COEGA REZONING EIA

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE REZONING OF THE CORE DEVELOPMENT AREA FROM AGRICULTURE TO SPECIAL PURPOSES

ENVIRONMENTAL IMPACT REPORT

Prepared by:
Coastal & Environmental Services
P. O. Box 934
Grahamstown
6140

Prepared for:
The Coega Development Corporation
Sports Bar Office Complex
Cnr. Oakworth Road & Carnarvon Place
Humerail
Port Elizabeth
South Africa
6001

January 2000
# TABLE OF CONTENTS FOR THE REZONING EIA

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Summary</td>
<td></td>
<td>vii</td>
</tr>
<tr>
<td>1. Introduction</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1.1</td>
<td>Background</td>
<td>1</td>
</tr>
<tr>
<td>1.2</td>
<td>Implications of rezoning</td>
<td>2</td>
</tr>
<tr>
<td>1.3</td>
<td>Terms of Reference</td>
<td>3</td>
</tr>
<tr>
<td>1.4</td>
<td>Structure of report</td>
<td>3</td>
</tr>
<tr>
<td>1.5</td>
<td>Study team</td>
<td>3</td>
</tr>
<tr>
<td>2. Approach to the EIA/Methodology</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>2.1</td>
<td>Introduction</td>
<td>7</td>
</tr>
<tr>
<td>2.2</td>
<td>Environmental Management System (EMS)</td>
<td>7</td>
</tr>
<tr>
<td>2.3</td>
<td>Environmental Impact Assessment (EIA)</td>
<td>11</td>
</tr>
<tr>
<td>2.3.1</td>
<td>The EIA methodology</td>
<td>11</td>
</tr>
<tr>
<td>2.3.2</td>
<td>Baseline information</td>
<td>13</td>
</tr>
<tr>
<td>2.3.3</td>
<td>Description of feasible alternatives</td>
<td>13</td>
</tr>
<tr>
<td>2.3.4</td>
<td>Additional information required</td>
<td>13</td>
</tr>
<tr>
<td>2.3.5</td>
<td>Public involvement</td>
<td>13</td>
</tr>
<tr>
<td>3. Project Description</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>3.1</td>
<td>Introduction</td>
<td>17</td>
</tr>
<tr>
<td>3.2</td>
<td>Development Zone philosophy and objectives</td>
<td>17</td>
</tr>
<tr>
<td>3.2.1</td>
<td>Government policy</td>
<td>17</td>
</tr>
<tr>
<td>3.2.2</td>
<td>Coega DZ: Vision and objectives</td>
<td>18</td>
</tr>
<tr>
<td>3.3</td>
<td>Coega DZ organisational structure and links</td>
<td>18</td>
</tr>
<tr>
<td>3.3.1</td>
<td>Coega Development Corporation</td>
<td>18</td>
</tr>
<tr>
<td>3.3.2</td>
<td>Concessionaires</td>
<td>19</td>
</tr>
<tr>
<td>3.3.3</td>
<td>Tenants</td>
<td>19</td>
</tr>
<tr>
<td>3.4</td>
<td>Proposed Land-use in the CDA</td>
<td>19</td>
</tr>
<tr>
<td>3.4.1</td>
<td>Introduction: Phased development approach to land-use</td>
<td>19</td>
</tr>
<tr>
<td>3.4.2</td>
<td>Existing businesses</td>
<td>20</td>
</tr>
<tr>
<td>3.4.3</td>
<td>Harbour</td>
<td>20</td>
</tr>
<tr>
<td>3.4.4</td>
<td>Light industrial areas</td>
<td>23</td>
</tr>
<tr>
<td>3.4.5</td>
<td>Commercial service industries area</td>
<td>23</td>
</tr>
<tr>
<td>3.4.6</td>
<td>Bulk minerals import/export facilities</td>
<td>24</td>
</tr>
<tr>
<td>3.4.7</td>
<td>Service Areas</td>
<td>24</td>
</tr>
<tr>
<td>3.4.8</td>
<td>Metals cluster</td>
<td>24</td>
</tr>
<tr>
<td>3.4.9</td>
<td>Centralised gas facility</td>
<td>24</td>
</tr>
<tr>
<td>3.4.10</td>
<td>Undetermined use area</td>
<td>24</td>
</tr>
<tr>
<td>3.4.11</td>
<td>Coega water reclamation works (WRW)</td>
<td>25</td>
</tr>
<tr>
<td>3.4.12</td>
<td>Coega Kop quarry</td>
<td>25</td>
</tr>
<tr>
<td>3.4.13</td>
<td>Open spaces and marine reserves</td>
<td>26</td>
</tr>
<tr>
<td>3.5</td>
<td>Infrastructure and service facilities</td>
<td>26</td>
</tr>
<tr>
<td>3.5.1</td>
<td>Transport requirements</td>
<td>26</td>
</tr>
<tr>
<td>3.5.2</td>
<td>Water</td>
<td>27</td>
</tr>
<tr>
<td>3.5.3</td>
<td>Wastewater and wastewater treatment</td>
<td>27</td>
</tr>
<tr>
<td>3.5.4</td>
<td>Stormwater/flooding</td>
<td>28</td>
</tr>
<tr>
<td>3.5.5</td>
<td>Electricity</td>
<td>28</td>
</tr>
<tr>
<td>3.5.6</td>
<td>Waste site</td>
<td>28</td>
</tr>
</tbody>
</table>
3.6 Land acquisition process 28
   3.6.1 Expropriation/purchase policy 28
   3.6.2 Resettlement and compensation policies and plans 29
3.7 Environmental management 30
   3.7.1 Environmental policy 30
   3.7.2 Environmental Management System 31
   3.7.3 Environmental targets 35
   3.7.4 Tenant Approval Procedure 36
   3.7.5 EIAs/Scoping 37
   3.7.6 Environmental design (guidelines) manual 37
   3.7.7 EMPs for construction 38
   3.7.8 Environmental guidelines 38
   3.7.9 Stakeholder communication 40
   3.7.10 Open Space Management Plan 40
   3.7.11 Algoa Bay Management Plan 42
   3.7.12 Marine risk assessment and management 43
   3.7.13 Monitoring and review 43
3.8 Employment and revenue/costs 44
   3.8.1 Employment 44
   3.8.2 Revenue and costs 44

4. The Terrestrial Environment 45
   4.1 Introduction 45
   4.2 Climate 45
      4.2.1 Temperature 45
      4.2.2 Rainfall 45
      4.2.3 Wind 46
   4.3 Geology 46
   4.4 Soils 47
   4.5 Geohydrology and Hydrology 47
      4.5.1 Catchment drainage 47
      4.5.2 Surface water 47
      4.5.3 Artesian system 49
   4.6 Ambient air quality and Noise 50
      4.6.1 Ambient air quality 50
      4.6.2 Ambient noise 50
   4.7 Vegetation and Floristics 50
      4.7.1 Vegetation of the Eastern Cape 50
      4.7.2 Vegetation of the Coega area 50
      4.7.3 Alien invasion 53
   4.8 Terrestrial Fauna 54
      4.8.1 Birds 54
      4.8.2 Reptiles 54
      4.8.3 Amphibians 54
      4.8.4 Mammals 55
      4.8.5 Terrestrial invertebrates 56
   4.9 Summary 57
5. The Marine Environment

5.1 Introduction
5.2 Water circulation patterns
5.3 Sediment dynamics
5.4 Water quality
5.5 The marine ecosystem
5.5.1 Estuarine ecosystem
5.5.2 Birds
5.5.3 Nearshore environment
5.5.4 Marine mammals
5.5.5 Marine fish
5.6 Summary

6. The Social Environment

6.1 Introduction – Regional Context
6.2 Biographical and Demographic Information for the Coega Area
6.2.1 Head(s) of household
6.2.2 Household demographic information
6.3 Education
6.4 Employment
6.5 Housing and Residential Aspects
6.6 Infrastructure and Services
6.6.1 Water
6.6.2 Waste disposal
6.6.3 Sanitation
6.6.4 Household fuels
6.6.5 Transport
6.7 Health

7. The Economic Environment

7.1 The Port Elizabeth-Uitenhage economy in regional and national context
7.2 Economic Size, Growth, Sectoral Composition
7.3 Sectoral Dynamics, Growth and Decline
7.4 Potential Impacts of a Reduction in Tariffs
7.5 Employment and Unemployment
7.6 Unionisation, Wages and Skills
7.6.1 Industrial action
7.6.2 Wages and skills
7.7 Areas of Potential Growth
7.8 New Directions in Investment
7.9 Industrial Spatial Development
7.10 The Coega DZ initiative
7.10.1 Background to the DZ
7.10.2 Industrial development at Coega
7.10.3 The Core Development Area
7.10.4 Deep water port
7.10.5 Revenue and costs of the DZ
8. **Spatially dependent impacts**

8.1 Introduction

8.2 Spatial planning and sensitivity

8.3 The Development Framework Plan

8.4 Spatially dependent impacts

8.4.1 Rationale

8.4.2 Correlation between the Development Framework Plan and sensitivity zones

8.5 Recommendations

9. **Environmental issues of high and medium environmental significance**

9.1 Introduction

9.2 Environmental issues of high and medium significance

9.2.1 Excavation and building activities

9.2.2 Change in landscape quality

9.2.3 Bulk movement of material

9.2.4 Electricity consumption

9.2.5 Increased consumption of water

9.2.6 Increased disposal of solid and liquid waste

9.2.7 Generation of substandard water

9.2.8 Increase in occupational accidents

9.2.9 Increased risk of radiation

9.2.10 Generation or use of hazardous substances

9.2.11 Generation of acute toxic releases

9.2.12 Increased risk of explosions

9.2.13 Increased risk of fires

9.2.14 Change in air quality

9.2.15 Increased lighting

9.2.16 Generation of odours

9.2.17 Increased noise levels

9.2.18 Change in visual quality due to tall or large structures

9.2.19 Reduction in habitat

9.2.20 Reduction of the dune ridge

9.2.21 Physical destruction or harm to vegetation

9.2.22 Introduction of alien species

9.2.23 Changes in food webs and predator/prey relationships

9.2.24 Introduction of barriers to plant and animal dispersal and movement

9.2.25 Improved access to and from the area

9.2.26 Employment of people

9.2.27 Influx of people into Port Elizabeth and the DZ

9.2.28 Increased crime and vandalism

9.2.29 Increased traffic congestion

9.2.30 Relocation of people or communities

9.2.31 Loss or disruption of established businesses

9.2.32 Increased business opportunities within the DZ

9.2.33 Establishment of new businesses

9.2.34 Increased exportation of goods

9.2.35 Change in recreation and/or tourism potential

9.2.36 Government expenditure to establish the DZ
9.3 Environmental issues of low significance that have not been covered in the high and medium impacts
9.3.1 Increased risk of traffic accidents
9.3.2 Increased risk of electrocution
9.3.3 Longshore drift
9.3.4 Increased wave action
9.3.5 Opportunity cost

10. Conclusions and Recommendations
10.1 Introduction
10.2 Environmental issues of high significance that can be mitigated
10.2.1 Introduction
10.2.2 Impacts of high significance that can be mitigated
10.3 Residual impacts of high significance
10.4 Effectiveness of the EMS
10.5 Risk of the No Go option
10.6 Additional recommendations to be considered by the CDC
10.7 Recommendations to be considered as conditions of approval
10.8 Conclusions

11. References

Appendices
Appendix A: Letter from CES to DEAET and Mr. Els’, Deputy Director of DEAET: Western Region, response
Appendix B: Environmental design manual
Appendix C: Construction environmental management procedure (EMP)

Figures
Figure 1.1: Map showing the proposed location of the proposed DZ in the PE-Uitenhage Metropolitan area
Figure 3.4: Land-use clusters proposed by the Development Framework Plan
Figure 3.7: Aspects of the EMS that will ensure that those activities which can either have a significant beneficial or detrimental effect on the environment are properly managed
Figure 7.2: GGP by sector for 1993
Figure 7.3: Average annual growth in GGP by kind of economic activity (1980-1991)
Figure 7.5: Percentage change of formal employment per kind of economic activity (1980-1991)
Figure 7.6: Distribution of industrial action according to triggers
Figure 7.9: Trend of industrial development in the PEU Metropole
Figure 8.2a: Coega DZ sensitivity zones
Figure 8.2b: Preliminary Spatial Framework showing possible areas for Phase 1 of the Coega DZ (A to D) and No Go areas for industrial development
Figure 8.2c: Land-use clusters proposed by the Development Framework Plan
Figure 10.8: Diagram showing the weighting of the positive and negative impacts after the implementation of the EMS and the incorporation of the suggested recommendations. The positive impacts seem to outweigh the negative impacts.
Tables
Table 2.2a: List of all the project activities identified by AES
Table 2.2b: List of all the environmental aspects identified by AES
Table 2.2c: List of impacts identified by AES
Table 2.2d: Criteria for determining the significance rating of the ‘environmental impacts’
Table 2.2e: Criteria for determining the significance rating of environmental aspect/impacts: general categories.
Table 3.7a: Examples of activities, some environmental aspects and related control measures
Table 3.7b: Air quality guidelines recommended for the Coega DZ
Table 3.7c: Maximum permissible rating levels of outdoor noise for different zones
Table 3.8: Estimate of Jobs Created by “Phase 1” of the Coega DZ
Table 4.4: Description of soils within the Algoa Bay area
Table 4.5a: Classification of rivers according to present ecological state
Table 4.5b: Classification of the four reaches of the Coega River
Table 4.8a: Reptile species listed in the International Red Data book of Reptiles and Amphibians
Table 4.8b: Amphibians of the Coega DZ
Table 4.8c: Red Data book mammals species known or expected to occur in the Coega area
Table 7.3: Ranking of importance of sectors: 1970-1990
Table 7.6: Extent of industrial action in PEU
Table 7.9: Industrial land in the PEU metropole
Table 10.2: Summary of environmental issues, resulting from various project actions, which result in impacts of HIGH significance that can be effectively managed by the implementation of the EMS and other guidelines, environmental design manual and construction EMP.
Table 10.3: Negative impacts of HIGH significance after implementation of an EMS

Plates
Plate 4.7a: A close up of pristine Mesic Succulent Thicket.
Plate 4.7b: “Bontveld” on calcrite south-west of the estuary.
Plate 4.7c: The endangered plant species, Orthopterum coegana (foreground), is found in three localities where calcarenite caps the basement sandstone on Coega Kop (Photo: G Marx).
Plate 9.2a: Existing quarries on Coega Kop. Severely disturbed western Kop in foreground with the less disturbed eastern Kop behind it.
Plate 9.2b: The change in visual quality is one of the HIGH negative residual impacts resulting from the Coega project. This plate is an example of heavy industry in the Markman Industrial Area.
Plate 9.2c: The Cerebos saltworks is one of the existing businesses in the Core Development Area
Plate 9.2d: Existing harbour in Port Elizabeth could allow for a “waterfront-type” development

Boxes
Box 1.2: The following reports have been produced for the Coega DZ (references provided in Chapter 11).
Box 2.2: The procedure used for the rating of impacts
Box 9.2: Characteristics of a Relocation and Compensation Plan
EXECUTIVE SUMMARY

1. INTRODUCTION

The change of land use, or rezoning, from agriculture to any other purpose is listed as a Schedule 1 activity in terms of the EIA regulations (Section 21(1), Government Gazette #18261) under the Environmental Conservation Act (Act 73 of 1989). As a result, the rezoning of a property or a portion thereof is subject to an Environmental Impact Assessment (EIA). African Environmental Solutions (AES), on behalf of the Coega Development Corporation (CDC), appointed Coastal & Environmental Services (CES) to undertake the required EIA.

