, the nature of the complaint received, the date on which the complaint was made and the response noted with the date and action taken. The Complaints register will be kept in accordance with the requirements of the ECO. This record shall be submitted with the monthly reports and an oral report given at the monthly site meetings.

Inspections

Ongoing visual inspections will be conducted daily by the ECO. The ECO will spend the bulk of his/her time on site on the lookout for any unsafe acts and activities that transgress the requirements as specified in the EMP. The ECO compiles the site register and maintains the complaints register and any other records required in the environmental authorisation.

Spot Fines

The ECO shall be authorised to impose spot fines for any of the transgressions detailed below:

- Littering on site.
- Lighting of illegal fires on site.
- Any persons, vehicles or equipment related to the Contractor's operations found within the designated "no-go" areas.

- Excess dust or excess noise emanating from site.
- Possession or use of intoxicating substances on site.
- Any vehicles being driven in excess of designated speed limits.
- Unauthorised removal and/or damage to fauna, flora or cultural or heritage objects on site.
- Urination and defecation anywhere other than using the toilet facilities that have been provided.

These activities, along with the appropriate guidelines to determining the fines shall be agreed to by uMhlathuze Municipality, the engineer and the Contractor. Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the Environmental Specifications and or legal obligations. uMhlathuze Municipality will inform the Contractor of the contravention and the amount of the fine.

Penalty Fines

Where environmental damage is caused or a pollution incident, and/or failure to comply with any of the environmental specifications contained in the EMP, the Contractor shall be liable to pay a penalty fine. The ECO shall recommend to the Contractor the issuing of penalties for contravention of the EMP, Environmental Authorisation, Contract, or environmental legislation. The following transgressions should be penalised:

- Hazardous chemical/oil spill.
- Damage to sensitive environments.
- Damage to cultural and historical sites.
- Unauthorised removal/damage to indigenous trees and other vegetation, particularly in identified sensitive areas.
- Uncontrolled/unmanaged erosion.
- Unauthorised blasting activities.
- Violation of environmental authorisation conditions.

These activities, along with the appropriate guidelines to determining fines shall be agreed to by uMhlathuze Municipality, the Engineer and the Contractor, and will be included within the final EMP. In addition to penalties, the Engineer has the power to remove from site any person who is in contravention of the EMP, and if necessary, the Engineer can suspend part of or all of the works, as required.

Internal Audits

Where the monitoring data and the inspections highlight any problems, an internal audit will be initiated by the ECO. The purpose of the audit is to ascertain the source of the problem and to define what action shall be taken to rectify the problem and prevent its reoccurrence.

External Audits

External audits will be conducted by an independent external auditor appointed by uMhlathuze Municipality. The external auditor will conduct an in-depth audit so as to ascertain compliance with the EMP as well as the conditions of the environmental authorisation.

Incident Reporting and Remedy

If a leakage or spillage of hazardous substances occurs on site, the local emergency services must be immediately notified of the incident (within 24 hours). The following information must be provided:

- The location;
- The nature of the load; and
- The status at the site of the accident itself (i.e. whether further leakage is still taking place, whether the vehicle or the load is on fire).

Written records must be kept on the corrective and remedial measures decided upon and the progress achieved therewith over time. Such progress reporting is important for monitoring and

auditing purposes. The written reports may be used for training purposes in an effort to prevent similar future occurrences. Annexure D provides an example of an environmental incidents register.

Verbal instructions

Verbal instructions are likely to be the most frequently used form of corrective action and are given in response to transgressions that are evident during routine site inspections by the ECO. Verbal instructions are also used to create further awareness amongst employees as often transgressions are a function of ignorance rather than vindictiveness. Workers must obey verbal instructions through formally recording the actions taken to resolve the matter so that the instruction could be successfully finalised and recorded.

Maximum allowable response time: 2 working days.

Written instructions

Written instructions will be given following an audit. The written instructions will indicate the source or sources of the problems identified on site and propose solutions to those problems. The implementation of solutions will be assessed in a follow-up audit and further written instructions issued if required.

Maximum allowable response time: 4 working days.

Public Communication and Liaison with Interested and Affected Parties

The Contractor shall comply with the requirements for public consultation as required by the Constitution Act, 1996 (Act No 108 of 1996) and the National Environmental Management Act, 1998 (Act No 107 of 1998).

During the construction phase of the project, the Contractor shall be responsible for erecting information boards, in the position, quantity, design and dimensions approved by the Engineer. The information boards shall contain relevant information regarding the construction activity and the relevant contact details to assist persons who wish to submit complaints regarding construction activities.

Information distribution

Copies of the EMP will be made available to I&APs at some of the local libraries and the CES website during the EIA process. Copies will also be distributed to all senior contract personnel. All senior personnel on the construction site will be required to familiarize themselves with the contents of the document.

5.7 Management Review

A formal management review needs to be conducted on a regular basis in which the internal audit reports written by the ECO be reviewed. The purpose of the review is to critically examine the effectiveness of the EMP and its implementation and to decide on potential modifications to the EMP as and when necessary. The process of management review is in keeping with the principle of continual improvement. Management review will take place when the liaison committee (refer to Section 5.2.7. above) consisting of a representative from uMhlathuze Municipality, the Contractor, the Engineer, and any other role-player deemed necessary by the members of the committee (the "Liaison Committee") meet every month to review the progress of the Contract in implementing and complying with its obligations in terms of this EMP for the duration of the project. Where necessary, management review will take place more frequently than every 2 months.

6 POTENTIAL ENVIRONMENTAL IMPACTS

Provided in Table 6-1 and 6-2 below, is a summary of the potentially significant environmental impacts that may occur as a result of the proposed Richards Bay CIA Project based on the detailed specialist studies undertaken in the EIR Phase. Impacts highlighted in the Ecological and Wetland Assessments were investigated for two development options.

- Option 1: Impacts were assessed for the proposed CIA development plans, taking into account the proposed stormwater layout and designated industrial properties.
- Option 2: Impacts were assessed for the potential CIA development plans including the recommended No-Go zone (Figures 8-8 & 8-9). This scenario assumes the No-Go areas will be fenced off and excluded from the development entirely thereby providing an ecological corridor and reducing impacts on the hydrological functioning of the system which, in turn, secures the functioning of this section of the catchment.

It is important that the Development Planners take cognisance of the potential impacts and proposed mitigation measures when finalising the layout of the proposed development. In addition, the Contractor must develop Method Statements to minimise potentially significant negative environmental impacts and to enhance positive impacts. These method statements must be approved by the ECO and uMhlathuze Municipality prior to commencement of any construction activities. Chapter 7 that follows provides the general and specific environmental specifications that must be implemented in order to achieve the above-mentioned objectives. It is also advisable that the reader refers to the EIR and the specialist volume for this project in order to obtain a more exhaustive list of the potential environmental impacts associated with the proposed project, irrespective of their ranking, as these will need to be considered and the mitigation or management measures associated with these impacts, implemented.

Table 6-1: Potential significant environmental impacts associated with the proposed establishment of the Richards Bay Central Industrial Area Project for Development Option 1.

Impacts	Without mitigation			With mitigation		
	Construction phase	Operation phase	No-Go	Construction phase	Operation phase	No-Go
Flora and Vegetation						
1: Loss of grassland	MOD -	N/A	MOD -	MOD -	N/A	N/A
2: Loss of forest	V HIGH -	N/A	MOD -	MOD +	N/A	N/A
3: Loss of species of special concern	MOD -	N/A	MOD -	LOW -	N/A	N/A
4: Introduction of alien species	HIGH -	HIGH -	HIGH -	MOD +	LOW -	LOW -
Fauna						
5: Loss of faunal biodiversity	MOD -	N/A	MOD -	LOW -	N/A	N/A
6: Loss of species of special concern	HIGH -	N/A	MOD -	MOD +	N/A	N/A
Cumulative Impacts General						
1: Noise on surrounding people	MOD -	MOD -	N/A	LOW -	MOD -	N/A
2: Dust generation	LOW -	N/A	N/A	LOW -	N/A	N/A
3: Pollution of soils and waters by hazardous chemicals	MOD -	HIGH -	N/A	LOW -	MOD -	N/A
4: Air pollution	N/A	HIGH -	N/A	N/A	MOD -	N/A
5: Reduction of available space in local landfills	N/A	MOD -	N/A	N/A	LOW -	N/A
Cumulative Impacts ecology						
7: Fragmentation of habitats	MOD -	N/A	N/A	LOW -	N/A	N/A
Wetland Impacts						
8: Loss and degradation of wetland habitat and functioning	V.HIGH -	N/A	MOD -	MOD -	N/A	N/A
9: Changes to the water regime	V. HIGH -	V. HIGH -	LOW -	MOD -	MOD -	LOW -
10: Loss and degradation of indigenous wetland vegetation	V HIGH -	N/A	LOW -	MOD -	N/A	N/A
11: Presence, introduction and spread of alien invasive species	MOD -	MOD -	LOW -	LOW -	LOW -	LOW -
12: Sedimentation of wetlands	V HIGH -	N/A	LOW -	MOD -	N/A	N/A
13: Reduction in water quality	HIGH -	N/A	MOD -	MOD -	N/A	N/A
Socio-Economic Issues						
Accessibility	HIGH -	N/A	MOD -	LOW -	N/A	N/A

Table 6-2: Potential significant environmental impacts associated with the proposed establishment of the Richards Bay Central Industrial Area Project for Development Option 2.

Impacts	Without mitigation		With mitigation	
	Construction phase	Operation phase	Construction phase	Operation phase
Flora and Vegetation				
1: Loss of grassland	MOD -	N/A	MOD -	N/A
2: Loss of forest	MOD -	N/A	MOD +	N/A
3: Loss of species of special concern	MOD -	N/A	LOW -	N/A
4: Introduction of alien species	MOD -	MOD -	MOD +	LOW -
Fauna				
5: Loss of faunal biodiversity	MOD -	N/A	LOW -	N/A
6: Loss of species of special concern	MOD -	N/A	MOD +	N/A
Cumulative Impacts General				
1: Noise on surrounding people	MOD -	MOD -	LOW -	MOD -
2: Dust generation	LOW -	N/A	LOW -	LOW -
3: Pollution of soils and waters by hazardous chemicals	MOD -	MOD -	LOW -	MOD -
4: Air pollution	N/A	HIGH -	N/A	MOD -
5: Reduction of available space in local landfills	N/A	MOD -	N/A	LOW -
Cumulative Impacts ecology				
7: Fragmentation of habitats	MOD -	N/A	LOW -	N/A
Wetland Impacts				
8: Loss and degradation of wetland habitat and functioning	MOD -	N/A	MOD -	N/A
9: Changes to the water regime	HIGH -	HIGH -	MOD -	MOD -
10: Loss and degradation of indigenous wetland vegetation	MOD -	N/A	LOW -	N/A
11: Presence, introduction and spread of alien invasive species	MOD -	MOD -	LOW -	LOW -
12: Sedimentation of wetlands	HIGH -	N/A	MOD -	N/A
13: Reduction in water quality	HIGH -	N/A	MOD -	N/A
Socio-Economic Issues				
Accessibility	HIGH -	HIGH	LOW -	LOW -

7 ENVIRONMENTAL SPECIFICATIONS: DESIGN, CONSTRUCTION AND OPERATION PHASES

This Chapter of the EMP outlines the environmental specifications which are required to be implemented for the design, construction and operation phases for the Richards Bay CIA Project. The specifications contained here-in are based on the mitigation measures recommended in the Specialist Reports.

It is important to note that in addition to the above, specific environmental specifications for particularly sensitive/specific areas within the proposed development site have also been included in this section (**see boxes below**).

Comprehensive environmental audits are to be undertaken periodically during the construction and operation phases, in order to verify compliance with the measures listed below, the recommendations contained within the EIA Report and all applicable environmental legislation. If compliance with any of these measures cannot be met, it will be the responsibility of the Contractor to motivate for this non-compliance.

7.1 Design of the development

The assessment of the potential environmental impacts of the proposed development was based on the current layout which includes encroachment onto the local wetland. In order to reduce potential negative impacts on this important ecological feature and natural drainage area, the design should be revised to observe the buffer zones proposed in the wetland specialist report. In addition, the location of storm water retention ponds and the removal of any forest patches should also be reviewed so as to reduce associated impacts.

According to the information supplied by the uMhlathuze Municipality, the proposed development will ultimately form the basis for the establishment of a variety of industrial activities. As discussed in the EIR, such development could potentially contribute to further deterioration of local air quality. As such, the planners need to assess the existing layout of the development with a view to accommodating future developments that would not impact significantly on air quality.

7.2 Site Plan

The contractor shall establish his construction camps, offices, workshops, staff accommodation and testing facilities on the site in a manner that does not adversely affect the environment. However, before construction can begin, the contractor shall submit to the engineer for his approval a site layout plan detailing plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the contractor proposes to put in place. In particular, this plan must include:-

- Site access (including entry and exit points).
- Access and haulage routes.
- All material and equipment storage areas (including storage areas for hazardous substances such as fuel and chemicals) - only designated areas may be used for the storage of materials, machinery, equipment and site offices.
- Construction offices and other structures (accommodation for staff, where required and considered appropriate). Preferred locations would be flat areas within the proposed project area. In addition, construction offices and other structures must not be located within the sensitive wetland and forest areas that comprise the no-go area described by specialists (refer to Ecological and Wetland specialist reports in the Volume 2: Specialist Reports for the Richards Bay CIA Project). An ecological specialist should be consulted as to the positioning of temporary structures.
- Areas where construction vehicles will be serviced.

- Security requirements (including temporary and permanent fencing, and lighting) and accommodation areas for security staff.
- Areas where vegetation will be cleared.
- The locality as well as the layout of the temporary waste storage facilities for litter, kitchen refuse, sewage and workshop-derived effluents. Waste storage facilities for sewage, grey water and workshop-derived effluents, where no formal facilities exist.
- Stormwater control measures.
- Provision of potable water and temporary ablution facilities.
- Potential pollution hazards and mechanisms to manage these.
- Intended mitigation measures regardless of the chosen site for approval by the ECO.

The site plan shall be submitted no later than the first site meeting. Detailed, electronic colour photographs shall be taken of the proposed site before any clearing may commence. These records are to be kept by the engineer for consultation during rehabilitation of the site.

Throughout the period of construction, the Contractor shall restrict all activities to within the designated areas on the approved construction layout plan. Any relaxation or modification of the construction layout plan is to be approved by the ECO. More specific requirements are described below.

7.2.1 Water for Human Consumption

Water for human consumption should be available at the site offices and at other convenient locations on site.

7.2.2 Heating and Cooking Fuel

- The Contractor shall provide adequate facilities for 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.

7.2.3 Sewage Management

All effluent water from the camp/office sites shall be disposed of or stored in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, pans dams, etc.). Only domestic type wastewater shall be disposed on via this system.

Particular reference in the site establishment plan shall be given to the management of sewage generated at the site offices, and on-site facilities for labour. Sanitary arrangements should be to the satisfaction of the ECO, the local authorities and all applicable legal requirements.

Safe and effective management will require the use of chemical toilets which are supplied and maintained. The type of sewage management will depend on the geology of the local area, the duration of the contract and proximity (availability) of providers of chemical toilets. Chemical toilets will be serviced and emptied on a regular basis and no overflow will be permitted. The positioning of the chemical toilets is to be done in consultation with the ECO but should be a suitable distance from the edge of the wetland.

The appropriate permits for sanitation facilities must be obtained from the local authorities.

Ablution Facilities

- The Contractor must provide the necessary ablution facilities for all his employees. These must be easily accessible (within 500m of any point of work), transportable and there should be a minimum of 1 toilet per 15 persons.
- Performing ablutions outside the toilet facilities is strictly prohibited. Use of the veld for this purpose shall not, under any circumstances, be allowed.
- The toilets shall be secured, and provided with an external closing mechanism to prevent toilet paper from being blown out.
- The toilets must be sited more than 50m away from any identified environmentally sensitive areas, drainage lines and water resources.
- Only approved chemical toilets shall be used.
- The Contractor shall arrange for regular emptying of toilets (toilets must be emptied on a daily basis) and will be entirely responsible for enforcing their use and for maintaining these facilities in a clean, orderly and sanitary condition to the satisfaction of the ECO.

7.3 Wetlands

Particularly sensitive areas (also refer to Figure 7-1):

High levels of sensitivity were given to several wetlands on site, and as a result a No-Go area was described. Wetlands are highly susceptible to destruction through disturbance and are protected by law.

Construction

The following mitigation measures must be implemented to ensure the least possible impact on the wetlands:

- The Contractor has a responsibility to inform all staff of the need to be vigilant against any practice that will have a harmful effect on wetlands. This information shall form part of the Environmental Education Programme to be effected by the Contractor.
- The natural wetlands encountered on the site are to be conserved and left as intact as possible.
- Keep removal of vegetation to a minimum.
- No construction shall take place in areas of high sensitivity i.e. "NO-GO Areas". All no-go areas must be demarcated with red tape under guidance of the ECO.
- Every effort should be made to rehabilitate any damage to wetlands to minimise the habitat losses to resident faunal species.
- Re-vegetation of disturbed areas must be undertaken with site indigenous species and in accordance with the instructions issued by the ECO.
- Any proclaimed weed or alien species that germinates during the contract period shall be cleared by hand before flowering.
- Infilling, excavation, drainage and hardened surfaces (including buildings and asphalt) should not occur in any of the wetland zones (i.e. permanent, seasonal or temporary). Should constructing be contained to non-wetland areas, caution must be taken to ensure building materials are not dumped or stored within the delineated wetland buffer zone
- Development must be carefully sited to minimize the footprint and ultimately the loss of the natural habitat within the wetland areas. Development must minimize the removal of vegetation and ensure the appropriate rehabilitation of disturbed sites. Clearing should be restricted to dry season to minimise soil erosion and sedimentation.
- Further buffering and linkages to other natural areas should be applied where the wetland has a particularly high biodiversity value.
- The design of drainage systems must ensure there is no contamination and eutrophication of the wetland areas. Drainage systems should be maintained regularly in order to minimise the runoff of harmful chemical substances into the wetland areas.