The proposed Coega DZ is situated in the Eastern Cape Province, along the north-eastern coastline of Algoa Bay, approximately 20km from Port Elizabeth. The Coega DZ will require that the land be rezoned from Agriculture to Special Purposes. This rezoning is required in order to obtain specific use rights and to determine the development controls. At this stage, the rezoning application will only be concerned with the first phase of the development, the Core Development Area.

A large amount of work has already been done on the development and management of the proposed Coega DZ, and therefore it was agreed with Mr. Struwig of DEAE&T that the scoping phase of the EIA process need not be undertaken. It is also felt that the most serious issues would have been raised previously. The bulk of the work for this EIA, which is current as of November 1999 involved a synthesis of existing information, and the rating of environmental impacts, most of which had already been identified during the development of the environmental management system (EMS). The purpose of the EMS is to identify actual or potential significant impacts, and to establish and maintain objectives and targets for these impacts, taking into account legislative requirements and information about these significant impacts. The EMS aims to manage the activities, products and/or services that cause impacts and allocate responsibilities for the implementation of these management plans. The EMS is presently being developed, and the DZ will be subject to a range of conditions, which will form part of the EMS.

The aim of this EIA is to identify and assess the significance of impacts, and where appropriate to make recommendations that may then be used by the relevant authorities as conditions of approval and hence be incorporated into the EMS. The ultimate aim is to minimise the number of residual negative impacts of HIGH significance.

2. APPROACH TO THE EIA/METHODOLOGY

In this Environmental Impact Assessment (EIA) the consequences of rezoning the land, which opens the door to industrial development, is being assessed. This makes it impossible to assess project-specific impacts. However, the current development of an Environmental Management System (EMS) allows us to build on the useful information generated as part of the EMS. Chapter 2 briefly describes the approach and methodology of the EMS and the EIA.

The Environmental Management System (EMS)
The EMS being developed as part of the CDC’s Environmental Policy is intended to guide development. For the purpose of establishing the EMS a database was developed. It included all potential project actions, associated environmental aspects and their impacts, and determined the significance of these impacts and the degree of control the CDC had over the significant aspects. This database formed the basis of this EIA.

Environmental Impact Assessment (EIA)
Since individual tenants are not yet known, individual tenant’s activities cannot be assessed. As a result, the approach was to rather assess the environmental issues associated with the action of developing and operating the Coega development zone. The EMS database could be used as the environmental issues had already been identified. In order to maintain a level of consistency between the assessment done to date for the EMS and the current study, CES decided to follow the rating procedure developed by AES, which is similar to our own rating system. CES felt that the EMS database adequately covered all possible environmental issues and impacts arising from the rezoning of land. Mitigation measures suggested in the EMS were considered for each environmental impact, and the practicality and effectiveness of the suggested mitigatory actions was used to decide on the residual impacts.

These ratings used were as follows:
Environmental impacts that have a HIGH environmental significance:
- will result in major biophysical or socio-economic changes
- will affect wide areas or a large group(s) of people
- will last for more than five years or be permanent
- will probably or definitely take place.
Environmental impacts that have a MEDIUM environmental significance:
- will result in major biophysical or socio-economic changes which are limited in extent OR will result in minor biophysical or socio-economic changes that affect wide areas or large groups of people
- will last for one to five years
- will be possible, i.e. might occur.

Environmental impacts that have a LOW environmental significance:
- will result in minor biophysical or socio-economic changes
- are limited in extent
- will last for less than one year
- are unlikely to occur.

Baseline information on the terrestrial, marine and social environment was obtained from the substantial amount of literature that already exists for the Coega DZ.

**Description of feasible alternatives**
A policy decision has been taken by the Ngqura Environmental Committee (NEC), on the basis that government has taken an ‘in-principle’ decision to proceed with the Coega project, that feasible alternative land uses need not be examined. CES has therefore not examined alternative land uses in this EIA.

**Public involvement**
In line with the process accepted by the authorities, a four-week public review period will be held following the release of the draft EIR. During this period, the draft report will be available for review and comment by the public, authorities and other interested and affected parties (IAPs), and two open houses will be held, one in Port Elizabeth and one in Motherwell.

**3. PROJECT DESCRIPTION**
This chapter describes the proposed development and management of the Core Development Area.

**Government policy**
In June 1996, the government launched the Growth, Employment and Redistribution strategy (GEAR). The plan presented a new vision for rebuilding and restructuring the economy, with Spatial Development Initiatives (SDIs) being an integral part of this plan. The SDI programme is a short-term investment strategy that aims to unlock inherent economic potential in specific (underdeveloped) locations in southern Africa. The Coega DZ is one of the key components of the Fish River SDI.

**Coega DZ organisational structure and links**
The CDC is a formal legal entity operating as a private limited company. In order to safeguard national, provincial and local interests, the principal shareholders are national, provincial and local government.

National Government is currently considering the concessioning option as a more cost-effective procurement method. The CDC will have the authority to give concessions and the concessionaire agreements will mandate concessionaires to operate within the Coega DZ on land leased from the CDC. Concessionaires will lease sites to tenants. The CDC may retain the right to "acquire" tenants, subject to mutual agreement with the concessionaire. Tenants will be leaseholders and leasehold agreements will be for periods agreed to between the parties.

**Proposed land-use in the Core Development Area**
A phased approach to development was adopted. The ultimate Coega DZ size could be 17000ha in extent. However, the initial development, that is the Core Development Area, will be 4120ha in extent. It has been designated for multiple uses and focuses on a mix of proposed land-uses, namely existing businesses; harbour; light industrial areas; commercial service industries area; bulk minerals import/export facilities; service areas; metals cluster; Coega water reclamation works; undetermined use area; centralised gas facility; Coega Kop quarry, and open spaces.

**Infrastructure and service facilities**
The construction of infrastructure and service facilities will also be phased. Aspects including transport requirements, wastewater and wastewater treatment, electricity, water, stormwater/flooding and a waste site have been considered.

**Land acquisition process**
It is the policy of National Government to acquire land for the DZ in the first instance using the "willing buyer/willing seller" principle. However, since the Coega Project is of national significance, government retains the right to
expropriate land in the national interest. It is also government policy to acquire all the land for the DZ at one time, rather than purchase land in phases.

A formal resettlement and compensation policy is in preparation, in consultation with key stakeholders in the Core Development Area, i.e. existing business and communities. It is likely that there will be a separate policy for each of these groupings.

Environmental management
An environmental policy (see Box below) has been established and is the instrument by which the CDC states its commitment to the principles of ecologically sustainable, socially acceptable and economically viable development, and establishes the framework by which the principles are turned into actions.

<table>
<thead>
<tr>
<th>THE MAIN POINTS OF COEGA’S ENVIRONMENTAL POLICY</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Apply word-class management practices</td>
</tr>
<tr>
<td>☐ Ensure sustainability</td>
</tr>
<tr>
<td>☐ Conform to legislative and regulatory requirements</td>
</tr>
<tr>
<td>☐ Develop, implement and maintain an (ISO14001) Environmental Management System (EMS)</td>
</tr>
<tr>
<td>☐ Establish baseline data with integrity</td>
</tr>
<tr>
<td>☐ Maintain an integrated monitoring system</td>
</tr>
</tbody>
</table>

The CDC is in the process of developing an EMS for the Core Development Area (see Box on page ix). The EMS is the overarching instrument by which the CDC intends to ensure that those activities that can either have a significant beneficial or detrimental effect on the environment are properly managed. The EMS has been developed in accordance with the requirements of the internationally recognised standard for environmental management, ISO 14001. Environmental targets for the Coega DZ have been formulated as part of the development of the EMS. These targets are the proposed indicators which will be measured. A Tenant Approval Procedure is presently being developed to assist prospective tenants within the Core Development Area to meet requirements to comply with South African environmental legislation and current best practice. Prospective tenants are required to fill in a detailed form designed (in part) to ascertain potential environmental issues.

Various guidelines have been formulated. These include:

- Environmental Design Manual (which includes planning and zoning guidelines, infrastructure guidelines, building/architectural guidelines & landscaping guidelines).
- Environmental Management Procedure for construction, which incorporates specifications to minimise negative environmental impacts and enhance the positive environmental impacts during the construction work.
- Environmental guidelines (which include air pollution guidelines, noise guidelines.
- Open Space Management Plan (although open space has been set aside within the DZ, the plan has not been formulated yet).
- Algoa Bay Management Plan (currently in draft form).

An important component of the EMS is regular monitoring and review of environmental performance in order to identify non-conformance and direct corrective and preventive action.
Climate

The climate of the Eastern Cape is complex, as it falls at the confluence of several climatic regimes, the most important of which are temperate and subtropical. There are thus many variations in temperature, rainfall and wind patterns that occur in the Eastern Cape. Exceptionally high temperatures may be experienced during berg wind conditions, which occur frequently during the winter, with maxima well over 30°C. Extreme temperatures also occur during summer, with little accompanying wind. The Port Elizabeth area experiences a warm temperate climate and has a bimodal rainfall pattern, with peaks in Spring and Autumn. The Coega area is subject to strong gradient winds with a strong prevalence from the west and west-south-west all year round, and east from October through to March. During stable or very stable conditions with light winds, surface inversions can occur trapping pollutants below the inversion. Alternatively, during conditions of neutral stability during the day, an Internal Coastal Boundary Layer may occur.
**Geology**

The metropole of Port Elizabeth is situated on the Peninsula Sandstone Formation of the Table Mountain Group. This formation consists of course-grained super-mature sandstone and is relatively resistant to erosion. It forms the bedrock of Algoa Bay and emerges as outcrops in the bay as the islands of St Croix, Jahleel, Bird and Brenton, and on land as Coega Kop. The areas between these islands are filled with recent marine deposits. The geology of area of the proposed Coega DZ is characterised by coastal limestone, overlaid by calcareous sands blown onshore. The Coega Fault extends from west of Groendal dam eastwards towards the coast, dipping at between 30° and 60° for about 120km. It is a normal tensional fault, with a vertical southward throw of 500m to 100m.

**Soils**

Coega area & proposed Core Development Area has relatively deep, red, lime-rich sandy-clay loams.

**Geohydrology and Hydrology**

The Coega catchment is approximately 45km long, 15km wide and has a total area of about 550km². Current land-use in the catchment area is mainly agriculture with a fair amount of natural subtropical thicket vegetation. The Coega River, which is a relatively small sand-bed river, is the most significant surface water feature associated with the proposed Coega DZ, but the possibility that there are small temporary wetland areas associated with the coastal dunes exists. The Coega River classification, based on preliminary river classification guidelines range from moderately modified (i.e. C classification) in the upper reaches to critically modified (i.e. F classification) in the lower reaches at the salt works. Except for the estuary and associated salt works, the river is mostly located outside the proposed Core Development Area.

The southern portion of the designated DZ is underlain at depth by an artesian aquifer formed by sandstones and quartzites of the Table Mountain Group. Confining this aquifer is a succession of eastward-thickening Cretaceous formations (Uitenhage Group) up to 1200m thick near the coast. It is one of the few artesian systems in southern Africa and the only one of practical importance in the country. This artesian system was protected under Government Proclamation No. 260 of 1957 and No. 958 of 1958, but the rights of access to this water will probably alter in the light of the new water act (Act No. 36 of 1998). Overexploitation of the aquifer has led to several periods where artesian yields have dropped, which led to the regulation of drilling and abstraction. Groundwater quality in the Coega Ridge Aquifer deteriorates relatively little along the flow path from west to east and has been carbon fourteen dated at 28 000 years near Coega Kop. In general, the water is mildly acidic due to oxidation of pyrite in the Table Mountain Group, but overall, the water quality can be considered as moderate to good.

**Ambient Air Quality and Noise**

The recent history of Port Elizabeth air quality is one of gradual improvement. Major sources of particulate matter in the central city and industrial suburbs during the 1970s and 1980s have either ceased operation or had additional control measures implemented. Based on current South African guidelines, the air quality in the Eastern Cape and the Port Elizabeth area is relatively good, with all specific indices lying between background concentrations and less than 50% of the guidelines. There are, however, presently a number of businesses in the Markman Industrial Area creating unpleasant odours. The present air quality allows for the establishment of an industrial area, and the opportunity to manage emissions in a way that strives to maintain this standard. Any major industrial development with heavy industries will alter this present air quality. South African air quality legislation is inappropriate for sustainable development and is currently in a state of change.

The proposed maximum permissible noise rating levels are based on national and international recommendations and guidelines. Most codes of practice and legislation relating to environmental noise incorporate the desired activity and time of day as part of the process that assesses and controls noise. In South Africa, the procedures for the measurement, assessment and control of environmental noise are contained in the Noise Control Regulations of the Environmental Conservation Act 73 of 1989 and the SABS Code of Practice 0103-1997 for “The measurement and assessment of environmental noise with respect to annoyance and speech communication”. Specific guidelines for issues such as air and noise have been drawn up for the Core Development Area.

**Vegetation and Floristics**

The vegetation of the Eastern Cape is complex and is best described as a tension zone where four major biomes converge and overlap. The dominant vegetation is Succulent Thicket, a dense, spiny vegetation type unique to this region. While species in the canopy are of subtropical affinities and are generally widespread species, the succulents and geophytes that comprise the understorey are of karroid affinities, and are often localised endemics.

The vegetation types of the proposed DZ area can be broadly divided into dune vegetation and inland vegetation types. Dune vegetation can be divided into five different communities, which include pioneer dune communities, dunefield communities, dune thicket communities, dune fynbos communities and alien communities. Although this vegetation has few vulnerable or endemic species, its conservation is important in terms of its unique role in stabilising dunes and...
creating dune habitats. Development would eliminate vegetation that plays a vital role in maintaining the stability of the dunes.

The dominant inland vegetation type is Succulent Thicket, which is in an almost pristine state. Bontveld occurs on the crests or plateau’s in the Coega DZ. The conservation status and significance of Bontveld was a matter of some debate, but is now understood better. Its distribution in a regional context is not clear at this time, but it is currently thought to only occur in four or five places in the Eastern Cape, most of which are under threat from mining. More than 30 Eastern Cape endemic species are found in the proposed DZ area. The most important of these are the endangered Orthopterum coegana and two unusual growth forms of Euphorbia polygona and Haworthia translucens, which are endemic to Coega Kop, and Aloe bowiea, a small endangered grass aloe known from only a few sites in the region is also present. Therefore, certain portions of the vegetation of the area are of high conservation importance.

Certain areas of both dune and inland vegetation are invaded by alien plant species. The most common invader species is Acacia cyclops (rooikrans), which was used in the past to stabilise the dunes, and presently forms large monospecific stands in areas throughout the proposed DZ. There are several other aliens present that pose a threat to the flora of this area.

**Terrestrial Fauna**

Two bird species, the martial eagle and Stanley’s bustard, are listed as species of special concern in terms of their Red Data Book status and three species are considered to be of conservation concern in a regional context (the secretary bird, the African marsh harrier and the blue crane). The are also six species from the coastal dune habitat identified as species of conservation concern. Of these the roseate and damara terns are two of the most endangered coastal species in South Africa.

The Eastern Cape supports nearly a third of the reptile species recorded in southern Africa. More than half of the Eastern Cape’s endemic reptile species occur in the Algoa Bay area, giving the region a high conservation value. The majority of these are found in Succulent Thicket and riverine habitats. The list of reptiles of special concern includes five endemic species (two of which may also be endangered), four endangered sea turtles, eight species listed on International Trade in Endangered Species list, one rare species and four peripheral species.

A total of 32 amphibian species and sub-species occur in the Eastern Cape, representing almost a third of the species recorded in South Africa. However, none of the species are endemic or Red Data Book Species.

In the study area the vast majority of mammals present are small or medium-sized. Of the 63 mammal species known or expected to occur in the Coega area, two species are endemic, the Duthie’s golden mole and the pygmy hairy-footed gerbil. Both occur in the dune vegetation, which forms only a limited area of the proposed DZ. Thirteen of the 63 species are Red Data Book species (4 vulnerable, 5 rare and 4 intermediate species).

The invertebrate fauna of the coastal dunefields of Algoa Bay and its associated vegetation has not been extensively studied. One grasshopper species, Acrotylos hirtus, is endemic to the dunefields. There is one butterfly, Lepidochrysops bacchus, which is known from a number of scattered localities in the Western Cape, as well as from four localities in the Eastern Cape (one of which is in the Coega DZ), and is listed as rare, along with Aloeides clarki and Poecilimitis pyroeis hersaleki, in the Red Data Book for Butterflies. Aloeides clarki is endemic to this particular region of the Eastern Cape, and is currently known to occur in four localities (three of these localities are in the region of the proposed DZ).

**5. THE COASTAL ENVIRONMENT**

Water circulation in Algoa Bay occurs on a variety of time and spatial scales, and is a consequence of external forcing from winds and tides. In particular, the Agulhas current and coast-trapped waves are known to have substantial impacts. This influx serves to increase coastal temperatures. The associated maximum temperatures are about 26°C in summer and some 3-4°C less in winter. Cold upwelling waters are driven into Algoa Bay by westerly winds and can reduce the water temperature to below 10°C. Inshore currents are weak and variable. Tidal and inertial currents are an important component of the current field and tend to move water masses to and fro.

The annual wind regime is dominated by moderate to strong westerly to south-westerly winds. The Coega dunes can be subdivided into two components, the mobile dune belt (transverse dunes) which moves the dunes along the shore towards the north-east at a rate approximately 1500m²/yr and the relatively fixed, vegetated dune ridge that forms a physical barrier between the coastal zone and the hinterland. Longshore drift, driven by waves, moves sand along the beach. The volume of sediment transported northward and eastward past the Coega River mouth is estimated at between 150 000 – 200 000m³/year. Results obtained from tests on mussel tissue were considered to be representative of an unpolluted coast in terms of trace metals.
Estuarine Ecosystem
Salt marsh communities play an important role in estuarine functioning by providing a unique niche for many estuarine invertebrates. Degradation of the intertidal area at Coega has occurred as a result of trampling and the formation of tracks by cattle grazing within the estuarine environment. Eelgrass, *Zostera capensis*, is found in patches in the intertidal zone within the estuary. Macroalgal species are present, indicating favourable environmental conditions, including high nutrient status, slow water flow and fluctuating salinities.

The Coega estuary has a low faunal diversity (in terms of invertebrates and fish) and the salt marshes are not utilised to the same extent as in more pristine estuaries. No unique or threatened species of invertebrate or fish were recovered and all are common in eastern Cape estuaries. The salt pans serve as feeding and resting grounds for a large number of Palaearctic waders during their summer migration to the Southern Hemisphere. The species of main concern are the greyheaded gull, lesser and greater flamingos, chestnuthanded plover, caspian tern, damara tern, roseate tern and the black oystercatcher. The chestnuthanded plover is listed as rare in the Red Data Book.

Marine Ecosystem
Seabirds are the most conspicuous component of marine life off the Coega coast and on the islands. Six of the South Africa’s 14 resident seabird species breed either on the islands or at the adjacent coast. The islands play a national and international role in the conservation of the Cape gannet, African penguin and roseate tern. A 500m-radius marine reserve has been proclaimed around each of these islands.

The presence of rich phytoplankton accumulations in the surf zone fuels the major foodwebs in Algoa Bay. The accumulations occur in the form of smooth foam on the water surface and are associated with rip currents during the day, disappearing at night due to the cells sinking to the bottom. During early morning, these diatoms rise to the surface and are moved towards the shore into the surf zone again. Because the diatoms accumulate into aggregations in the surf zone, they constitute a ready accessible food resource for herbivorous fish, zooplankton and a variety of benthic filter feeders. Sand mussels attain maximum densities where phytoplankton production is high and in turn are key organisms in the nearshore foodwebs, being preyed on by a variety of organisms.

Ten species of whale, dolphin and seal are relatively common in the Algoa Bay area. Southern Right whales use the shallow waters of Algoa Bay to give birth to and nurse their young. Between 200 to 400 Humpbacked Dolphins of southern Africa’s estimated population of less than 1000 live in Algoa Bay. The Coega coast is part of their core habitat.

The fish fauna of Algoa Bay is typical of the Agulhas Bank and is made up of both South African endemics and wide-ranging species. The rocky reef areas around the islands of Brenton, Jahleel and St. Croix support a host of fish species and these areas are also part of the nurseries of some sea bream and rock cod species. Subtidal fishes of the surf zone are important in the food web of Algoa Bay.

6. THE SOCIAL ENVIRONMENT

Regional Context
The Eastern Cape is the second largest of the nine new provinces and has the fourth highest population density of the provinces, and the second highest percentage of children under the age of 15. It is the second poorest province in the country, and recent research has shown that 72% of families live below the poverty line. The nearest city to the proposed Coega Development Zone is Port Elizabeth, South Africa’s fifth largest city. The highest concentrations of people in the province occur in the magisterial districts of Port Elizabeth and Uitenhage, which comprises the Port Elizabeth-Uitenhage Metropolitan area. This metropolitan area houses approximately 1 166 345 people, with 78% living in the Port Elizabeth area and 22% in Uitenhage.

There are considerable discrepancies in the standard of living of the different population groups: the white and Asian communities live in conditions that could be described as first world with adequate access to adequate educational, recreational and health facilities, while black communities live in third world conditions. The black community experiences the highest levels of poverty and unemployment, with least access to these facilities, particularly in the Motherwell area.

Biographical and Demographic Information for the Coega Area
Households that have a single household head are disadvantaged in terms of financial and social terms compared to households that have both a female and male head. Of the heads of households, 18.8% are headed by a single male and 23.2% by a single female. The average household size is 4.1 persons, which compares favourably to mean household size in similar communities around Port Elizabeth. The population within the DZ area is relatively spread out and does not form a clear community, although the leaders claim that it should be treated as a unified community. The population
Currently living in the proposed Coega DZ is estimated at 1221 people. Of these, 611 are male and 610 female. Xhosa is the home language of 53.4% of these people, with 43.6% being Afrikaans.

More than 50% of the population is functionally illiterate. The level of education in the Coega DZ is similar for male and females and is generally low. The unemployment level among the employable sector of the community in the Coega DZ area is high, with only 18.1% having full-time employment and 30.8% of the community unemployed. Of those members of the community who are employed, a high number work within the Coega DZ (53.5%). A further 26.8% work in the immediate vicinity, including St George’s Strand, Motherwell, Markman industrial area and Bluewater Bay. Seventy-six percent of all earners have an income less than R1000 per month. Salaries and wages form the biggest source of income in this community.

The majority of the households (76.4%) in the proposed DZ have lived in the area for at least ten years. The majority of dwellings are permanent structures and are in a reasonably liveable condition. Dwellings are constructed out of a variety of substances, e.g. brick, mortar, corrugated iron, wood, clay, manure and bricks.

**Infrastructure and Services**

At present, there is water available from the Orange River Scheme and the groundwater source currently in use within the area is the Uitenhage Artesian System. The majority of households in the area have a water supply within 100m of them. The City of Port Elizabeth currently disposes its general, non-hazardous waste at two solid waste disposal sites, one near Struandale industrial area, and one at Arlington. As peri-urban areas do not have the same levels of service that is found in urban areas, the majority of the households burn their refuse.

There is a lack of acceptable toilet facilities in the households in the Coega DZ area and this is a source of concern for the community. Some households have no sanitation facilities (30.9%), others have pit toilets (38.9%), bucket toilet systems (14.8%) and the rest have flush toilets (either septic tank or waterborne sewerage).

In general, households spend very little on fuel, with the exception of paraffin. Paraffin is widely used for lighting, heating (water and household) and cooking. Electricity, candles and wood are also used.

The Coega area is serviced by the N2 national road, secondary roads and gravel roads. The N2 is the major road link along the east coast and serves an important function in the economy of the Eastern Cape region and is in good condition. The old Grahamstown road (R435) within the Coega area provides a linking road from the N2 for traffic travelling to Uitenhage. The Addo road (R450) is the main access road for traffic from the Addo and Kirkwood agricultural hinterland to Port Elizabeth. This road also provides access to Motherwell Residential Township and the Markman Industrial Township. The main railway line from Port Elizabeth enters the Coega DZ on the seaward side of Markman Industrial Township, which is served from the Aloes Railway Station, with a maximum capacity of 54 trains per day for trains to and from Port Elizabeth on this line. The community is highly dependent on public transport. Taxis are the most commonly used mode of transport (39.9%) while other modes of transport include private (27.5%) and buses (26.2%).

The community in the proposed Coega DZ area appeared to be healthy, but 13.8% of the children were inadequately nourished and 5.2% were severely malnourished. The most common diseases encountered in the area are mostly related to shack dwelling, such as tuberculosis, measles, meningitis, typhoid and gastro-enteritis. Within the Coega DZ, the bacteria *Yersinia pestis* is endemic. This bacteria is currently in a passive state and is being monitored by the Department of National Health.

### 7. THE ECONOMIC ENVIRONMENT

**Regional and National context**

The Port Elizabeth-Uitenhage (PEU) Metropolitan area is one of the country’s main manufacturing centres. It is being argued that its distance from the main consumer markets, the relative absence of mineral resources and the fact that agriculture is generally low yielding in nature, limits the economic base of the Eastern Cape. The Port Elizabeth and East London economies are primarily based on manufacturing, with motor manufacturing and related industries of particular importance. Tourism has also been identified as a strategic focus to facilitate economic growth in the province, which has been earmarked by government for special attention because of its consistent low ranking in terms of human development. However, it is felt that Port Elizabeth is strategically placed for an export-led economic growth strategy.