- The construction of a surface stormwater drainage system during the construction phases must be done in a manner that would protect the quality and quantity of the downstream system. The use of swales, which could then be grassed for the operational phase, is recommended as the swales would attenuate run-off water.
- Stormwater outflows should not enter directly into the wetland. The velocity of water that may reach wetlands should be slowed before it is intercepted by virgin soils using a siltation and erosion control structure. The plans and specification for this structure should be forwarded to the relevant stakeholders such as Working for Wetlands and local municipalities.
- Roads should not be allowed to traverse a wetland. Where possible, an alternative route should be considered and utilized. If no viable alternative route exists then it should be ensured that the road has minimal affect on the flow of water through the wetland (e.g. by using a bridge or box culverts rather than pipes). During construction, disturbance to the wetlands at, and adjacent to, the road crossing site should be minimised.
- The vegetation within wetland areas must be considered at all times during construction. It is essential to clear vegetation in the drier winter months and to limit clearing to areas immediately needed for construction.
- Any stands of aquatic vegetation should be avoided during the construction phase and viable populations should remain in situ to allow for the possible recovery of these stands.
- Imported fill material should be monitored during and after construction for the presence of any alien species. Any such species should be removed immediately.
- If building commences within the delineated wetland areas, this impact is unavoidable. Development plans could exclude wetland areas from construction in order to avoid such impacts. However, as far as possible, any wetland areas should be avoided during the construction phase. Building materials and activities should remain strictly outside of the delineated wetland buffer areas.
- Emergency plans must be in place in case of spillages into the wetland systems.
- Chemicals used during building must be stored safely on site and surrounded by bunds. No stockpiling should take place within a wetland.
- Storage containers must be regularly inspected so as to prevent leaks into aquatic systems, e.g. groundwater.
- All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.
- Stockpiles must be located away from river channels if at all possible and for as short a time as possible.
- Erosion control of all banks must take place so as to reduce erosion and sedimentation into river channels or wetland areas.
- Pillars, columns, thrust blocks or parapets should not be placed within wetland areas if at all possible. If this is necessary, all precautions should be taken to avoid excessive disturbance of the area.
- Silt traps and culverts should be regularly maintained and cleared so as to ensure effective drainage.
- Weather forecasts from the South African Weather Bureau of up to three days in advance must be monitored on a daily basis to avoid exposing soil or building works or materials during a storm event and appropriate action must be taken in advance to protect construction works should a storm event be forecasted.
- An Environmental Control Officer (ECO) would provide the management and accountability required in order to comply with recommended mitigation measures.

Operation

- The design of drainage systems must ensure there is no contamination and eutrophication of the wetland areas.
- Drainage systems should be maintained regularly in order to minimise the runoff of harmful chemical substances into the wetland areas.

- Water quality monitoring must be undertaken and results assessed. uMhlathuze municipality should take the necessary management actions should water quality status decline, particularly in areas where there is no reticulated water supply – this may involve the provision of alternate water supply.
- The water quality in the streams supplied by wetlands that will be affected (Ngodweni Stream) should be tested prior to the commencement of construction activities with the objective of establishing baseline data for further monitoring of water quality. These data can be used as a level on which upon monitoring will be based.
- The construction camp and necessary ablution facilities meant for construction workers must be well removed from aquatic systems, especially undisturbed wetlands.
- Local people should be employed to act as litter patrols on a weekly or daily basis if necessary during the construction phase, to ensure that pollution is reduced at all times.
- Littering and contamination of water sources during construction must be mitigated by effective construction camp management
- All construction materials including fuels and oil should be stored in a demarcated area that is contained within a berm to avoid spread of any contamination.
- Cement and plaster should only be mixed within mixing trays. Washing and cleaning of equipment should also be done within a bermed area, in order to trap any cement or plaster and avoid excessive soil erosion. These sites must be rehabilitated prior to commencing the operational phase. Mechanical plant and bowsers must not be refueled or serviced within or directly adjacent to any wetland area
- Remaining wetland areas should be fenced off to prevent public access and thereby reduce secondary impacts (littering, dumping & burning).

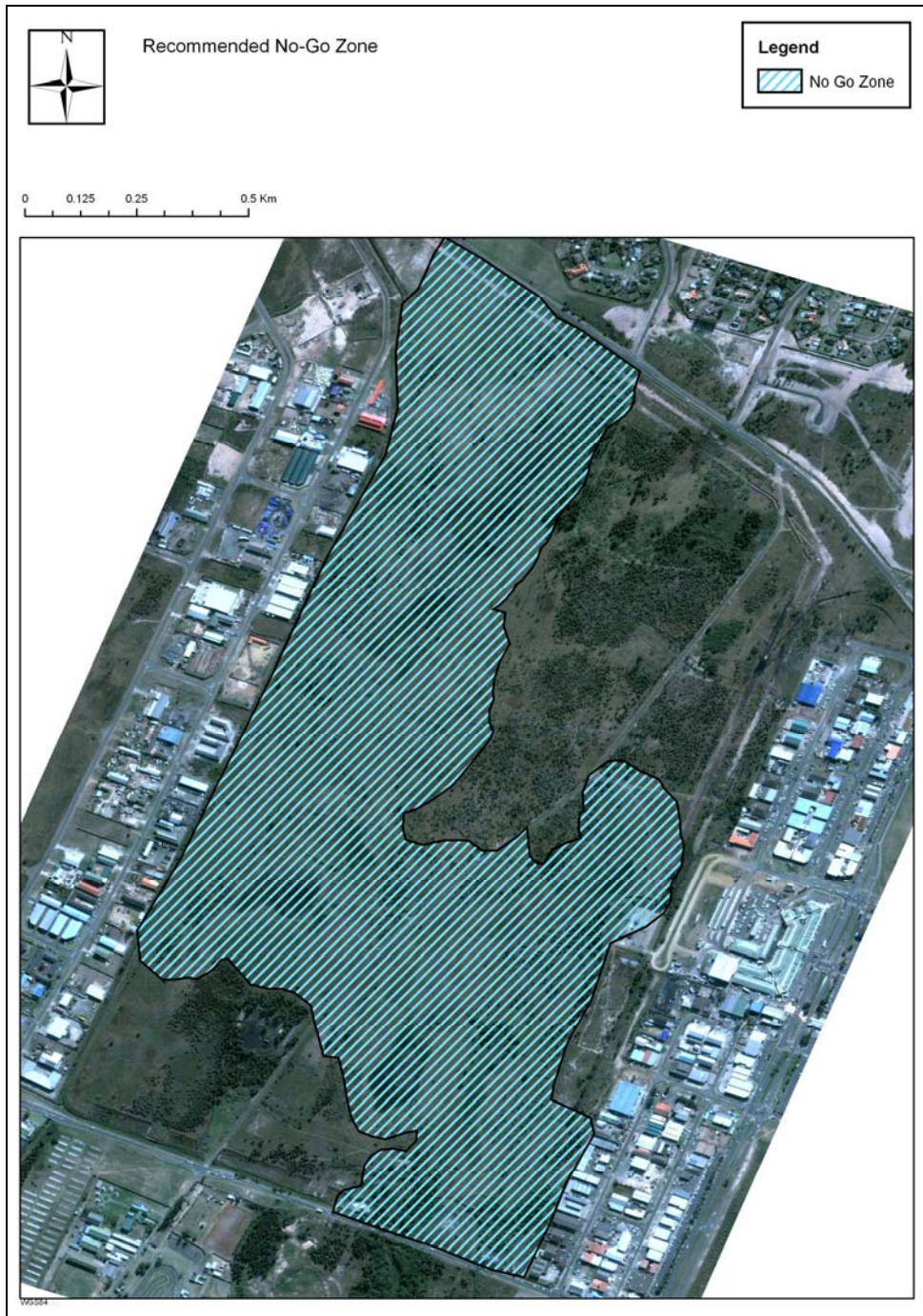


Figure 7-1: Delineated 'No-Go' areas of the proposed CIA site

7.4 Vegetation

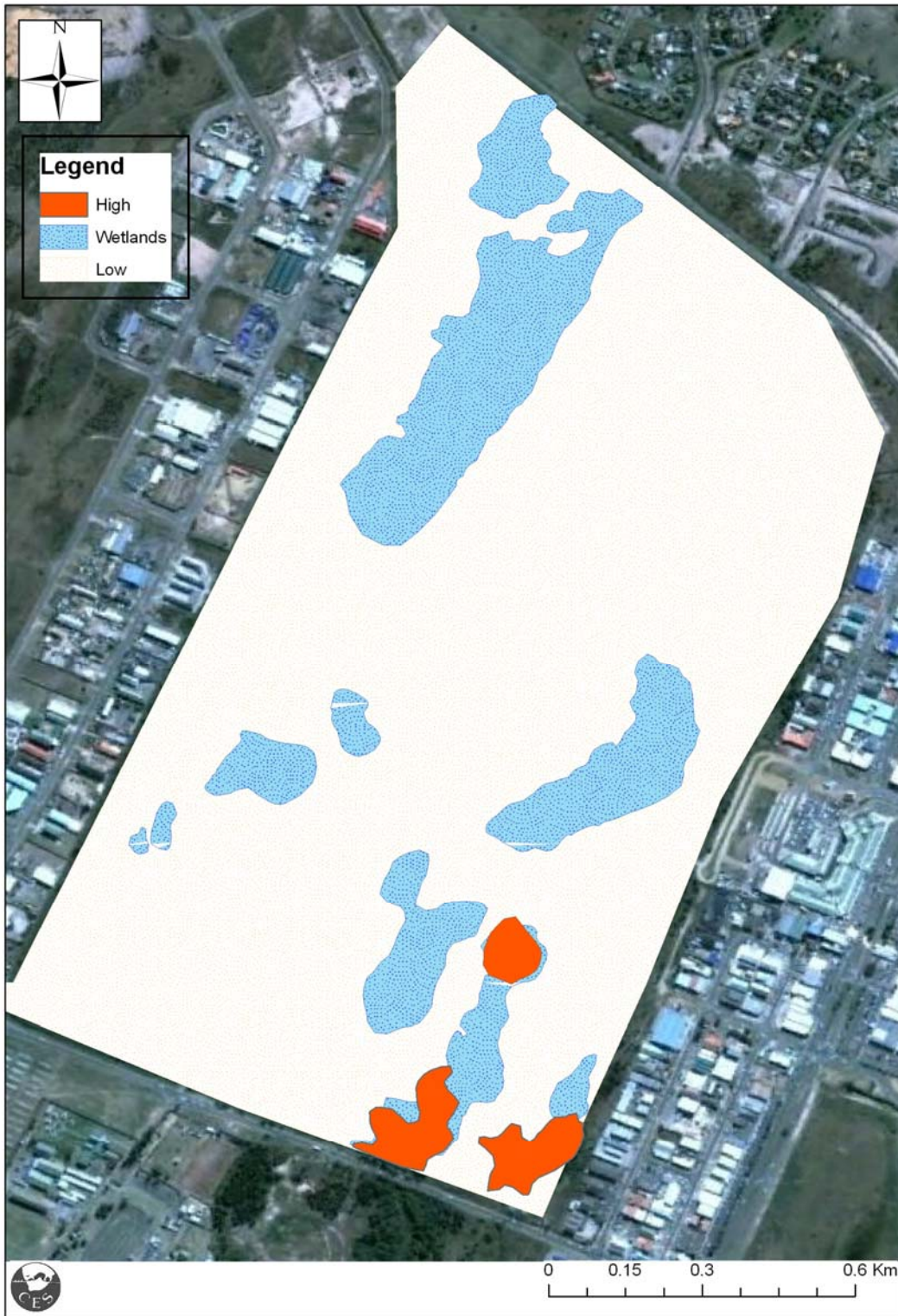
Particularly sensitive areas (also refer to Figure 7-2):

High levels of sensitivity were given to the two forest patches on site, as well as to the wetlands. The forest patch is also given a high sensitivity rating. Forests are highly susceptible to destruction through disturbance and are protected by law.