**Economic size, growth and sectoral composition**

Manufacturing remains a key sector of the economy of the PEU Metropole, with the automotive industry dominating this sector. This sector employs the most people, but other sub-sectors that rate high in terms of number of employees are textiles, food, rubber products, footwear and fabricated metal products.
Sectoral dynamics, growth and decline
Over the past few decades the manufacturing sector has retained its position in first place, but the government and finance sectors have become more important. Between 1980 and 1981 sectors such as quarrying, agriculture and construction experienced negative growth, whereas the highest average rates of growth were the services, trade and catering, finance and real estate sectors. This indicates that tourism is a growth sector.

Potential impacts of a reduction in tariffs
Changes in trade policy, particularly the removal of the General Export Incentive Scheme (GEIS) will benefit the primarily goods producers and the downstream industries. Sectors such as agriculture, mining, basic metal and non-traded sectors are likely to benefit, whereas the textile sector will be most negatively affected. However, there will be different effects on each region resulting from changes in tariff protection. The Eastern Cape will be the worst affected as a consequence of the strong influence of motor vehicle and rubber industries, and to a lesser extent the textile sector. Thus, the general agreement on trade and tariffs (GATT) provides both threats and opportunities to the Eastern Cape economy, requiring a re-organisation to combat threats and capitalise on opportunities.

Employment and unemployment
The manufacturing, service and informal sectors provide 70% of the employment opportunities in the area. Between 1980 and 1991 there was an increase of formal employment in the construction, trade, catering, finance, real estate and services sectors. The concomitant decrease in the manufacturing sector suggests that it is unlikely to be a major source of employment growth in the future, unless it occurs in the sub-sectors which are expanding, such as components of the automotive industry. The unemployment rate in the Eastern Cape has increased dramatically over the past two decades, from 16.4% to 39.8%. Unemployment figures in black township areas are even higher, reaching 60%.

Industrial action, wages and skills
There has been a decrease in the number of strikes and stoppages. The automotive and tyre industries, the transport industry, the public sector and the metal industry were the sectors most affected by the industrial action, with the most common reason for strikes related to wages. A survey indicated a shortage of certain “blue collar” skills, viz. artisan, technical, supervisory, machine-operating, basic literacy and spray-painting skills. In comparison with the rest of South Africa, the economically active population in the PEU Metropole is relatively well educated. The PE Technikon is the only tertiary educational unit that offers courses such as engineering and engineering technology to improve “blue-collar” skills. Consequently, the more skilled labour in the engineering fields are sourced in other regions of South Africa.

Area of potential growth
Recent studies suggest that a number of manufacturing industries which could possibly develop in the Port Elizabeth area include the food industry, the paper industry, tobacco products and wooden furniture. It was also found that mohair, wool and fresh fruit and vegetables provided additional opportunities to the manufacturing sector for further beneficiation due to strong backward linkages.

Opportunities in the agricultural sector are in the canning, preserving and confectionery industries. There are also significant opportunities offered by the fishing industry, which is limited due to the quota system regulating the tons of fish to be harvested. Therefore the important potential growth sector in the area is eco-tourism and manufacturing for the motor industry.

New directions in investment
In the PEU Metropole there has been extensive investment in production expansion in the motor vehicle and components industry over the past eighteen months. These investments total over two billion rands, which could possibly increase due to the attraction of foreign direct investment, particularly in the food and beverages, motor and components, and electronics and information technology sectors. However, the scale of the proposed investment at Coega far outweighs any of the actual investments in the PEU area, indicating the potential economic impact of such a product on the area and region.

Industrial spatial development
Within the greater Port Elizabeth area, 424 hectares of vacant land zoned for industrial purposes is currently available for development. Most of this is available at Markham and Brickfields. If the development of Coega had not been considered, future industrial development would probably have focused on Jagvlakte at Uitenhage. Other than this, industrial development would have consisted of infill and succession processes (brownfield developments) in existing industrial areas. The only nearby land for industrial development close to Coega is the Markham industrial township. The trend has been towards industrial development in the north easterly and north westerly direction, with the South Coast of the city be used for recreational needs. Thus, the Coega initiative is in line with this planning, but it is considered essential that it does not impact negatively on tourist potential.
The Coega DZ initiative
The Coega DZ and port form part of the Fish River SDI. The SDI programme is premised on the presence of sustainable industrial agglomerations (or economic clusters) in a particular area. In general, clusters depend not only on appropriate infrastructure, but also on ‘anchor’ tenants who act as catalysts for further investment and as a magnet for other economic activity. ‘Anchor’ projects are usually large scale and, in the construction and operational phases, present large-scale employment opportunities and other economic opportunities for local enterprises. Securing “anchor” tenants for the Coega DZ is a key aspect of the work currently being undertaken by the Coega Implementing Authority. South Africa’s arms procurement has provided opportunities to pursue counter-trade initiatives in this regard. There is also a proposal for the establishment of a stainless steel plant at Coega by Ferrostaal. If the arms deal is confirmed, Ferrostaal would be the anchor tenant in the Core Development Area, replacing Gencor. Thyssen SA has also considered locating to Coega for the development of its galvanised mill. In addition to the “anchor” tenants, a number of other investors have expressed interest in locating operations in the DZ.

The economic benefits of the Coega DZ will be considerable for the greater Port Elizabeth area and for the country as a whole. The total investment planned for the Core Development Area is not clear at this stage but the possible signing of the R30 billion defence contracts and agreements worth even more have breathed new life into Coega. Thyssen SA’s galvanised mill is estimated to be worth R1.8 billion. The total investment of the previously planned Gencor zinc refinery, the Kynoch phosphoric acid plant and the PPC cement works was estimated to be R3500 million. With the additional investors that showed interest in locating in the DZ, the investment could have reached as much as R4 000 million. The building of the port is expected to cost about R1 000 million and infrastructure investments are likely to require a further R500 million investment. In addition to these expenditures, the marketing, management and development are expected to require an investment of R150 million in the first five years.

8. SPATIALLY DEPENDANT IMPACTS

The CDC has compiled, with advice from Gibb Africa and Metroplan, a Development Framework Plan (DFP) for the Coega DZ. This DFP aims to provide an overall development strategy for the Coega DZ. It describes the development potential of the site, identifying material and man-made constraints and opportunities. This is achieved through the creation of a series of Development Clusters, which include a wide range of industrial, business, leisure and transport activities. The DFP was based on a sensitivity map, which zoned the area into high, medium and low sensitivity areas, in the Strategic Environmental Assessment (SEA). The sensitivity map was derived from a Terrestrial Ecology specialist report, which described the constraints that the environment placed on planning in the DZ.

Due to these different levels of environmental sensitivity in various areas in the DZ, the same level of industry may impact differently on different zones of sensitivity. For example, the cumulative impact of a heavy industry cluster on a zone defined has having low sensitivity and suitable for development may be low, whereas in a more sensitive zone it may be more significant. Although difficult to quantify, these potential impacts arise from land-use planning issues, which is a result of rezoning.

The spatial framework (i.e. placement of the Development Clusters) as presented in the DFP has maintained and upheld the ecological sensitivities of the area as described in the specialist report. However, there are two areas that do not comply with the spatial framework, namely Areas C and E. Area C was designated a GO area by CES in 1997, and the SEA suggested that it was suitable for light industry, storage and service areas for the port. This has not been upheld in the DFP, which designates the area as medium to heavy industry. Area E, located south of the N2 and west of the salt works was identified as a possible NO GO area in 1997. The vegetation of this area was provisionally classified as Bontveld (see Plate 4.7b), but at the time of the report, the conservation status and significance of Bontveld was still a matter of some debate. This area has been incorrectly zoned for light industry, with the caveat that the area is visually sensitive.

9. ENVIRONMENTAL ISSUES OF HIGH AND MEDIUM ENVIRONMENTAL SIGNIFICANCE

Chapter 9 discusses environmental issues of HIGH and MEDIUM significance, and five environmental issues of LOW significance (those that are not covered by the medium or high impacts), and draws attention to the various mitigatory measures that have been developed in the EMS. The environmental issues, their significance before and after mitigation and a very brief description of the mitigation is summarised in the Table overleaf.
<table>
<thead>
<tr>
<th>Environmental Issue</th>
<th>Significance¹</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After mitigation</td>
</tr>
<tr>
<td></td>
<td>mitigation</td>
<td></td>
</tr>
<tr>
<td>Excavation and building activities</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Change in landscape quality</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Bulk movement of material</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Electricity consumption</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Increased consumption of water</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Generation of substandard water</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Increase in occupational accidents</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Increased risk of radiation</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>Generation or use of hazardous substances</td>
<td>H</td>
<td>M/L</td>
</tr>
<tr>
<td>Generation of acute toxic releases</td>
<td>M</td>
<td>M/L</td>
</tr>
<tr>
<td>Increased risk of explosions</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Increased risk of fires</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Change in air quality</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Increased lighting</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Generation of odours</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Increased noise levels</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Change in visual quality due to tall or large structures</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>Reduction in habitat</td>
<td>H</td>
<td>H/M</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Reduction of the dune ridge</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Physical destruction or harm to vegetation</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Introduction of alien species</td>
<td>H</td>
<td>M/L</td>
</tr>
<tr>
<td>Changes in food webs and predator/prey relationships</td>
<td>M</td>
<td>L</td>
</tr>
</tbody>
</table>

¹ Significance rating: H = High, M = Medium & L = Low
**10. CONCLUSIONS AND RECOMMENDATIONS**

**Environmental issues of high significance**
Most of the negative environmental issues of HIGH significance are reduced to impacts of lower significance, as most of the impacts can be managed. The twelve environmental issues of HIGH significance before mitigation include:
1. the permanent change in landscape quality, of most of the 4120 hectares of the Core Development Area
2. the destruction of flora covering approximately 3000 ha (75%) of the CDA
3. the loss of habitat in a similar area
4. the disposal of solid and liquid waste
5. the presence of hazardous materials in portions of the CDA
6. a reduction in air quality over most of the CDA and beyond
7. the increase in noise levels within the CDA and its immediate environs
8. increased crime and vandalism within and possibly around the CDA
9. the generation of substandard water within the CDA
10. the disruption of at least four existing businesses within the CDA
11. excavation and building activities over significant portions of the CDA, and
12. the introduction of alien vegetation in areas cleared within the CDA.

All of these can be effectively mitigated, reducing impacts to MEDIUM or LOW significance.

Four social and economic benefits of HIGH significance result from the establishment of the DZ:
1. Employment opportunities for approximately 11,555 temporary and 3,200 permanent jobs in the Eastern Cape, and a further approximately 25,000 in the rest of South Africa.
2. The establishment of a significance number of new, large scale businesses.
3. The export of substantial goods, and
4. The provision of improved access (road, rail and sea).

**Residual impacts of high significance**

There are four environmental issues that result in residual impacts of HIGH significance:

1. It is likely that there will be a change in recreational and tourism potential along the shoreline. Approximately 5 km of the 50 km of shoreline of Algoa Bay will be affected. Minimising the possibility of locating industrial land-use along the coast could mitigate this effect. However, the development framework plan indicates that certain industrial activities are located seaward of the N2, leading to a residual impact of HIGH significance.
2. There is likely to be an influx of job seekers into the area. We are unsure of the extent of this impact. Mitigatory measures such as the provision of basic services to improve the social conditions of informal settlements does not effectively mitigate the social consequences of in-migration.
3. A total of 1276 people will definitely need to be relocated, causing social impacts. Despite the proposed mitigation the impacts are still likely to be HIGH, as relocation is a very disruptive social process.
4. The DZ will host a number of industrial operations, which out of necessity will need to be large and possibly tall. The overall landscape will change significantly, and these facilities will be visually intrusive, resulting in visual impacts of HIGH significance that cannot realistically be mitigated.

**Effectiveness of the EMS**

It is our opinion that the EMS has identified all potentially significant impacts and is very effective at mitigating most of the significant environmental impacts that will result from the establishment of the Coega DZ, except for the four impacts mentioned above.

**Risk of the No Go option**

Rezoning of the land from Agricultural to Special Purposes can only take place subsequent to the land being purchased by the CDC. However, there is a risk that the proposed Coega DZ may not proceed. Should this occur after the purchase and rezoning of the land to Special Purposes, the land would be available for industrial development, but controls in the form of the EMS and other guidelines would not be in place. Should the Coega DZ not proceed subsequent to the rezoning of the land, one option is that rezoning be revoked so that the land could be returned to agricultural. An alternative option is that Government puts measures in place to prevent the unchecked development of industries in the area.

**Additional recommendations to be considered by the CDC**

1. Clear guidelines regarding compliance with existing EIA regulations (DEAT 1998) should be formulated for the Core Development Area, in order to streamline the Tenant Approval Procedure.
2. Economic incentives could be developed, to encourage development within the Core Development Area, as this will reduce the risk of the DZ failing.
3. Representatives from Coega make contact with all affected businesses, land owners and NGO’s in the area, and that the proposed communications strategy (see section 3.7.9) be developed and implemented as a matter of urgency.
4. A relocation and compensation plan for affected communities must be formulated in consultation with these affected parties. This should form a specific component of the EMS. Relocation should also be monitored, in order to assess the changes in social conditions of those being relocated.
5. A decision needs to be made by CDC and PEM as to whether certain services should be upgraded to accommodate the anticipated influx of people into the area, e.g. health facilities, schools, etc. This re-inforces the need to ensure that all planning of the DZ be dovetailed with planning of the greater Port Elizabeth area, and that liaison with Port Elizabeth Municipality is ongoing.
6. Clear guidelines, objectives and targets should be developed to ensure that local suppliers and contractors are used during the building operations, in order to maximise the economic benefits to the sub-region and the Eastern Cape.
7. The Algoa Bay management plan (ABMP) should place emphasis on the potential introduction of alien species onto the islands.
8. A decision needs to be made by the CDC and local government as to whether a satellite police station, with visible patrolling of the area particular at night, should be established as part of the proposed service centre within the DZ.
9. Guidelines for lighting should be developed to help minimise light scatter and resultant light pollution. It must be noted that lighting is a mitigatory measure with regard to crime and vandalism and these guidelines should be enforced in areas close to residential areas and public roads (e.g. N2).
Coastal & Environmental Services

Recommendations to be considered as conditions of approval

1. The CDC must adhere to its own Environmental Policy, which includes the implementation of the EMS, including associated guidelines and procedures. CDC must demonstrate adherence to its EMS by receiving certification to the ISO 14001 standard before the commencement of construction of any infrastructure within the Core Development Area.

2. Other guidelines and reports established for the Coega DZ, for example noise and air pollution guidelines, Tenant Approval Procedure, Environmental Design Manual (see Appendix B), the Construction Environmental Management Procedure (see Appendix C) and the Algoa Bay Management Plan, must be implemented as part of the EMS.

3. The development of an Open Space Management Plan must be commissioned if the project gets the go ahead.

4. The recommended Relocation & Compensation Plan must be commissioned and finalised before construction, and there must be adequate consultation with affected communities.

5. Until such time as the Bontveld in Area E (Figure 8.2b) can be shown to have a low importance value in terms of conservation of species and habitat, it should not be developed (NO-GO area), and should be zoned as open space in the Core Development Area. Should Coega wish to proceed with development in this area, it is recommended that a study be undertaken to assess the actual extent and conservation value of Bontveld. If shown to be of low conservation value and is adequately protected elsewhere, then the proposed development as planned in this area could be considered.

6. The environmental design manual recommends that all facilities within the DZ should be constructed above the 1-in-100 year floodline (see Appendix b). However, the DFP (see Figure 8.2c in Chapter 8) places the water reclamation works within the 1-in-100 year floodline (as well as part of the medium/heavy industrial area). The risks associated with having the water reclamation works as well as the medium/heavy industry below the 1-in-100 year floodline must be determined. If risks are unacceptable, then they must be located above the 1-in-100 year floodline, further to the south-west and out of the 1-in-100 floodline.

7. Should the Coega DZ not proceed subsequent to the rezoning of the land, the rezoning could be revoked and the land returned to agriculture to prevent the unchecked development of industries in the area. Alternatively Government must put measures in place to prevent the unchecked development of industries in the area.

Conclusions

The EMS coupled with a tenant approval procedure will effectively mitigate most impacts. Despite this, the establishment of a DZ will permanently alter almost all components of the environment in and around Algoa Bay. The landscape of Algoa Bay will change from a partially developed (rural) area to an industrial one, having major visual impacts and significantly altering the landscape character. Certain industrial activities will lead to increased levels of air pollution. Changes in landform, various impacts arising from the disposal of solid and liquid waste, increased energy and water consumption, the possible introduction of alien species, noise, physical destruction or harm to biota and a reduction in habitat are all negative impacts that result from the establishment of the DZ.

It is important to recognise that a large number of benefits will result from the rezoning. Of particular importance is the employment opportunities presented by the DZ, both during construction and operational phases. Establishment of new businesses, the export of goods and improved access to the area also result in significant benefits. Thus, most of the benefits accrue to the economic environment, whereas the biophysical environment is negatively effected.

From this analysis it is evident that the rezoning of land from Agricultural to Special Purposes will result in a significant number of HIGH negative impacts on predominantly the biophysical environment, but will result in a larger number of benefits of HIGH significance on the economic and social environments. If the additional recommendations, suggested in Chapter 9 and 10, as well as the suggested conditions of approval are incorporated into the management strategy for the Core Development Area the positive impacts seem to outweigh the negative impacts.
POSITIVE IMPACTS SEEM TO OUTWEIGH NEGATIVE IMPACTS AFTER THE IMPLEMENTATION OF THE EMS AND THE INCORPORATION OF THE SUGGESTED RECOMMENDATIONS.

- Change in recreation/tourism potential
- Influx of people
- Relocation of people or communities
- Change in visual quality due to tall or large structures

- Employment of people
- Establishment of new businesses
- Increased exportation of goods
- Improved access to the area
1. INTRODUCTION

1.1 BACKGROUND

The change of land use, or rezoning, from agriculture to any other purpose is listed as a Schedule 1 activity in terms of the Environmental Impact Assessment (EIA) regulations (Section 21(1), Government Gazette #18261) under the Environment Conservation Act (Act 73 of 1989). Schedule 1 identifies activities that may have a substantial detrimental effect on the environment. As a result, the rezoning of a property or portion thereof is subject to an Environmental Impact Assessment (EIA). In addition, the proposed Coega development must also conform to the new National Environmental Management Act (NEMA) (Act 107 of 1998), as these two Acts jointly regulate the management of the environment. NEMA will repeal sections of the Environment Conservation Act over the next few years, until it is eventually replaced by NEMA. Thus NEMA is essentially a framework Act, with sustainable development as its fundamental basis. It embraces the following three fields of environmental concern:

- resource conservation and exploitation
- pollution control and waste management
- land-use planning and development

It is against this backdrop that this EIA has been undertaken.

African Environmental Solutions (AES), on behalf of the Coega Development Corporation (CDC), appointed Coastal & Environmental Services (CES) to undertake the required EIA. The CDC is a formal legal entity operating as a private limited company, and in order to safeguard national, provincial and local interests, the principle stakeholders are national, provincial and local government.

The Coega DZ has had, and continues to have, extensive coverage in the local media. The government appears to have taken a decision to proceed in principle with the project, and the Ngqura Environmental Committee (NEC) assumes that the project is proceeding. The NEC is a key role-player in the EMS and is a committee representing governmental departments, which have a stake in the environmental management of the zone, and will act as an ‘independent watchdog’ over the activities of the CDC.

The proposed Coega Development Zone2 (DZ) is situated in the Eastern Cape Province, along the north-eastern coastline of Algoa Bay, approximately 20km from Port Elizabeth (Figure 1.1). The proposed Coega DZ will require that the land be rezoned from Agriculture to Special Purposes. This will provide the best opportunity to formulate a zone with specific guidelines and a broad variety of uses, controlled by performance standards in terms of environmental and other issues. This rezoning is required in order to obtain specific use rights and to determine the development controls3. At this stage, the rezoning application will only be concerned with the first phase of the development, the Core Development Area, an area of some 6 400ha. This EIA thus focuses on this portion of the proposed DZ. The majority of the Core Development Area is agricultural land, although there are a number of existing industries including a salt works, a mariculture operation, a pig farm and a brick works.

1.2 IMPLICATIONS OF REZONING

The rezoning of land from Agriculture to Special Purposes could result in significance negative impacts on especially the biophysical environment, but will also result in a large number of benefits on the economic and social environments. These impacts are a result of various project actions that are likely to take place in the Core Development Area. The main environmental issues that may result from the rezoning include:

- Changes in landscape quality
- Excavation and building activities
- The bulk movement of materials, especially during construction
- Increased electricity consumption
- Increased consumption of water
- Increased disposal of solid and liquid waste
- Generation of substandard water
- An increase in occupational accidents

---

2 Also previously referred to as the Coega Industrial Development Zone or Coega IDZ
3 According to “Coega development zone investigation for a position paper on the proposed rezoning”, prepared by Metroplan.
• An increased risk of radiation
• Generation or use of hazardous substances
• Generation of acute toxic releases
• Generation of odours
• Increased risk of explosions
• Increased risk of fires
• Changes in air quality
• Increased noise levels
• Increased lighting
• Changes in visual quality due to tall or large structures
• Reduction in habitat
• Reduction of the dune ridge
• Physical destruction or harm to vegetation
• Introduction of alien species
• Changes in food webs and predator/prey relationships
• Introduction of barriers to plant and animal movement
• Improved access to and from the area
• Employment of people
• Influx of people into Port Elizabeth and the DZ
• Relocation of people or communities
• Increased crime and vandalism
• Increased traffic congestion
• Loss or disruption of established businesses
• Establishment of new businesses
• Increased business opportunities within the DZ
• Change in recreation and/or tourism potential
• Increased risk of traffic accidents
• Increased risk of electrocution
• Longshore drift
• Increased wave action
• Opportunity costs

Changes to the environmental significance of these issues are discussed in this EIA.

1.3 TERMS OF REFERENCE

The terms of reference for this study are to conduct an EIA on the Core Development Area to assess the impacts of rezoning from Agriculture to Special Purposes, by assessing impacts for the entire Core Development Area (as opposed to individual development clusters). This is done in terms of the Environmental Impact Assessment (EIA) regulations (Section 21(1), Government Gazette #18261) under the Environment Conservation Act (Act 73 of 1989).

1.4 STRUCTURE OF REPORT

The Coega Rezoning Environmental Impact Report (EIR) consists of 10 chapters, with appendices found after Chapter eleven.

Chapter 2 outlines the approach and methodology used in this EIA, and the relationship between the EMS and the EIA. Chapter 3 provides an updated description of the DZ, and explains the EMS that has been developed. Chapters 4 to 7 briefly describe the biophysical and social environments of Coega, as a lot has already been written about the area. Chapter 8 addresses impacts that require special attention, as their significance is influenced by the location of various activities in the DZ. The objective here is to highlight impacts arising from the proposed Development Framework Plan. Chapter 9 describes the environmental issues arising from the project actions, discusses their significance and presents mitigatory measures that have been suggested. Chapter 10 presents the conclusions and recommendations, and describes the residual impacts of HIGH significance, after implementation of the EMS and other mitigatory measures, and evaluates the effectiveness to the EMS. The appendices supply additional information.
1.5 STUDY TEAM

The following persons were responsible for the production of this report:

- Dr. A.M. Avis of Coastal & Environmental Services. Management of the EIA, Chapters 9-10 and review.
- Ms. K. Johnson of CES. Project Co-ordination, Chapters 4-6 & 8, database of impacts and public involvement.
- Mr. J. Blood of CES. Chapters 1-6, database of impacts and public involvement.
- Prof. H. Nel, Head of the Department of Economics and Economic History at Rhodes University. Specialist input on economic aspects. Chapter 7, and review of economic impacts.
2. APPROACH TO THE EIA AND METHODOLOGY

2.1 INTRODUCTION

The Coega Rezoning Environmental Impact Assessment (EIA) has been unable to follow a conventional EIA procedure, and is a little unorthodox due to the fact that no specific project is being assessed. Rather, the consequence of rezoning the land, which opens the door to industrial development, is being assessed. This makes it impossible to assess project-specific impacts. However, the current development of an Environmental Management System (EMS) allows us to build on the useful information generated as part of the EMS. This chapter briefly describes the approach and methodology of the EMS and rezoning EIA.

2.2 THE ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

The CDC as proponent subscribes to various principles intended to guide the development in a manner that is ecologically sustainable, socially acceptable, and economically viable. The Environmental Policy is the instrument by which the CDC states its commitment to these and other principles, and establishes the framework by which the principles are turned into actions. The CDC aims to apply world class environmental management practices to Development Zone (DZ) activities. The Environmental Policy includes a number of actions (see section 3.7.1). One of these actions is to establish and maintain an Environmental Management System (EMS). The development of the EMS at this early stage adopts the concept of ‘backcasting’. This concept identifies the desired future state and then designs systems (in this case an Environmental Management System) to meet the desired future state.

The purpose of an EMS is to identify actual or potential significant impacts, and to establish and maintain objectives and targets for these impacts, taking into account legislative requirements and information about specific significant impacts. An EMS aims to manage the activities, products and/or services that cause impacts (project actions in EIA terminology) and allocate responsibilities for the implementation of these management plans. An EMS incorporates both internal and external auditing functions to ensure that it is correctly implemented and maintained. Therefore, the EMS will attempt to mitigate (reduce or remove) as many of the potentially negative impacts arising from the Coega DZ as is possible. It will also attempt to optimise benefits resulting from the DZ. The EMS is specifically designed for the CDC and will include any conditions of approval that arise from this rezoning EIA.

For the purpose of establishing an EMS for the Coega DZ, the principle consultants, AES compiled a database that:

- Listed all project actions identified to date, e.g. acquiring land for the Coega DZ, operation of the harbour, etc. (Table 2.2a);
- Listed their associated aspects, e.g. air pollution, export of goods, etc. (Table 2.2b), and wherever possible, the resultant impacts, e.g. impact on fauna, flora, etc. (Table 2.2c);
- Briefly described the impacts; and
- Rated the significance according to a predefined rating scale and indicated the degree of control (Table 2.2d & e).

---

3 According to the ISO standard, an environmental aspect is an element of an organisation’s activities, products or services that can interact with the environment. The working definition is thus that an environmental aspect is the actual or potential cause of an environmental impact.