Construction

The following mitigation measures must be implemented to ensure the least possible impact on the local vegetation:

- The Contractor has a responsibility to inform all staff of the need to be vigilant against any practice that will have a harmful effect on vegetation. This information shall form part of the Environmental Education Programme to be effected by the Contractor.
- The natural vegetation encountered on the site is to be conserved and left as intact as possible.
- Keep removal of vegetation to a minimum.
- Wood from the forest may not be used as fuel for fires during construction.
- No construction shall take place in areas of high (forest patches) sensitivity i.e. "NO-GO Areas". All no-go areas must be demarcated with red tape under guidance of the ECO and a professional botanist.
- It is recommended that areas containing species of special concern be noted and every effort made to reduce the impacts of construction on these sections of vegetation.
- Every effort should be made to rehabilitate the damaged vegetation to minimise the habitat losses to resident faunal species.
- Re-vegetation of disturbed areas must be undertaken with site indigenous species and in accordance with the instructions issued by the ECO.
- Areas within the footprint of the development shall be examined prior to any earthworks being carried out to see if there are any endangered plants or SSC which should then be removed by a professional botanist and, where possible, replanted in a suitable area. Prior to removal, however, suitable relocation areas need to be identified, either within the site or in other disturbed areas on the property.
- Only trees and shrubs directly affected by the works, and such others as may be indicated by the ECO in writing, may be felled or cleared.
- The ECO must undertake a targeted survey of protected trees to identify any individuals of protected species. These must be marked with red tape.
- A permit must be obtained from the Department of Water and Environmental Affairs and Forestry (DWEAF) prior to the removal or damage of any protected tree species.



WGS84TM31

Figure 7-2: Sensitivity map of the study area showing which vegetation elements have a high (forest pockets) and low (the rest of the study site) sensitivity with wetlands, which are inherently sensitive.

- Sensitive areas adjacent to the construction area, including all potential habitats for threatened species and areas of indigenous forest, must be clearly demarcated and no construction activities or impacts must be permitted to occur across these demarcations. Demarcated areas must be fenced off or clearly demarcated with red tape and no personnel or equipment must be permitted to enter these areas.
- Any proclaimed weed or alien species that germinates during the contract period shall be cleared by hand before flowering.
- As far as possible, open fires should not be permitted on the construction site. Where required, fires shall only be allowed in facilities or equipment specially constructed for this purpose.
- A strict monitoring plan must be implemented to prevent the additional spread and the continued removal of alien species such as those of *Pinus* and *Eucalyptus* species, which were already present on site or that become established on areas that were disturbed during construction.

Operation

Management of the development area during the operational phase shall focus on maintaining biodiversity and managing alien invasion. Achieving these objectives will require the preparation of an Alien Eradication Plan, and a Biodiversity Protection Plan. The latter will need to determine, *inter alia*, frequency of burning and/or mowing, areas to be left undisturbed etc.

The following applies with regards to vegetation during the operation phase:

- Continued monitoring of the site for potential alien invasion must take place, especially of plant species that were already on site.
- Maintenance of areas set aside within the site for conservation must take place to ensure that these are not being impacted further in any way.

7.5 Rehabilitation

The construction areas and areas where site offices were erected will require rehabilitation at the end of the contract. The area will require ripping and the re-spreading of topsoil to generate vegetation. In this regard, the following rehabilitation strategies apply:-

- Suitable plant species for re-vegetation must be determined early in the re-vegetation programme.
- Depending on the variation in soil types on the micro-scale, it shall be important to differentiate different soil characteristics during rehabilitation from the point of view of separating soil types. The correct soil types must be replaced in the areas from which they were originally removed. This is important as it relates to rehabilitated plants which may only grow in specific soil types. A horticultural specialist shall be brought in to over-see this task.
- Rehabilitation must be scheduled to take place as soon as possible after construction has been completed with acceptable cover being achieved after 3 months.
- Ongoing monitoring and maintenance of rehabilitation works should be undertaken, especially following construction of any roads or digging of trenches for cables.
- All construction material, including concrete slabs are to be removed from the site on completion of the contract.
- An indigenous re-vegetation strategy must be developed and implemented, especially of disturbed areas. This can provide a buffer to protect remaining indigenous vegetation from invasion by weeds and alien invader plants.

During the re-vegetation / rehabilitation programme, the following applies:

- A botanist/ecologist must be on site to determine if any of the SSC occur where the units and associated infrastructure are positioned.
- Before the clearing of the site is authorised, the appropriate permission must be obtained from the Department of Water Affairs and Forestry (DWAF) for plants listed in the National Forests

Act, and from the Department of Agriculture, Environmental Affairs and Rural Development (DAEARD) for the destruction of the Provincial Nature Conservation Ordinance (PNCO) Schedule 12 protected species.

- In order to acquire a permit to destroy or remove plant species that fall under the National Forest Act an application form will need to be submitted to DWAF. A letter needs to be drafted and sent to DAEARD prior to the destruction/removal of any PNCO Schedule 12 species: This letter must list the species that will be removed or destroyed and the reason for their removal or destruction.
- These permits may be subject to certain conditions, for example allowing various nurseries to collect plants before vegetation clearance commences; the removal of certain species for rehabilitation purposes, etc.
- The plants can also be removed and placed in a nursery for use for rehabilitation purposes. If a species is identified for relocation, individuals of the species will need to be located within the proposed site, before vegetation clearing commences, and carefully uprooted and removed by a skilled horticulturist. Prior to removal, however, suitable relocation areas need to be identified, either within the site or in other disturbed areas on the property. Individual plants that cannot be relocated at the time of removal should be moved to the nursery.
- It should be noted that many critical SSC are plants that will not be able to be successfully uprooted and replanted at all, or at best may have a low survival rate. In all cases the species will require very careful treatment to give them the best chances of survival, and specialist horticultural knowledge will be needed.

7.6 Fauna

Particularly sensitive areas:

- Sensitive vegetation areas; the forest patch and the wetlands.
- The entire site, but especially wetlands and forests for birds.

The following measures must be implemented:

- During construction, sensitive habitats must be avoided by construction vehicles and equipment, wherever possible. Only necessary damage may be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place.
- Construction activities must remain within defined construction areas. No construction / disturbance will occur outside these areas.
- The extent of lay down areas must be minimised and they should not be located in areas that provide habitat for any faunal SSC.
- The Contractor shall ensure that all identified highly sensitive habitats are protected by demarcated no-go areas through fencing or other suitable means.
- Buffer zones shall be provided around sensitive habitats.
- If any fencing is to be done; the fences should have enough space between wires for small animals to move across them uninhibited.
- The removal, damage or disturbance of fauna or avifauna will be forbidden in all demarcated no-go areas or specified environmentally sensitive areas.
- The ECO will make the Contractor aware of any Ordinances, Acts, by-laws, or regulations pertaining to the protection of fauna on the site. Where applicable, the Contractor will apply for the necessary permits prior to removing any animals listed in the relevant schedules promulgated in terms of any relevant legislation.
- The trapping of any animal is strictly prohibited. Any animal killed as a result of trapping or hunting or found in the possession of an employee of the Contractor will result in that employee being removed from site for the duration of the Contract.
- No domestic pets or livestock will be permitted on site during the construction period.

7.7 Waste Management

The Contractor's intended methods for waste management and waste minimisation must be implemented at the outset of the contract, and approved by the ECO. All personnel shall be instructed to dispose of all waste in the proper manner.

No waste from construction or otherwise, may be disposed of on site. All waste generated on site, must be removed from the site and disposed of at a licensed waste disposal site. In this regard, adequate litter drums or other suitable containers must be located on site to ensure that waste generated on site is disposed of in suitable and timeous manner.

Where possible, some of the construction waste should be recycled and used in construction.

7.7.1 Solid Waste and liquid wastes

Construction and Operational Phases

Solid waste shall be stored in a designated area within the site area in covered, tip proof drums for collection and disposal. All refuse containers must be free of any holes and in good condition. A refuse control system shall be established for the collection and removal of refuse to the satisfaction of the ECO. As far as possible, general waste (including paper, glass, plastics, aluminium, etc.) shall be sorted for recycling.

Disposal of solid waste shall be at a DEA licensed landfill site, or at a site approved by DEA in the event that an existing operating landfill site is not within reasonable distance from the site. No waste shall be burned.

Any water contaminated by cement shall not be allowed to flow freely into the environment. Instead, it must be contained and solids allowed to settle out. Thereafter, the solid material shall be disposed of to a landfill site with other solid waste.