4 An environmental impact is defined as the change to the environment, whether adverse of beneficial, caused by an organisation’s activities, products or services.
## Table 2.2a  List of all the project actions identified by AES

<table>
<thead>
<tr>
<th>Action Description</th>
<th>Environmental Aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition of land for DZ/harbour</td>
<td>Provision of telecommunications</td>
</tr>
<tr>
<td>Clearing and burning of vegetation</td>
<td>Provision/maintenance of electric fixtures</td>
</tr>
<tr>
<td>Coega Kop quarrying</td>
<td>Reduction in tariffs</td>
</tr>
<tr>
<td>Commercial/office-based operations</td>
<td>Road traffic</td>
</tr>
<tr>
<td>Concessionaire operations</td>
<td>Siting/design of roads</td>
</tr>
<tr>
<td>Construction activities</td>
<td>Provision of access control</td>
</tr>
<tr>
<td>Harbour construction</td>
<td>Provision of new services/infrastructure</td>
</tr>
<tr>
<td>Harbour operation</td>
<td>Provision of access to sensitive areas</td>
</tr>
<tr>
<td>Industrial operations</td>
<td>Provision of incentives for businesses into DZ</td>
</tr>
<tr>
<td>Integration of DZ planning with PE</td>
<td>Upsets in industrial operations</td>
</tr>
<tr>
<td>Landscaping</td>
<td>Waste/resource sharing service</td>
</tr>
<tr>
<td>Maintenance activities</td>
<td>Provision of lighting</td>
</tr>
</tbody>
</table>

## Table 2.2b  List of all the environmental aspects identified by AES

<table>
<thead>
<tr>
<th>Environmental Aspect</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxic releases</td>
<td>Physical destruction or harm</td>
</tr>
<tr>
<td>Air pollution</td>
<td>Radiation</td>
</tr>
<tr>
<td>Bulk movement of material</td>
<td>Reduction in habitat</td>
</tr>
<tr>
<td>Change in landforms</td>
<td>Reduction of dune ridge</td>
</tr>
<tr>
<td>Change in recreation or tourism potential</td>
<td>Relocation of businesses</td>
</tr>
<tr>
<td>Changes in foodweb (predator/prey relationships)</td>
<td>Relocation of people or communities</td>
</tr>
<tr>
<td>Concentration of businesses to the detriment of other areas</td>
<td>Substandard water</td>
</tr>
<tr>
<td>Cost of establishing the DZ/harbour</td>
<td>Tall or large structures</td>
</tr>
<tr>
<td>Crime/vandalism</td>
<td>Traffic accidents</td>
</tr>
<tr>
<td>Disposal of solid and liquid waste</td>
<td>Traffic congestion</td>
</tr>
<tr>
<td>Electrocution</td>
<td>Use of arable land</td>
</tr>
<tr>
<td>Employment of people (or change in employment)</td>
<td>Water consumption</td>
</tr>
<tr>
<td>Energy consumption</td>
<td>Wave action</td>
</tr>
<tr>
<td>Establishment of new businesses</td>
<td></td>
</tr>
<tr>
<td>Excavation and building activities</td>
<td></td>
</tr>
</tbody>
</table>

## Table 2.2c  List of the impacts identified by AES

<table>
<thead>
<tr>
<th>Impact Description</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in landform/topography</td>
<td>Impact on fauna</td>
</tr>
<tr>
<td>Change in social behaviour/interaction</td>
<td>Impact on flora</td>
</tr>
<tr>
<td>Coastal erosion</td>
<td>Nuisance to humans</td>
</tr>
<tr>
<td>Depletion of resources or biodiversity</td>
<td>Human safety</td>
</tr>
<tr>
<td></td>
<td>Visual impact</td>
</tr>
</tbody>
</table>
### Criteria for determining the Significance Rating of the ‘Environmental Impact’

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity of the impact*</td>
<td>Low (L)</td>
</tr>
<tr>
<td>How serious is the impact due to its potential for causing disruption?</td>
<td>Minor biophysical or socio-economic change which is limited in extent</td>
</tr>
<tr>
<td>Duration of impact</td>
<td>Less than 1 year</td>
</tr>
<tr>
<td>Likelihood of impact</td>
<td>Improbable</td>
</tr>
</tbody>
</table>

*reference examples for rating of severity (row 1)

<table>
<thead>
<tr>
<th>Biophysical change</th>
<th>Socio-economic change</th>
<th>Extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor</td>
<td>Major</td>
<td>Minor</td>
</tr>
<tr>
<td>• loss of endemic species</td>
<td>• change in quality of water or air within tolerable limits for sensitive receptors</td>
<td>• use of renewable or plentiful resources</td>
</tr>
<tr>
<td>• change in quality of water or air into range detrimental or toxic to sensitive receptors</td>
<td>• change in income level of individuals</td>
<td>• change which initiates movement or migration of people</td>
</tr>
<tr>
<td>• change in income level of individuals</td>
<td>• change in income level of individuals</td>
<td>• change which initiates movement or migration of people</td>
</tr>
<tr>
<td>• change in noise levels within SABS 0103 guidelines</td>
<td>• change where response is value-dependent or subjective (e.g. visual impact)</td>
<td>• change which initiates movement or migration of people</td>
</tr>
<tr>
<td>• change where response is value-dependent or subjective (e.g. visual impact)</td>
<td>• change which initiates movement or migration of people</td>
<td>• change in noise levels in exceedance of SABS 0103 guidelines</td>
</tr>
<tr>
<td>• change where response is value-dependent or subjective (e.g. visual impact)</td>
<td>• change which initiates movement or migration of people</td>
<td>• change in noise levels in exceedance of SABS 0103 guidelines</td>
</tr>
<tr>
<td>• change which initiates movement or migration of people</td>
<td>• change in noise levels in exceedance of SABS 0103 guidelines</td>
<td>• change where response is measureable or objective (e.g. health)</td>
</tr>
<tr>
<td>• change which initiates movement or migration of people</td>
<td>• change in noise levels in exceedance of SABS 0103 guidelines</td>
<td>• change where response is measureable or objective (e.g. health)</td>
</tr>
<tr>
<td>• change which initiates movement or migration of people</td>
<td>• change in noise levels in exceedance of SABS 0103 guidelines</td>
<td>• change where response is measureable or objective (e.g. health)</td>
</tr>
<tr>
<td>• change which initiates movement or migration of people</td>
<td>• change in noise levels in exceedance of SABS 0103 guidelines</td>
<td>• change where response is measureable or objective (e.g. health)</td>
</tr>
</tbody>
</table>
### Table 2.2e Criteria for determining the Significance Rating of Environmental Aspect/Impacts: General Categories

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Legal Requirements and other requirements to which the organisation subscribes</strong></td>
<td>Is the aspect/impact or its associated activity, product or service subject to legal or other requirements?</td>
</tr>
</tbody>
</table>
| Neither legal requirements nor other organisational commitments apply | No specific legal requirements, but either:  
  • Organisation has made commitments, policy statements or public statements in this regard  
  or  
  • General legislation applies | Specific legislation applies |
| **Environmental Impact**                                                 | To what degree may a detrimental or beneficial change to the environment occur because of the aspect or its associated activity, product or service? This change could include, for example, pollution, resource consumption, or a social or economic change |
| from Table 2.2d, if:  
  • any 2 are rated L;  
  • 1 is rated L and the other 2 M | from Table 2.2d, if:  
  • the three criteria are rated H-M-L in any combination;  
  • all three are rated M | from Table 2.2d, if:  
  • any 2 are rated H;  
  • 1 is rated H and the other 2 M |
| **Stakeholder Perceptions**                                              | To what extent may these views be affected, either negatively or positively? |
| Relatively unimportant; no existing negative perceptions; unlikely to cause perceptible change in views | Some effect on image (positive or negative); limited media exposure.  
  **Negative:** potentially embarrassing  
  **Positive:** potentially image enhancing | Significant or lasting effect on image (negative or positive); already strong perceptions; prolonged media exposure  
  **Negative:** potentially damaging  
  **Positive:** potentially beneficial in a definable manner (not just improved image) |
| **Net financial benefit**                                                | Consider cost savings as well as preventative, consequential and direct costs. Also consider possible increase / loss in business. |
| Costs outweigh possible benefits by a wide margin (>R100k)               | Costs and benefits are comparable (within R100k of each other)          | Benefits outweigh costs by a wide margin (>R100k) |
It is important to understand how this database was derived, as it is used extensively in the EIA. Aspects and impacts have been grouped according to the level of control that the CDC will be able to exercise over them, and then prioritised for management purposes according to this degree of control. The levels of control are defined as Direct (d), Partial (p), Influence (i) and None (n). These aspects and impacts have also been rated according to a predefined significance scale (H - high, M - medium and L – low [Table 2.2d & 2.2e]). The procedure used by AES for the rating of impacts is presented in Box 2.2 at end of the chapter. The overall significance rating incorporated four criteria, namely legal, stakeholder perception, financial and environmental. If any of the four criteria were rated as high, the overall significance was automatically rated as high. Based on the overall significance and level of control, impacts were then rated as first (64 impacts), second (299 impacts) and third (586 impacts) priority. First Priority impacts were those with the rating Hd or Hp, while Second Priority impacts were considered to be those with the rating Hi, Md or Mp. The remainder were considered Third Priority. The database was then split into three sections according to the level of priority (i.e. first, second or third).

The EMS aimed to focus on and manage the first priority aspects and impacts. Second priority aspects and impacts will gradually be incorporated into the management system as the first priority impacts are successfully controlled. First priority aspects and impacts are related not only to the activities undertaken directly by the CDC, but also by the activities of tenants and concessionaires during construction and operation. Thus, the CDC developed a Tenant Approval Procedure (TAP) (see section 3.7.4) to screen prospective tenants and ensure that they are aware of and can meet the relevant specific environmental standards and guidelines developed for the EMS.

2.3 THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) METHODOLOGY

2.3.1 EIA METHODOLOGY

A large amount of work has already been done on the environmental implications of this development (Box 2.3). Of particular relevance is the Strategic Environmental Assessment (SEA) and various specialist reports, and the environmental guidelines produced as part of these and subsequent studies.

The SEA, carried out for the entire area, made provision for formal scoping. This included four information briefs distributed to I&APs, open houses and public meetings, meetings with stakeholders and interest groups, and the installation of a telephone hotline. Consequently, it was agreed with Mr. Struwig of DEAE&T that the scoping phase of the EIA process need not be undertaken for this EIA, since an extensive amount of scoping has been done for the proposed Coega development as a whole (see Appendix A). It was also felt that the most serious issues would already have been raised. The EIA process therefore commenced with a plan of study, followed by the production of the environmental impact report (EIR- this document, current as of November 1999), which is subject to public review.

The bulk of the work for this EIA therefore involved synthesising existing information to rate environmental impacts, most of which had already been identified during the preparation of the environmental management system (EMS), which is presently being developed by the CDC. The EMS will assist in the management of the DZ according to a range of clearly defined environmental objectives, which form part of the EMS. Thus, a further aim of the EIA (in addition to identifying and assessing the significance of impacts) was to make recommendations for possible additional objectives that should be incorporated into the EMS. This is in line with the primary aim of any EIA, namely to ensure that as few as possible residual impacts of high significance result from develop.

Identifying and predicting the significance of impacts was made to the best of the consultants’ ability, given the unknown nature of specific future developments, but assuming the implementation of various guidelines developed as part of the EMS.
Box 2.3 The following reports have been produced for the Coega DZ (references are provided in Chapter 11)

- Environmental Design Manual
- Environmental principles, guidelines and actions arising from the Strategic Environmental Assessment
- Haul road linking Coega quarry to the proposed Coega port
- Construction and operation of stormwater system for the Coega IDZ
- Construction Environmental Management Procedure
- Environmental impact report on a proposed harbour in the vicinity of Coega
- Strategic Environmental Assessment of the Coega IDZ
- Coega Port Study. Environmental impacts of a quarry at Coega Kop
- Ecological survey of Coega Kop
- Environmental Management Programme Report: Western Coega Kop Quarry
- Ambient noise guidelines
- Social baseline report
- Groundwater impact study
- Initial Noise Impact Study on the Coega Kop Quarry
- Coega Industrial Development Zone and Port: Feasibility Study
- Preliminary catchment management guidelines for the Coega River

Since individual tenants are not yet known, individual tenants activities cannot be assessed. As a result, the approach taken was to assess the environmental issues associated with the action of developing and operating the Coega DZ. After careful review it was decided to use the EMS database, as many of the environmental issues had already been identified. In order to maintain a level of consistency between the assessment done to date for the EMS and the current study, CES decided to follow the rating procedure developed by AES (see Table 2.2d), which is similar to our own rating system. The database was also used because the EMS was started before this EIA, and since the EMS is part of the proposed management programme for the proposed DZ it will be incorporated into the project, thus mitigating potential impacts.

CES felt that the EMS database adequately covered all possible environmental issues and impacts arising from the rezoning of land from Agriculture to Special Purposes. Mitigatory measures suggested in the EMS were considered for each environmental issue, and the practicality and effectiveness of the suggested mitigatory actions were used to decide on the significance of the residual impacts.

The risk or likelihood of all impacts taking place as a result of project actions differs. There is no doubt that some impacts would definitely occur if rezoning takes place, but certain other impacts are not as likely, and may or may not result from the rezoning of land. Although these impacts may be severe, the likelihood of them occurring may affect their overall significance, and this was taken into account by assessing the likelihood of HIGH negative residual impacts taking place, as follows:

Unlikely to occur — the risk of these impacts occurring is slight, for example an increase in alcoholism and associated family violence as a result of increased wealth could occur, but is unlikely.
Likely to occur — the risk of these impacts is more likely, although it is not definite, for example the change in social behaviour as a result of an influx of people to the area.
Will definitely occur — there is no chance that this impact will not occur, for example the clearing of vegetation for the various operations.

2.3.2 BASELINE INFORMATION
Baseline information on the terrestrial (Chapter 4), marine (Chapter 5) and social environment (Chapter 6) was obtained from the substantial amount of literature that already exists for the Coega DZ. The reports that were used for these chapters are cited in the references.

2.3.3 DESCRIPTION OF FEASIBLE ALTERNATIVES
A policy decision has been taken by the Ngqura Environmental Committee (NEC), on the basis that government has already taken an ‘in-principle’ decision to proceed with the Coega project, that feasible alternative land uses need not be examined. The rationale behind this will be discussed in Chapter 3. As agreed with the authorities, CES has not examined alternative land uses in this EIA. Rather, the EIA focuses on the mitigation of potential environmental issues.
2.3.4 ADDITIONAL INFORMATION REQUIRED
A large number of specialist studies have already been undertaken. However, one of the objectives of this EIA will be to identify any outstanding information that should be obtained (see Chapter 10, Section 10.7 points 3 & 4).