All future occupants of the site must manage waste according to best practice and the requirements of national legislation.

7.7.2 Litter

Construction Phase

No littering by construction workers must be allowed. During the construction period, the facilities shall be maintained in a neat and tidy condition, and the site is to be kept free of litter. Fines shall be implemented for persons found littering.

Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work, the Contractor shall provide litter collection facilities for later safe disposal at DEA approved waste disposal sites.

Operation Phase

During the operation phase, the area of the development should be cleared of litter on a regular basis. Once collected, this litter shall be disposed of at a DEA approved waste disposal site.

7.7.3 Hazardous Waste

Construction Phase

Hazardous waste such as bitumen, oils, oily rags, paint tins etc. shall be disposed of at a DEA approved hazardous waste landfill site. Special care should be taken to avoid spillage of hazardous waste from entering the ground or contaminating water. In the event of the above occurring, the affected areas shall be promptly reinstated to the satisfaction of the ECO.

As far as possible, maintenance of machinery and vehicles on site should be avoided. Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery should be collected in a holding tank and returned to the supplier. Water and oil should be separated in an oil trap. Oils collected in this manner, should be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit should be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company. The Contractor shall ensure that an emergency preparedness plan is in place for implementation in the case of a spill or substances which can be harmful to an individual or the receiving environment.

All used filter materials should be stored in a secure bin for disposal off site. Hazardous waste shall not be stored or stockpiled in any area other than that designated on the construction site layout.

Any contaminated soil should be removed and replaced. Soils contaminated by oils and lubricants should be collected and disposed of at a facility designated by the local authority to accept contaminated materials.

Washing of vehicles on the construction site should not be permitted as this is likely to result in release of hydrocarbon-contaminated wash water into the environment.

Operational Phase

Hazardous materials (if any) which may be generated during the operation phase must be disposed of in a DEA approved hazardous waste landfill site. The Contractor shall ensure that an emergency preparedness plan is in place for implementation in the case of a spill or substances which can be harmful to an individual or the receiving environment. All future occupants of the site must manage waste according to best practice and the requirements of national legislation.

7.8 Maintenance and Machinery

The contractor's management and maintenance of his plant and machinery will be strictly monitored according to the criteria given below, regardless whether it is serviced on the site (i.e. at the place of construction activity or at a formalised workshop).

7.8.1 Safety

All the necessary handling and safety equipment required for the safe use of petrochemicals and oils shall be provided by the Contractor to, and used or worn by the staff whose duty it is to manage and maintain the supplier's plant, machinery and equipment.

7.8.2 Hazardous Material Storage

Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials (e.g. oils, lubricants, paints etc) will be stored in a secured, appointed area that is fenced and has restricted entry. Storage of hazardous products shall only take place using suitable containers approved by the ECO.

The Contractor shall provide proof to the Engineer that relevant authorisation to store such substances has been obtained from the relevant authority. In addition, hazard signs indicating the nature of the stored materials shall be clearly displayed on the storage facility or containment structure. Before containment or storage facilities can be erected, the Contractor shall furnish the Engineer with details of the preventative measures which are proposed to be installed in order to mitigate against pollution of the surrounding environment from leaks or spillage. The proposals shall also indicate the emergency procedures to be implemented in the event of misuse or spillage of substances that will negatively impact on an individual or the environment.

7.8.3 Fuel and Gas Storage

- Fuel shall be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers.
- Storage of fuel and gas will be confined to the demarcated secure area(s).
- Areas around fuel tanks are to be bunded or contained in an appropriate manner as per the requirements of SABS 089:1999 Part 1.
- Fuel tanks shall be located at least 3.5m from buildings, boundaries and any other combustible or flammable material.
- Leakage of fuel shall be avoided at all times and if found to occur shall be remedied immediately. Suitable and adequate supplies of absorbents shall be available at all times to control and absorb any spillages.
- The Contractor will ensure that an emergency preparedness plan is in place for implementation in case of leakage or spillage of fuel which can be harmful to an individual or the receiving environment.
- An adequate bund wall (110% volume) shall be provided for fuel and diesel areas to accommodate any spillage or overflow of these substances. The area inside the bund wall should be lined with an impervious lining to prevent infiltration of the fuel into the soil.
- Where provision is made for draining water from bunded area, such drains shall be so controlled as to prevent hazardous products from entering natural water courses, public sewers or public drains.
- No storage of any combustible materials (paper, cardboard, wood etc) shall be permitted in any bunded area.
- Generators and fuel supply needed during construction must be placed on trays, which can rest on clean sand.
- Once construction has been completed, this sand must be removed from the site and disposed of at a registered waste site.
- All storage tanks shall be removed after construction.
- Gas welding cylinders and LPG cylinders should be stored in a secure, well-ventilated area which is clearly marked with hazard signs.

7.8.4 Fires

Construction Phase

- No open fires should be permitted on the site.
- Where fires are unavoidable, the Contractor shall ensure the management of fires emanating from construction camps and that education of the work force concerning management of fires is undertaken.
- The Contractor shall ensure that camp fires at construction sites are strictly controlled to ensure that no veld fires are caused. This is especially important where fires may affect sensitive habitats.
- Fires shall only be allowed in facilities or equipment specially constructed for this purpose and these must be located in areas that are sheltered from the prevailing winds.
- A firebreak shall be cleared and maintained around the perimeter of the camp and office sites at all times. The location of this firebreak shall be decided with input from a local botanist and the ECO.

7.9 Clearing of the Site

In all areas where the contractor intends to, or is required to clear the natural vegetation and soil, either within the construction area, or at designated or instructed areas outside the construction area, a plan of action shall first be submitted to the engineer and ECO for approval.

The plan shall contain a photographic record and chainage/land reference of the areas to be disturbed. This shall be submitted to the engineer for his records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during subsequent inspections.

The contractor shall be responsible for the re-establishment of grass within the development boundaries for all areas disturbed during construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated from, construction has to be stored temporarily or otherwise within the construction area, or at designated or instructed areas outside the construction area. This responsibility shall extend until expiry of the defects notification period.

7.10 Soil Management

7.10.1 Topsoil

Topsoil shall be removed from all areas where physical disturbance of the surface would occur and shall be stored and adequately protected. The contract will provide for the stripping and stockpiling of topsoil from the site for later re-use. Topsoil is considered to be the natural soil covering, and to include all organic matter. Depth may vary at each site, and must be determined on a site-specific basis and removed accordingly. The areas to be cleared of topsoil shall include the storage areas and site camps.

All topsoil stockpiles and windrows shall be maintained throughout the contract period in a weed-free condition. Weeds appearing on the stockpiled topsoil shall be removed by hand. The topsoil stockpiles shall be stored, shaped and sited in such a way that they do not interfere with the flow of water such that damming or erosion is caused, or itself be eroded through the action of water. Stockpiles of topsoil shall not exceed a height of 2m, and if they are to be left for longer than 6 months shall be analysed and, if necessary, nutrient levels replenished before replacement.

Soils contaminated by hazardous substances shall be disposed of at a DEA hazardous waste disposal site.

The Contractor shall ensure that minimal amounts of topsoil are lost due to erosion, either by wind or water. This can be facilitated through the grassing of topsoil stockpiles. Areas to be top-soiled and grassed shall be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns. The Contractor's programme shall clearly show the proposed rate of progress of the application of topsoil and re-vegetation. The Contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the progress plan approved by the ECO. The Contractor's responsibility shall also extend to the clearing of drainage or water systems that may have been affected by such negligence within and beyond the boundaries of the road reserve.

7.10.2 Subsoil

The subsoil is the layer of soil immediately beneath the topsoil. This layer of soil shall be removed to a depth instructed by the ECO, and stored separately from the topsoil if not used for construction purposes. During rehabilitation, this subsoil shall be replaced in the excavation in the original order it was removed.

7.11 Drainage

- The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all construction activities.
- Before a site is developed or expanded, the effect on the drainage pattern as a result of this development or expansion shall be established.
- Recognised water users/receivers must not be adversely affected by the expansion or re-development.
- No water source shall be polluted in any way due to proposed changes.
- Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion, direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products.
- The Contractor shall submit in writing to the Engineer and ECO his proposals for prevention, containment and rehabilitation measures against environmental damage of the identified water and drainage systems that occur on the site. Consideration shall be given to the placement of sedimentation ponds or barriers where the soils are of a dispersive nature, or where toxic fluids are used in the construction process. The sedimentation ponds must be large enough to contain runoff such that they function correctly under heavy rain conditions.
- Measures shall be put in place to protect the hill slopes in the Waainek catchment area against erosion as a precaution in areas affected by the exposing of unconsolidated soils during construction of the wind energy facility.
- Storage containers must be regularly inspected so as to prevent leaks into the aquatic system.
- Weather forecasts from the South African Weather Bureau of up to three days in advance must be monitored on a daily basis to avoid exposing soil or building works or materials during a storm event and appropriate action must be taken in advance to protect construction works should a storm event be forecasted.

7.12 Earthworks and Layerworks

This section includes all construction activities that involve the excavation of all materials, and their subsequent placement, stockpile, spoil, treatment or batching, for use in the permanent works, or temporary works in the case of deviations. The contractor shall take cognisance of the requirements set out below.

7.12.1 Excavation, hauling and placement

The contractor shall provide the engineer and ECO with detailed plans of his intended construction processes prior to starting any excavations. The plans shall detail the number of personnel and plant to be used and the measures by which the impacts of pollution (noise, dust, litter, fuel, oil, sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. Particular attention shall also be given to the impact that such activities will have on the adjacent built environment, including nearby houses. The contractor shall demonstrate his “good housekeeping”, particularly with respect to closure at the end of every day so that the site is left in a safe condition from rainfall overnight or over periods when there is no construction activity.