2.3.5 PUBLIC INVOLVEMENT
In line with the process accepted by the authorities, a four-week public review period will be held following the release of the draft EIR. During this period, the draft report will be available for review and comment by the public, authorities and other interested and affected parties (IAPs), and two open houses will be held, one in Port Elizabeth and one in Motherwell5. These will be advertised at least two weeks in advance and posters will be put up in strategic places. A list of IAPs will be generated from responses to the advertisement/s as well as from the Coega database, and these people will be contacted by mail. Written comments should be submitted by the end of the public review period to CES6

---

5 A Xhosa translator will be available.
6 Coastal & Environmental Services
PO Box 934
Grahamstown
6140
Tel: 046 – 622 2364/7   Fax: 046 – 622 6564   email: ces@imaginet.co.za
1.1 **Summary of the process**
The process documented within this procedure is made up of four key steps:

1.1.1 Identification of the activities, products or services for assessment. The level of detail should be broad enough for meaningful examination, but focussed enough to be sufficiently understood.

1.1.2 Identification of the environmental aspects associated with the activities, products and services (i.e. the causes of potential environmental, health or safety impacts) as well as the associated potential impacts arising from the aspects.

1.1.3 Allocation of a significance rating to each aspect/impact using pre-determined criteria.

1.1.4 Prioritising significant aspects and impacts for objective and target setting and development of operational control measures.

1.2 **Basic assumptions**
It is intended that the following basic assumptions apply in the application of this procedure:

1.2.1 Significance rating should be allocated and recorded in a manner that reflects and documents the consistent and systematic application of the significance criteria.

1.2.2 Significance ratings should be allocated using quantitative data where possible in addition to the experience of the person(s) making the judgement.

1.2.3 In the determination of ratings, the viewpoint of the organisation’s management should be adopted. The assumed approach should reflect what might reasonably be expected of a responsible organisation.

1.2.4 In the determination of ratings, existing mitigation or control measures should be considered. Engineering and administrative controls can significantly reduce both the severity and the likelihood of an environmental impact.

1.2.5 In the determination of ratings, consideration must be given to the full range of conditions:
- routine/normal;
- non-routine/abnormal;
- shut down and start up situations where applicable;
- emergency situations.

1.2.6 In determination of ratings, consider potential problems from past and planned operations.

1.2.7 In determination of ratings, consider:
- potential secondary impacts (e.g. economic impact resulting from an air pollution incident);
- cumulative impacts;
- all elements of the environment i.e. air, water, land, natural resources, flora, fauna, humans and their interrelationships.

1.3 **Revision of previous results**

1.3.1 The outcome of the process reflects the situation at a snapshot in time. The results must be reviewed at least annually to reflect changes in (or to) the organisation.

1.3.2 Changes that should prompt the review of previous results include:
- new or modified activities, products or services;
- new or amended laws or regulations;
- a change in the scope of the EMS;
- a change in the stakeholders that can materially influence the organisation;
- a change in the significance criteria.
1.3.3 Both this procedure and the significance criteria must be reviewed for continuing adequacy and appropriateness prior to a review of the analysis.

1.4 Detailed Procedure

1.4.1 List all activities, products and services associated with the organisation.

1.4.2 For each listed activity, product and service, list the associated environmental aspects and their related impacts.

1.4.3 For each unique combination of environmental aspect and related impacts, use the criteria in Table 2.2d to allocate a rating of “Low”, “Medium” or “High” for the categories “Legal Requirements”, “Environmental Impact”, “Stakeholder Perceptions” and “Financial Benefit”. Obtain the rating for “Environmental Impact” by first rating the sub-criteria listed in Table 2.2e, then combining them in accordance with the requirements of Table 2.2d.

1.4.4 Allocate overall significance ratings as follows:

a) Assign an overall significance rating of “H” if:
   - An H rating was allocated for any one of the Legal, Impact or Stakeholder criteria;
   - An H rating was allocated for Financial criteria and one of the other three criteria is rated at least M
   - all four criteria were rated M.

b) Assign an overall significance rating of “M” if:
   - an M rating was allocated for the Financial criteria and at least one other of the Legal, Impact or Stakeholder categories is rated M;
   - an L rating was allocated for the Financial criteria and at least two of the Legal, Impact or Stakeholder categories was rated M.

c) Assign a significance rating of “L” if:
   - Any other combination of rating is allocated.

1.4.5 Prioritise significant aspects/impacts for objective and target setting and development of operation control measures as follows:

a) Allocate a letter in addition to the overall significance rating to reflect the organisation’s ability to control or alter the aspect under consideration.

   d Direct control
   p Partial control
   i Influence
   n No control or influence

b) Address the aspects/impacts in the following order of priority:

   First priority are considered to be those with a rating of \( H_d \) or \( H_p \).

   Second priority are considered to be those with a rating of either \( H_i \), \( M_d \) or \( M_p \).

   (Note: Impacts with overall rating of L and those with a control rating of “n” should not be considered in setting objectives and targets).
3. PROJECT DESCRIPTION

3.1 INTRODUCTION

This chapter describes the proposed development and management of the Core Development Area of the Coega Development Zone (DZ). As it is not possible to predict accurately each activity within the Core Development Area, the description includes measures designed to limit total cumulative environmental impacts.

The chapter commences with an overview of government economic policy and linkages to Spatial Development Initiatives (SDIs) and DZs. Thereafter, the focus shifts to the Coega DZ and the organisational structure and links between the Coega Development Corporation (CDC), concessionaires and tenants. Later sections describe proposed land–use activities/clusters and associated infrastructure. The land acquisition process, including expropriation, resettlement and compensation policies are also described, followed by the series of environmental management processes designed to ensure the sustainable management of the Coega DZ. The last section outlines briefly the employment opportunities and the revenue and costs of the Coega DZ.

3.2 DEVELOPMENT ZONE PHILOSOPHY AND OBJECTIVES

3.2.1 GOVERNMENT POLICY

In June 1996, the government launched the Growth, Employment and Redistribution strategy. Known as GEAR, the plan was to present a new vision for rebuilding and restructuring the economy. GEAR aims to transform South Africa into an economy able to compete internationally, and at the same time to achieve an annual growth of 6% in Gross Domestic Product (GDP) and a significant increase in employment.

A key element of GEAR is its desire to make South African industry internationally competitive. Spatial Development Initiatives (SDIs) are an integral part of this effort to strengthen the economy. The SDI programme is a short-term investment strategy that aims to unlock inherent economic potential in specific (underdeveloped) spatial locations in southern Africa. It uses public resources to leverage private sector investment in order to kick-start development.

The national SDI programme consists of ten regional SDIs and four Development Zones (DZs). To date, the current portfolio of SDIs have identified 518 potential investment opportunities valued at R115.4 billion with the capacity to generate more than 118 000 new jobs.

Whereas SDIs tend to cover large areas, DZs are spatially confined and tend to have an industrial (as opposed to broader development) focus. DZs aim to facilitate export-oriented development and as such it is important that they are locate near international ports of entry. DZs should not be confused with Export Processing Zones, which are effectively independent bonded areas where less rigorous environmental standards and labour practices are often employed, while DZs are subject to South African environmental and labour legislation.

The Coega DZ is one of the key components of the Fish River SDI, although it is envisaged that the Coega DZ will function as a separate entity. It is proposed to build a new harbour at the Ngqura river mouth as part of the Coega DZ proposal. Planning for the Coega DZ has been underway for approximately three years and includes a feasibility study and an SEA. The design of the Coega DZ continues.

3.2.2 COEGA DZ: VISION AND OBJECTIVES

The vision for the Coega DZ is "to be the most customer-focused, competitive, efficient, innovative, environmentally and socially responsible Industrial Zone in Africa providing realistic investment opportunities for tenants and a reasonable return for shareholders." This vision has been used to formulate a mission statement for the Coega DZ, which is to provide a world-class, internationally attractive and competitive industrial development zone with purpose-built infrastructure and a deep-water port. In order to translate this vision and mission statement into an operational industrial area, the Coega Implementing Authority (CIA) has the following key objectives:

- establish an entity with a legal character
- acquire land
- develop purpose-built infrastructure and a port (at Ngqura)
- identify, attract and secure tenants
- establish legal and environmental parameters
- develop a comprehensive human resources strategy
The proposed DZ regulations will confer certain powers on the Coega Development Corporation (CDC). Flowing from these powers, the primary duties of the CDC as envisioned in the DZ regulations (and which are consistent with the objectives) are as follows:

- establish and operate the Zone in accordance with the terms and conditions of the DZ operating permit
- develop and maintain infrastructure and other zone facilities to a standard consistent with the needs of zone enterprises and conforming to the requirements of applicable legislation
- maintain a staffed managerial office within the DZ, including reception area
- facilitate investments within the DZ by zone enterprises
- keep statistics, accounts, databases and other records of activities in the Zone and report to the Board on such activities in the manner provided by regulations
- provide and maintain common areas and facilities
- comply with applicable legislation, including the Regulation and Rules and Procedures for the DZ and with the Rules and Procedures prescribed in consultation and in agreement with the Board for the operation of the DZ.

3.3 COEGA DZ ORGANISATIONAL STRUCTURE AND LINKS

The CDC, an entity which will have links with external stakeholders (often represented by government bodies) and organisations located within the Core Development Area, will manage the Coega DZ and Core Development Area. These links are described in this section.

3.3.1 COEGA DEVELOPMENT CORPORATION

The CDC is a formal legal entity operating as a private limited company. In order to safeguard national, provincial and local interests, the principal shareholders are national, provincial and local government.

The CDC is mandated by National Government to implement the Coega Project (DZ and port). Therefore, the CDC will be licensed to procure and operate the Coega DZ and Core Development Area.

3.3.2 CONCESSIONAIRES

National Government is currently considering the concessioning option as a more cost-effective approach to the operation of sections of the DZ, than the traditional approach of managing it themselves. The CDC will have the authority to give concessions and the concessionaire agreements will mandate concessionaires to operate within the Coega DZ on land leased from the CDC.

3.3.3 TENANTS

As noted above, if the concessioning option is followed, concessionaires will lease sites to tenants. The CDC may retain the right to “acquire” tenants, subject to mutual agreement with the concessionaire. Tenants will be leaseholders and leasehold agreements will be for periods agreed between the parties. The Tenant Approval Procedure (see Section 3.7.4) will screen prospective tenants for suitability.

3.4 PROPOSED LAND-USE IN THE CORE DEVELOPMENT AREA

3.4.1 INTRODUCTION: PHASED DEVELOPMENT APPROACH TO LAND-USE

The concept for land-use in the Coega DZ is governed by four principal factors:

- Environmental considerations
- Geotechnical and geomorphological suitability
- Highest sustainable added value
- Clustering of industries to achieve synergy and efficiency.

From the outset of the Coega project, a phased approach to development was adopted. The ultimate Coega DZ size could be 17 000ha in extent. However, the initial development, that is the Core Development Area, will be 4 120ha in extent and is designated for multiple uses. Existing land-uses are as follows:

- saltworks (owned by National Salt Limited)
- mariculture (owned by Marine Growers)
- brickfields
- agriculture
- recreation
It is anticipated that the development and location of tenants in the Core Development Area will occur over the next 10–20 years, at which point all available space will have been leased. Thereafter, development will be targeted to the east of the Coega River. The ultimate development is considered to be in the 50–100 year timeframe. Accordingly, flexibility of approach is essential. The phased approach intends to build bulk infrastructure to service confirmed developments with the capacity for extension as further tenants are signed up.

The land falls within the areas administered by the Western District Council and PE Transitional Local Council. Currently, the land is mostly zoned as agricultural. Within the Core Development Area, it is proposed to rezone the land for special purposes, with generic indications of likely land-use (and land-uses which are excluded).

The overarching intention is to develop a number of synergistic clusters in the greater DZ, of which the following have been identified:

- automotive
- electronic
- metallurgical
- other

Based on detailed strategic planning for the Core Development Area, designated land-use zones have been identified, in consideration of financial, technical and environmental factors. The key goal is to develop a cluster of metallurgical industries using a synergistic approach, which will serve as a catalyst for other principal uses in the Core Development Area. These uses in the Core Development Area, together with the approximate predicted sizes, are indicated in Figure 3.4.

It should be noted that detailed master planning for the Coega DZ has not yet been completed and certain key elements are underway, including detailed studies of solid waste management/disposal, wastewater treatment (i.e. the water reclamation works and return effluent study) and transportation (i.e. the integrated transportation study). As a consequence, it is possible that:

- the location of each designated land-use within the Core Development Area may change (with the exception of the port, Coega Kop quarry, medium/heavy industrial area and the saltworks (which may be relocated by agreement in the future);
- the land allocation/size for each area may change;
- technical details may change (e.g. quay lengths, etc).

This project description focuses on the mix of proposed land-uses (and less on their precise location within the Core Development Area), and for the purposes of this report assumes the current proposed land-use as depicted in Figure 3.4.

In accordance with the principles in the SEA, development in the Core Development Area will be phased. Infrastructure will be required in order for the Core Development Area to function (including the port) and an anchor tenant(s) to serve as a catalyst to attract more tenants. However, it is not appropriate or meaningful to indicate the proposed dates for development of each of the land-use zones since these are not known at present.

### 3.4.2 EXISTING BUSINESSES

It is a priority to try and maintain the viability of existing businesses. However, the saltworks may have to be relocated in the short to medium term, as will Marine Growers. Other businesses that may have to be relocated are the Algoa Brickworks and Coastal Livestock.

### 3.4.3 HARBOUR

Note that a separate Port EIA is assessing in detail the impacts associated with the proposed Ngqura harbour.

The primary function of the port will be to act as an inter-modal transhipment point for bulk cargo for industries in the DZ and the associated hinterland. The landward area of the port is bounded to the north-west by the N2 national road; to the north-east by the boundary between Hougham Park and Sonop Farms; to the south-west by the line joining a point on the N2 National Road and the high water mark, which will become the boundary between St George’s Strand and the Coega DZ; to the south-east by the high water mark between these two boundaries. This area will be vested in the port authority, presently Portnet.