7.12.2 Spoil sites

The contractor shall be responsible for the safe siting, operation, maintenance and closure of any spoil site he uses during the contract period, including the defects notification period. This shall include existing spoil sites that are being re-entered. Before spoil sites may be used, proposals for their locality, intended method of operation, maintenance and rehabilitation shall be given to the engineer and ECO for his approval. The location of these spoil sites shall have signed approval from the affected landowner before submission to the engineer. No spoil site shall be located within 500m of any watercourse. A photographic record shall be kept of all spoil sites for monitoring purposes. This includes before the site is used and after revegetation.

The use of approved spoil sites for the disposal of hazardous or toxic wastes shall be prohibited unless special measures are taken to prevent leaching of the toxins into the surrounding environment. Such special measures shall require the approval of the relevant provincial or national authority. The same shall apply for the disposal of solid waste generated from the various camp establishments. The engineer will assist the contractor in obtaining the necessary approval if requested by the contractor.

Ideally, the storage of excavated material on site should be minimised to avoid unnecessary impacts to the local environment. As soon as practical after excavation, if not simultaneously, all excavated material that is not required for construction or rehabilitation shall be removed from the site for disposal at an appropriate location. This location must be agreed between the developer, engineer and local municipal officials prior to initiation of excavation.

7.12.3 Stockpiles

The contractor shall plan his activities so that excavated materials, in so far as possible, can be transported direct to and placed at the point where it is to be used. However, should temporary stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the engineer and ECO for their approval, together with the contractor's proposed measures for prevention, containment and rehabilitation against environmental damage.

The areas chosen shall have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care shall be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the contractor shall at all times ensure that they are:

- Positioned and sloped to create the least visual impact;
- Constructed and maintained so as to avoid erosion of the material, generation of dust and contamination of surrounding environment; and
- Kept free from all alien/undesirable vegetation.

After the stockpiled material has been removed, the site shall be re-instated to its original condition. No foreign material generated / deposited during construction shall remain on site. Areas affected by stockpiling shall be landscaped, top soiled, grassed and maintained at the contractor's cost until clearance from the engineer and the relevant National Authority is received. In all cases, the engineer shall approve the areas for stockpiling and disposal of construction rubble before any operation commences and shall approve their clause only when they have been satisfactorily rehabilitated.

7.12.4 Blasting activities

Wherever blasting activity is required on the site the contractor shall rigorously adhere to the relevant statutes and regulations that control the use of explosives. In addition, the contractor shall, prior to any drilling of holes in preparation for blasting, supply the engineer with a locality plan of the blast site on which shall be shown the zones of influence of the ground and air shock-waves and expected limits of fly-rock. The plan shall show each dwelling, structure and service within the zones of influence and record all details of the dwellings/structures/services including existing

positions, lengths and widths of cracks, as well as the condition of doors, windows, roofing, wells, boreholes etc. The contractor, alone, shall be responsible for any costs that can be attributed to blasting activities, including the collection of fly-rock from adjacent lands and fields. The submission of such a plan shall not in any way absolve the contractor from his responsibilities in this regard. The contractor shall also indicate to the engineer the manner in which he intends to advertise to the adjacent communities and/or road users the times and delays to be expected for each individual blast. The Contractor shall be responsible for obtaining all necessary permits required for blasting activities.

7.12.5 Batching sites

Asphalt plants are considered scheduled processes listed in the second schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965). Should the use of an asphalt plant be considered on site, the contractor shall be responsible to obtain the necessary permit from the DEA, regardless of where they are sited.

Crushing plants and concrete batching plants shall be subject to the requirements of the applicable industrial legislation that governs gas and dust emissions into the atmosphere. Such sites will be the subject of regular inspections by the ECO and relative authorities during the life of the project. The contractor shall provide plans that take into account such additional measures as concrete floors, bunded storage facilities and linings to drainage channels. All sites shall adhere to the following requirements:

- The batching activity shall be located in an area of low environmental sensitivity to be identified and approved by the ECO.
- No batching activities shall occur on unprotected substratum of any kind (i.e. directly on the ground).
- All wastewater and runoff from batching areas shall be strictly controlled, and cement-contaminated water shall be collected, stored and disposed of at a site approved by the ECO. Mixing trays shall be used at all mixing and supply points.
- Contaminated water shall be disposed of at a waste disposal site approved by the ECO.
- Effluent from concrete batch plants and crusher plants should be treated in a suitable designated sedimentation dam to the legally required standards to prevent surface and groundwater pollution. The designs of such a facility should be submitted to the ECO for approval.
- Contaminated water storage facilities shall not be allowed to overflow and appropriate protection from rain and flooding shall be implemented.
- Unused cement bags are to be stored so as not to be affected by rain or runoff events.
- Used bags shall be disposed of by the Contractor in the appropriate manner.
- Care shall be taken to collect contaminated wash-water resulting from cleaning activities of equipment and flushing of mixers, and dispose of it in a manner approved by the ECO.
- Suitable screening and containment shall be in place to prevent wind blown contamination associated with bulk cement silos, loading and batching.
- All visible remains of excess concrete shall be physically removed on completion of the plaster or concrete pour section and disposed of. All excess aggregate shall also be removed.

Ultimate approval of these measures shall be from the relevant national authority, as shall approval of closure. The engineer will assist the contractor in his submissions to the relevant authority.

The contractor shall invite the relevant department to inspect the site within 2 months after any plant is commissioned and at regular intervals thereafter.

7.13 Spillages

Construction Phase

Streams, rivers and dams shall be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and tar or bituminous products. In the event of a spillage, the contractor shall be liable to arrange for professional service providers to clear the affected area.

Responsibility for spill treatment lies with the contractor. The individual responsible for, or who discovers a hazardous waste spill must report the incident to his/her ECO or to the engineer. The ECO will assess the situation in consultation with the engineer and act as required. In all cases, the immediate response shall be to contain the spill. The exact treatment of polluted soil / water shall be determined by the contractor in consultation with the ECO and the engineer. Areas cleared of hazardous waste shall be re-vegetated according to the engineer's instructions

Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the engineer. The costs of containment and rehabilitation shall be for the contractor's account, including the costs of specialist input.

Operational Phase

The Contractor shall compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to unexpected or accidental environment-related incidents throughout the life cycle of the project. These plans should include:

- Emergency organisation (manpower) and responsibilities, accountability and liability.
- A list of key personnel.
- Details of emergency services applicable to the various areas along the route that the turbine components will need to be transported as well as for the site itself (e.g. the fire department, spill clean-up services, etc.).
- Internal and external communication plans, including prescribed reporting procedures where required by legislation.
- Actions to be taken in the event of different types of emergencies.
- Incident management plans for the site.
- Incident recording, progress reporting and remediation measures required 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.
- Training plans and testing exercises and schedules for effectiveness.

The Contractor shall comply with the emergency preparedness and incident and accident-reporting requirements, as required by the Occupational Health and Safety Act, 1993 (Act No 85 of 1993), the National Environmental Management Act, 1998 (Act No 107 of 1998), the National Water Act, 1998 (Act No 36 of 1998) and the National Veld and Forest Fire Act, 1998 (Act No 101 of 1998) as amended and/or any other relevant legislation.

7.14 Areas of Specific Importance

Any area, as determined and identified within the project document as sensitive or of special interest within the site shall be treated according to the express instructions contained in these specifications or the approved EMP. The contractor may offer alternative solutions to the engineer in writing should he consider that construction will be affected in any way by the hindrance of the designated sensitive area or feature. However, the overriding principle is that such defined areas requiring protection shall not be changed. Every effort to identify such areas within the site will have been made prior to the project going out to tender. The discovery of other sites with archaeological or historical interest that have not been identified shall require *ad hoc* treatment.

7.14.1 Archaeological Sites

The foot survey did not locate any heritage sites; however, the aerial photographs indicate that sites do exist in the study area. All of the sites need to be reassessed after vegetation clearance has occurred AND during the construction phase. The first assessment will be to determine if settlements are yet visible, while the second assessment will monitor the specific areas for human remains. It should not be the responsibility of the company to report human remains; rather an archaeologist is on site to make the evaluation.

The general areas should be surveyed after vegetation clearance has occurred. There will be vegetation clearance for the various servitudes and for the construction of buildings. UMhlathuze Municipality will need to determine who is responsible for the costs of an archaeologist on site for the servitudes and/or site-specific construction. Costs for site specific activity is covered by the landowner; however, the owner of each plot of land must be made aware of these potential costs. All faunal remains, whether they are human or animal, that are uncovered in the study area need to be assessed and identified by an expert. Earthmoving activity will need to be stop until the remains and area has been assessed. This should not be a hindrance to the overall development, since there are only thirteen of these sensitive areas.

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 discovery. The South African Heritage Resources Agency (SAHRA) shall be contacted and they will appoint an archaeological consultant to record the site and excavate if necessary. Work may only resume once clearance is given in writing by the archaeologist.

7.14.2 Graves and middens

If a grave or midden is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the graves/middens shall be stopped and the engineer informed of the discovery. The National Monuments Council should be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial. The undertaker will, together with the National Monuments Council, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred.

7.15 Noise Control

Construction Phase

- Construction will be restricted to normal daytime working hours (08:00 – 17:00). No construction activities will take place during weekday evenings and night-time (after 17:00), on Saturdays after midday (12:00) and the entire day on Sundays.
- No construction piling should occur at night. Piling should only occur during the hottest part of the day to take advantage of unstable atmospheric conditions.
- All noise-making equipment shall be turned off when not in use.
- All equipment shall be kept in good working order.
- All equipment shall be operated within specifications and capacity (i.e. do not overload machines).
- Compliance with the appropriate legislation with respect to noise is mandatory.
- The Contractor will familiarise himself with, and adhere to, any local bylaws and regulations regarding the generation of noise.
- Construction staff should be given “noise sensitivity” training.
- The Contractor will endeavour to keep noise generating activities associated with construction activities to a minimum.

- Modern low noise emission vehicles and equipment shall be favoured on site. The details of all construction machinery and vehicles must be determined prior to construction in order to identify potentially noisy machinery and to seek possible alternatives. These details will include the manufacturer, type and noise emission data of each machinery/vehicle and how many will be used at any time. Note that manufacturers of modern vehicles and machinery provided for the international market are obliged to provide noise emission data. Where this information is not available, noise measurements must be conducted prior to use of such machinery or vehicles.
- A well planned and co-ordinated “fast track” procedure is implemented to complete the total construction process in the area in the shortest possible time.
- The size of explosive charges used for blasting (if required) should be optimised so as to balance breaking capacity against minimising any vibration impact and fly-rock.

7.16 Dust Control

- Appropriate dust-suppression techniques as approved by the Engineer and ECO shall be implemented on all exposed surfaces during periods of high wind. Such measures shall include; wet suppression, chemical stabilisation, use of wind fence covering surfaces with straw or chippings, and the re-vegetation of open areas.
- Water used for dust suppression must be applied in quantities small enough not to generate run-off and result in soil erosion.
- Mitigation actions such as the reduction of vehicle speed and proper signage shall also be implemented.
- Blasting must be restricted to periods of calm wind conditions to minimise the potential for dust dispersion.
- Vegetation cover should be maintained and vegetation cover only removed until such time as soil stripping is required.
- Exposed soil that has the potential for generating dust shall be re-vegetated or stabilised as soon as possible after construction work is completed, or kept damp until re-vegetation occurs.
- Excavation, handling and transport of topsoil and spoil shall be avoided during periods of excessive wind.
- Adequate water carts shall be available on site to meet demands throughout the duration of the contract.
- The Contractor shall ensure that loose building materials and excavated material stockpiles are adequately protected against the wind by a covering of some description, such as canvas.
- Stockpiles may also be dampened to minimise dust generation.
- Construction vehicles and machinery will be serviced on a monthly basis, with a major service every six months.
- Construction vehicles and machinery shall be inspected for excessive emissions.

7.17 Control and Management of Alien Vegetation

Construction Phase

- Mitigation measures to reduce the impact of the introduction of alien invaders, as well as mitigation against alien invaders that have already been recorded on the site should be actively maintained throughout both the construction and operation phases.
- The Contractor shall be held responsible for the removal of alien vegetation within the development area disturbed for the duration of the construction phase. This includes, for example, access roads, stockpile areas, and wherever material generated for or from construction has been stored temporarily or otherwise within the development area.
- Any proclaimed weed or alien species that germinates during the contract period shall be cleared by hand before flowering.
- Removal of existing alien species shall be consistently done
- Alien plants must be removed as soon as they are detected.

- Removed alien vegetation must be burned in an appropriate location (to be approved by the ECO), or should be disposed of in accordance with the appropriate methods developed by the Working for Water Programme, and advice from this organisation shall be obtained.
- A pest control operator registered for the industrial application of herbicides shall apply herbicides, or shall supervise the application of herbicides in compliance with the terms of the Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No 36 of 1947). The use of herbicides shall not be permitted within identified sensitive areas. Removal of alien vegetation within these areas must be undertaken by hand.
- Re-vegetation of disturbed areas must be undertaken with site indigenous species.
- The Contractor shall avoid translocating stockpiles of topsoil from one place to another in order to avoid translocating soil seed banks of alien species.
- Depending on the variation in soil types on the micro-scale, it shall be important to differentiate different soil characteristics during rehabilitation from the point of view of separating soil types. The correct soil types must be replaced in the areas from which they were originally removed. This is important as it relates to rehabilitated plants which may only grow in specific soil types. A horticultural specialist shall be brought in to over-see this task.
- A strict monitoring plan must be implemented to prevent the additional spread and the continued removal of alien species such as those of *Pinus* and *Eucalyptus* species.

Operational Phase

- The Contractor shall be held responsible for the removal of alien vegetation within the boundaries of the wind energy facility disturbed during construction in accordance with the appropriate methods developed by the Working for Water Programme, and advice from this organisation shall be obtained. This responsibility shall extend for the duration of the defects liability period.
- During operation, the clearing of alien plants within the area is required to control alien invasions. This is mandatory, according to current legislation.

7.18 Erosion Control Measures

The following areas should also be regarded as being of high erosion risk:

- Slopes > 20°.
- Slopes with convergent sub-surface drainage (percolines).
- Road culverts.
- Cut and fill slopes in areas of slope instability or erodable geology.

The above areas, particularly steep cut and fill slopes in soft or erodable material, will require appropriate erosion control measures (e.g. use of gabions) and appropriate re-vegetation methods as listed below.

Construction Phase

General

- The removal of the natural vegetation cover must be avoided and where this cannot be done, minimised.
- Agricultural drainage methods must be used in fill materials to remove water that could trigger slumping.
- Perched water tables must be identified early and adequate drainage for these trigger-points provided.
- The disturbance of the natural soil structure must be prevented and excavations planned carefully.
- The moving of heavy machinery into areas unnecessarily must be avoided.

- All fill material must be very well compacted and innovative use of geo-textile materials in the retention of soil fill areas made.
- Rainwater runoff from cut slopes must be prevented as far as possible.
- Sufficient storm water take off points must be created in such a way that water does not have an opportunity to gather momentum.
- Storm water ditches must contain structures that will reduce velocity of the run off.
- The use of vegetated swales must be investigated in less steep areas.
- Particular care must also be taken to ensure that no existing infrastructure such as water and sewerage reticulation lines is damaged during construction activities.
- Any cut surfaces must be vegetated as soon as possible using local indigenous materials.
- Only local indigenous vegetation shall be used for mulching.

Operational Phase

- The various protective measures that were installed during the construction phase must be properly maintained. These include but are not limited to the following:-
 - Vegetation of road verges and cut faces must be inspected and maintained on a regular basis. This is particularly important on steep slopes.

7.19 Fencing of the Construction Site

Construction Phase

Appropriate fencing should be erected around the construction site during the construction process. The clearing of vegetation for fencing shall be limited to the removal of trees and shrubs within 1m of the fence line within the construction area. Where possible, the fence line must be aligned to retain indigenous trees or tree groups. There shall be no removal of grass or topsoil within this width except for rehabilitation purposes.

Any existing fences damaged during construction activities shall be repaired immediately.

The following must be adhered to with regards to fencing:

- The Contractor shall ensure that all identified highly sensitive habitats are protected by demarcated no-go areas through fencing or other suitable means. Particularly areas of sensitive forest and wetlands to avoid destroying these whilst construction takes place.
- In areas which need fencing; the fences should have enough space between wires for small animals to move across them uninhibited.

7.20 Pedestrian and Traffic Safety

Construction Phase

- During construction the site shall be fenced off to prevent access.
- Fencing shall be inspected weekly and maintained properly, by the Contactor, until construction is complete.
- The Contractor shall ensure that signage, which should be pictorial and in the vernacular, is erected on all boundary fences warning against entering the construction area.
- Public awareness programmes shall be developed by the Contractor with the community to identify areas of particular risk and approaches to reduce risk.
- Traffic calming and speed control measures for access to construction sites shall be instigated in consultation with the local authorities.

7.21 Health Risks and Traffic generated Pollutants

Construction Phase

- During construction all vehicles and construction machinery should be maintained to a standard that minimises pollutants.

Operation Phase

- Levels of air pollution must be regularly monitored;

7.22 Access Requirements

Construction Phase

No access/haul roads other than those required for construction purposes shall be developed. As far as possible, existing roads shall be used for access/haulage purposes. All new temporary access/haul roads as approved by DEA shall also be approved by the Contractor in consultation with the ECO. Prior to the construction of new access/haul roads, topsoil shall be stripped and stockpiled as discussed under Section 7.8 above. All temporary roads no longer required shall be decommissioned and the land rehabilitated as described under Section 7.3 above.

Operational Phase

All access requirements must be identified and detailed by the Contractor. Communities, landowners and/or developers within the turbine site will be required to apply for access to the turbines from the Contractor. The Contractor must consider each application and consult with each applicant in this regard.

7.23 Landscape and Visual

- The Contractor shall ensure that construction camps are located inconspicuously in the landscape to reduce visual impact severity. This will include placing construction camps in already disturbed landscapes in close proximity to the construction area. In addition, construction camps shall be made of temporary structures that can be moved easily, and will not be placed on ridges, elevated slopes and open landscapes.
- The Contractor shall ensure that construction activities are expedited in the construction phase reducing the temporal scale thereby reducing the visual exposure time.
- The Contractor shall place construction camps, stock piles and associated activities within the construction site or on previously disturbed sites where-ever possible to reduce extensive landscape impacts that can lead to a general depletion of the overall landscape character.
- The Contractor shall ensure that construction camp establishment avoids landscape modifications like tree cutting, grading and levelling of the landscape.
- The Contractor shall write design and placement guidelines for structures and infrastructure i.e. signage, communication, lighting etc. for approval by the ECO and these must consider:
 - Use of appropriate materials;
 - Massing, i.e. cluster activities where possible;
- The Contractor shall ensure the establishment of appropriate setbacks/buffers from adjacent sensitive land uses, especially residential and tourism;
- The Contractor with the approval of the engineer shall ensure that building structure has modest scale, height and form of simple rectangular nature;
- The Contractor with the approval of the engineer shall ensure that structures to be as 'transparent' as possible to 'melt' / integrate into the landscape- make use of slender structures;
- Signage and other infrastructure, to be kept to a minimum;

- New road construction should be minimised and existing roads should be used where possible.
- The Contractor should maintain good housekeeping on site to avoid litter and minimise waste.
- Clearance of indigenous vegetation should be minimised and rehabilitation of cleared areas should start as soon as possible.
- Erosion risks should be assessed and minimised as erosion scarring can create areas of strong contrast which can be seen from long distances.
- Laydown areas and stockyards should be located in low visibility areas (e.g. valley between the ridges) and existing vegetation should be used to screen them from views.
- Night lighting of the construction sites should be minimised within requirements of safety and efficiency.
- Fires and fire hazards need to be managed appropriately.

7.24 Accommodation of Traffic

Adequate traffic accommodation must be implemented during transportation of construction materials to the site. All relevant road traffic and other legislation must be adhered to when transporting abnormal loads to the site. The Contractor shall ensure that all construction personnel and vehicles are clearly visible. The safety of both workers on site and road users is to be ensured at all times.

7.25 Employment

Without compromising construction and operation activities and schedules, local labour should be employed as far as possible. Those successful in obtaining employment should be provided with the appropriate skills development and training.

7.25.1 Local Labour Recruitment and Employment Strategy

The facilitation strategy has been developed to provide a framework for the Contractor and uMhlatuze Municipality to effectively facilitate the implementation of the Richards Bay CIA Project in a manner that creates opportunities for the intended beneficiaries to be actively involved in the project. The strategy to be adopted should be in line with and guided by the objectives and policies of National Government.

The social dynamics of the Richards Bay community should be taken into consideration in the formulation of a facilitation strategy. For example, in an area where the traditional authorities are dominant, the strategy should be to influence them to engage other community structures. This should be done in a manner that would assure them that their authority is not eroded yet the rest of the community does not feel marginalized.

The project should involve all the communities in the vicinity of the Richards Bay CIA Project to ensure full participation in the project. The facilitation of employment in the areas should be done in consultation with their Tribal Authorities, Ward Committees, Councillors, Municipalities and other development committees in the area.

Typically, this approach would involve the following steps:

- **Step One: Appointment of a Co-ordinating Social Facilitator**
The Co-ordinating Social Facilitator (CSF) will be responsible for all the social components of the project, including the setting up of Project Steering Committees (PSC) and the ground rule for the rest of the other structures and systems that will be required for the project. The CSF will manage and monitor the work of the various PSCs and oversee the recruitment, appointment and training of the Community Liaison Officers (CLO).
- **Step Two: Establishment of Project Steering Committees and Labour and Employment Desks:**
The PSC will essentially be the link between the Project Team and the Local Community. The PSC, together with the CSF and the CLO will be responsible for the development of a labour pool. It is with this labour pool where local labour will be recruited. The PSC through a labour desk will be intricately involved in the recruitment process and will monitor the performance of local labourers.
- **Step Three: Appointment of Community Liaison Officers:**
The CLO will be on the ground and basically do the day-to-day and week-to-week monitoring of labour in conjunction with the site agent and the Contractor. Both the PSC and the CLO will be responsible, answerable and accountable to the CSF.

8 CONCLUSIONS

Although all foreseeable actions and potential mitigations or management actions are contained in this document, the EMP should be seen as a day-to-day management document. The EMP thus sets out the environmental and social standards, which would be required to minimise the negative impacts and maximise the positive benefits of the proposed establishment of the Richards Bay Central Industrial Area Project as detailed in the EIR and specialist reports. The EMP could thus change daily, and if managed correctly lead to a successful construction and operational phases.

Further guidance should also taken for any conditions contained in the Environmental Authorisation, if the project is granted approval, and that these DAEARD conditions must be incorporated into the final EMP.

All attempts should be made to have this EMP available, as part of any tender documentation, so that the engineers and contractors are made aware of the potential cost and timing implications needed to fulfil the implementation of the EMP, thus adequately costing for these.

ANNEXURE A PROFORMA: PROTECTION OF THE ENVIRONMENT

To be signed by Contractors

PRO FORMA

Employer _____

Contract No _____

Contract title _____

PROTECTION OF THE ENVIRONMENT

The Contractor will not be given right of access to the site until this form has been signed.

I/ we _____ (Contractor) record
as follows:

1. I/ we, the undersigned, do hereby declare that I/ we am/ are aware of the increasing requirement by society that construction activities shall be carried out with due regard to their impact on the environment.
2. In view of this requirement of society and a corresponding requirement by the Employer with regard to this Contract, I/ we will, in addition to complying with the letter of the terms of the Contract dealing with protection of the environment, also take into consideration the spirit of such requirements and will, in selecting appropriate employees, plant, materials and methods of construction, in so far as I/ we have the choice, include in the analysis not only the technical and economic (both financial and with regard to time) aspects but also the impact on the environment of the options. In this regard, I/ we recognise and accept the need to abide by the "precautionary principle" which aims to ensure the protection of the environment by the adoption of the most environmentally sensitive construction approach in the face of uncertainty with regard to the environmental implications of construction.
3. I/ we acknowledge and accept the right of _____ to deduct, should they so wish, from any amounts due to me/us, such amounts (hereinafter referred to as fines) as the Resident Engineer and Environmental Site Officer shall certify as being warranted in view of my/ our failure to comply with the terms of the Contract dealing with protection of the environment, subject to the following:
 - 3.1 The Resident Engineer and Environmental Officer, in determining the amount of such fine, shall take into account *inter alia*, the nature of the offence, the seriousness of its impact on the environment, the degree of prior compliance/non-compliance, the extent of the Contractor's overall compliance with environmental protection requirements and, in particular, the extent to which he considers it necessary to impose a sanction in order to eliminate/reduce future occurrences.
 - 3.2 The Resident Engineer and Environmental Officer shall, with respect to any fine imposed, provide me/ us with a written statement giving details of the offence, the facts on which the Resident Engineer and Environmental Officer has based his assessment and the terms of the Contract (by reference to the specific clause) which has been contravened.

Signed _____
CONTRACTOR

Date _____

ANNEXURE B PROPOSED ENVIRONMENTAL EDUCATION COURSE

WHAT IS THE ENVIRONMENT?

- Soil
- Water
- Plants
- People
- Animals
- Air we breathe
- Buildings, cars and houses



WHY MUST WE LOOK AFTER THE ENVIRONMENT?

- It affects us all as well as future generations
- We have a right to a healthy environment
- A contract has been signed
- Disciplinary action (e.g. construction could stop or fines issued)

HOW DO WE LOOK AFTER THE ENVIRONMENT?

- Report problems to your supervisor/ foreman
- Team work
- Follow the rules in the EMP



WORKING AREAS

Workers & equipment must stay inside the site boundaries at all times



RIVERS & STREAMS

- Do not swim in or drink from streams
- Do not throw oil, petrol, diesel, concrete or rubbish in the stream
- Do not work in the stream without direct instruction
- Do not damage the banks or vegetation of the stream



ANIMALS

- Do not injure or kill any animals on the site
- Ask your supervisor or Contract's Manager to remove animals found on site



TREES AND FLOWERS

- Do not damage or cut down any trees or plants without permission
- Do not pick flowers



SMOKING AND FIRE

- Put cigarette butts in a rubbish bin
- Do not smoke near gas, paints or petrol
- Do not light any fires without permission
- Know the positions of fire fighting equipment
- Report all fires
- Do not burn rubbish or vegetation without permission



PETROL, OIL AND DIESEL

- Work with petrol, oil & diesel in marked areas
- Report any petrol, oil & diesel leaks or spills to your supervisor
- Use a drip tray under vehicles & machinery
- Empty drip trays after rain & throw away where instructed



DUST

Try to avoid producing dust -
Use water to make ground & soil wet



NOISE

- Do not make loud noises around the site, especially near schools and homes
- Report or repair noisy vehicles



TOILETS

- Use the toilets provided
- Report full or leaking toilets



EATING

- Only eat in demarcated eating areas
- Never eat near a river or stream
- Put packaging & leftover food into rubbish bins



RUBBISH

- Do not litter - put all rubbish (especially cement bags) into the bins provided
- Report full bins to your supervisor
- The responsible person should empty bins regularly



TRUCKS AND DRIVING

- Always keep to the speed limit
- Drivers - check & report leaks and vehicles that belch smoke
- Ensure loads are secure & do not spill



EMERGENCY PHONE NUMBERS

Know all the emergency phone numbers:

- Ambulance:
- Fire:
- Police:



FINES AND PENALTIES

- Spot fines of between

To be confirmed by Engineer

- Your company may be fined
- Removal from site
- Construction may be stopped



PROBLEMS - WHAT TO DO!

- Report any breaks, floods, fires, leaks and injuries to your supervisor
- Ask questions!



**ANNEXURE C
ENVIRONMENTAL COMPLAINTS REGISTER**

ENVIRONMENTAL COMPLAINTS REGISTER							
CONTRACT TITLE:							
CONTRACT NUMBER:							
DATE	COMPLAINT	COMPLAINT MADE BY (Include Contact Details)	ACTION REQUIRED	RESPONSIBLE PERSON	ACTION IMPLEMENTED	DATE ACTION IMPLEMENTED	CHECKED BY ECO

ANNEXURE D ENVIRONMENTAL INCIDENTS REGISTER

ENVIRONMENTAL INCIDENTS REGISTER							
CONTRACT TITLE:							
CONTRACT NUMBER:							
DATE	INCIDENT (What, where, how, possible impacts)	REPORTED BY	ACTION REQUIRED	RESPONSIBLE PERSON	ACTION IMPLEMENTED	DATE ACTION IMPLEMENTED	CHECKED BY ECO