It is expected that the new port will be developed in phases over a number of years. For the first phase, three berths are planned, although it is envisaged that the port could in time be enlarged to a total of 17 berths.
The port will be constructed in three stages. In the first stage, the site preparation will take place before the main contractor moves onto site. This is expected to take 8 months to complete and involve a work force of approximately 100 people. The second stage will involve the construction of the port and is expected to take 27 months to complete and involve approximately 800 construction personnel at its peak. Finally a smaller land-side infrastructure and sand bypass phase with a duration of 18 months and involving 250 people will occur.

The Port consists of three main components, viz. breakwaters, quay walls and dredged areas, as described below:

- the main breakwater is on the north-eastern side of the entrance and extends from the beach in a southerly direction for a distance of 2100m. The secondary breakwater extends from the beach in an easterly direction for a distance of just under 1100m. The breakwater will be constructed using core rock (5kg to 2000kg), armour rock (2 tonne to 5 tonne), and dolosse concrete armour units (30 tonne).
- a 600m-long quay wall will be constructed on the south-western side of the river channel, and a 300m-long quay wall will be constructed on the north-eastern side of the river channel. The south side quay wall will accommodate two berths for vessels of up to 80000 dwt. The north-eastern side will consist of a single berth.
- parts of the 3km-long approach channel and inner basins will have to be dredged. The approach channel will vary in width from 300m to 500m whilst the river channel section will have a width of 300m.

Details of the land-side infrastructure requirements are as yet not clearly defined. It is envisaged that the north-eastern quay will be used for liquid bulk cargo. This quay will therefore require liquid bulk cargo handling equipment.

It is envisaged that the south-western quay be used for dry bulk cargo. This quay will therefore require bulk loaders and unloaders. Transportation of bulk cargo materials of a granular or powder form will be done using a conveyor system. Break bulk cargo will be transported by railway or road. The railway and the conveyor will be routed up the transportation corridor.

3.4.4 LIGHT INDUSTRIAL AREAS
These industries will include small firms that will provide parts/equipment for the medium/heavy industries.

3.4.5 COMMERCIAL SERVICE INDUSTRIES AREA
These are higher value-added industries and include banking, insurance, information technology, wholesalers, retailers, maintenance/support firms (to service the medium/heavy industries during the operation and shut-down phases). The buildings will generally be of a more prestigious design and will be located adjacent to the N2 arterial road.

3.4.6 BULK MINERALS IMPORT/EXPORT FACILITIES
The Core Development Area Plan is predicated by the following prospective tenants and facilities:

- Iron ore (ex Sishen) (export)
- Manganese (transferred from PE port) (export)
- Coal (ex Molteno) (import/export)
- Liquid fuels (transferred from PE port) (import/export)

3.4.7 SERVICE AREAS
The designated Service Areas provide the vital administrative, health and safety back-up. The facilities to be provided include:

- fire station
- ambulance/paramedic support
- vehicle service station
- taxi and bus node
- crèche for children whose mothers are working in the DZ
- vocational training centre

3.4.8 METALS CLUSTER
The Core Development Area Plan is also predicated by the following prospective tenants and facilities:

- Stainless Steel Plant (Coils and Long Products)
- Stainless Steel Plant (Specialist Products)
- Galvanising Plant (Zinc Coating of Mild Steel Products).
3.4.9 CENTRALISED GAS FACILITY
Land has been allocated for a centralised gas facility. Initially, gas requirements will be met by individual on-site facilities with bulk gas being transported by road or rail. Once sufficient demand has been achieved, a centralised facility, fed by a pipeline from the main depot in Port Elizabeth, will be set up.

3.4.10 UNDETERMINED USE AREA
Certain areas of land have not yet been designated for a particular land-use. These areas partially fulfil the function of a buffer zone but the planning retains sufficient flexibility to allow future appropriate development, that is light industries and/or commercial/service industries.

3.4.11 COEGA WATER RECLAMATION WORKS (WRW)
There is agreement in principle with the Port Elizabeth TLC to service the initial development utilising the present spare capacity at the Fish Water Flats WRW. Dependent on the outcome of the WRW and Return Effluent Study, treated effluent from the Fish Water Flats WRW could be utilised as industrial process water and as water for fire fighting and irrigation purposes to service the initial developments.

The establishment of the Coega WRW will depend on the growth of demand and, more particularly, on the future expansion of the Motherwell Township. There is agreement in principle with the Port Elizabeth TLC to service those parts of the future Motherwell Township which are part of the Coega River watershed.

The Coega WRW will be developed in phases as demand increases, and will be the future source of treated effluent for the DZ. Tertiary treatment will be a prerequisite for treated effluent supplies. No effluent discharges into Algoa Bay are planned.

3.4.12 COEGA KOP QUARRY
The Coega Kop (western) Quarry is located on a 59.95ha property known as Erf 9, Wells Estate. The property, quarry and mineral rights of the western Coega Kop are owned by Transnet. Although a formal mine plan for quarrying has not yet been produced (in the Environmental Management Programme Report [EMPR]) it is expected that approximately 5 million m³ of rock will be removed to provide armour blocks for the proposed Coega harbour breakwater. Maximum production is expected to reach 53 000 m³ per week. Quarrying for the breakwater is expected to last for 18 months. During this time a truck will leave or enter the quarry every 2 minutes, 22 hours a day, 5 days a week.

The following project description is reproduced directly from the EMPR (CES, 1999), which is to be submitted to the Department of Minerals and Energy (DME) for approval:

“Rock will be transported to the harbour on a haul road, which will be sealed with bitumen to reduce dust. Underpass crossings will be constructed to cross the N2 and train-operated booms will be used to cross the railway. Domestic and industrial waste will be disposed of at Aloes WasteTech site (H:H facilities are available), and mine residue will be stockpiled and unusable material will be dumped in the quarry void. No sewage plant, pollution control dams, potable water supply system, process water supply system or mineral processing plant will need to be established on the site. No disturbance to watercourses or stormwater will occur and evaporation rates are expected to exceed inflow into the quarry void.

The construction phase will consist of erection of buildings, fencing, clearing of loose rock and establishment of crushing plant. The operational phase will involve stockpiling of topsoil and overburden, and quarrying of certain areas. No structures are likely to be affected by blasting or subsidence, although blasting may not occur within 100m of the (water) pipeline. Rock will be sorted using a large sieve, and will be transported from the quarry to the harbour by 36-tonne payload off-highway dump trucks along a dedicated haul road.”

Ultimately the quarry will be decommissioned and rehabilitated, as outlined in the EMPR.

3.4.13 OPEN SPACES
A large area of indeterminate size within the Core Development Area will be retained as Open Space, mainly covering the steep slopes of the Coega River valley and estuary. It is envisaged that Open Space will be used for conservation and (passive) recreation. This Open Space will be managed in accordance with an Open Space Management Plan, which still has to be developed. Details of this plan and the terms of reference are provided in Section 3.7.10.

An Algoa Bay Management Plan is currently being developed for the management of the marine environment in Algoa Bay, extending from Cape Recife in the south to Woody Cape in the north, including the islands in the bay. See section 3.7.11 for the terms of reference.
3.5 INFRASTRUCTURE AND SERVICE FACILITIES

A series of infrastructure position papers were prepared for the Coega DZ in late 1998 and January 1999. These position papers were compiled following consultation with a number of key stakeholders. An important principle adopted in these position papers is that of phased construction of services and infrastructure in the Core Development Area. These position papers form the framework for the description of infrastructure, which follows below.

3.5.1 TRANSPORT REQUIREMENTS

Elements included in the transportation position paper masterplan include:

- national, provincial and local roads
- rail freight
- road and rail public transport services
- materials handling and conveyance
- future air transport requirements
- solid/hazardous waste transportation requirements

Some of the key objectives of the transport system are to:

- provide an efficient road and rail network
- adequately cater for commuters
- ensure that the needs of pedestrians are provided for
- maintain the environmental integrity of the Coega DZ
- ensure the integration of bulk services alongside transportation routes
- achieve the most economical solutions commensurate with sound engineering principles

Final transportation planning is not yet complete, but the items which are planned for or may be constructed for the Core Development Area include:

- iron ore and manganese will be railed from the Northern Cape to the bulk mineral storage area, and from this storage area the ore will be transported by conveyer to the quayside and local industries
- oil and petroleum products will be transported by pipeline from the quayside to the proposed tank farm east of the saltworks
- cement from PPC will be brought to the harbour by road for export
- a transport corridor alongside the southern bank of the Coega River will include a conveyer and access road (and space for a rail link)
- public transport will be provided mainly by buses and taxis. A commuter rail service is being investigated by the SA Rail Commuter Corporation
- an airport may be constructed in the future

3.5.2 WATER

Some of the key objectives of bulk water supply are to:

- provide an efficient and reliable bulk water supply to the DZ
- achieve the most economical solutions commensurate with sound engineering principles
- ensure that bulk water structures take cognisance of aesthetics and environmental requirements

An additional principle is that dual reticulation (“fresh” and recycled water) will be provided.

The work programme for the provision of water in the Core Development Area includes:

- construction of the main bulk feeder line into the DZ to enable distribution within the Core Development Area (completed)
- construction of distribution mains within the Core Development Area
- augmentation of Nooitgedagt Treatment Works
- augmentation of reservoir supply main off the Grassridge – Motherwell pipeline
- Coega Kop reservoirs
- additional work required to service the entire DZ
3.5.3 WASTEWATER AND WASTEWATER TREATMENT
Some of the key objectives of treated effluent management and sewerage management (collectively “wastewater management”) are to:

- provide an efficient and reliable treated effluent service to the DZ
- use as far as practically and economically feasible the treated effluent for recycled industrial (and irrigation) use
- ensure that treated effluent prescribed quality standards are complied with
- maintain the environmental integrity of the Coega River
- achieve the most economical solutions commensurate with sound engineering principles
- ensure that treated effluent structures take cognisance of aesthetics and environmental requirements

The work programme for the provision of wastewater facilities in the Core Development Area includes:

- investigations by PEM regarding the implementation of a scheme to produce approximately 20 ML per day of treated effluent at the Fishwater Flats Treatment Works (FFTW) for distribution to the DZ
- additional filtration works at FFTW
- pump station at FFTW
- pumping (rising) main from FFTW to the Coega DZ
- storage reservoir at the Coega DZ
- distribution mains
- additional work will be required later, e.g. construction of the Coega Treatment Works.

3.5.4 STORMWATER/FLOODING
Some of the key objectives of stormwater management are to:

- provide an efficient and reliable stormwater management system for the DZ
- ensure safety and limit the risk of loss of life during flooding
- limit damage to properties as a result of flooding and to maintain access
- maintain the environmental integrity of the Coega River and its drainage tributaries
- limit erosion and siltation
- use detention ponds to attenuate peak flows, utilising public open spaces, parks and pans where possible

The work programme for the provision of stormwater infrastructure has not been finalised but might include:

- a main open stormwater channel
- closed culverts servicing each tenant site
- stormwater detention ponds

3.5.5 ELECTRICITY
There are two scenarios for the provision of electricity to the Core Development Area, namely Eskom in combination with PEM, and private initiatives.

In the first scenario, electricity for large customers (>100 Megavolt Amps-MVA) will be supplied by Eskom from the Grassridge substation using overhead lines. Electricity for smaller customers will be provided by Port Elizabeth Municipality from Motherwell, Aloes and possibly eventually from Grassridge. The required lines, cables and substations will be constructed on demand. A number of servitudes will be registered within the Core Development Area (e.g. along the proposed haul road and N2) and these will be used wherever possible. Eskom undertakes their own EIAs for their projects.

In terms of the second scenario, electricity supply will be developed and provided by a private initiative (which will have to comply with existing environmental regulations).

3.5.6 WASTE SITE
A new (hazardous) waste site will be developed to serve the Coega DZ and the region. A number of candidate sites have been identified outside the boundaries of the DZ. A separate procedure, compliant with Minimum Requirements issued by DWAF in 1998, and an EIA - which both fall outside the scope of the Rezoning EIA - will be required to assess the proposed waste site. A consultant has been appointed to identify and licence a preferred site.
3.6 LAND ACQUISITION PROCESS

3.6.1 EXPROPRIATION/PURCHASE POLICY
It is the policy of National Government to acquire land for the DZ, in the first instance using the “willing buyer/willing seller” principle. However, since the Coega Project is of national significance, government retains the right to expropriate land in the national interest. It is also government policy to acquire all the land for the DZ at one time, rather than purchase land in phases. If the land is expropriated, then the land must be held by Government and cannot be sold freehold to developers.

3.6.2 RESETTLEMENT AND COMPENSATION POLICIES AND PLANS
A formal resettlement and compensation policy is in preparation, in consultation with key stakeholders in the Core Development Area, i.e. existing business and communities. It is likely that there will be a separate policy for each of these groupings.

As far as businesses/organisations are concerned the intention is that:
- they shall remain in the Coega DZ wherever possible and be governed by laws, guidelines, standards etc applicable in the Coega DZ
- businesses not able to comply with DZ standards shall be relocated
- existing businesses no longer able to operate within the Coega DZ owing to adverse environmental impacts or to other restricting factors, shall be relocated
- some businesses will sell their properties at market-related prices

Communities and individuals living in the Coega DZ shall be relocated and compensated, as residential land-use may be incompatible with activities planned for the Coega DZ. Individuals shall not be “worse off” after relocation than they were in the Coega DZ area, in terms of homes, lifestyle, schools, travel, medical services etc. It is intended to give a financial compensation of R3000 per family regardless of whether the family may qualify for a housing subsidy from the Provincial Housing Board or not. The precise level and form of compensation options (e.g. cash pay-out, housing subsidies, rental agreements etc) have not been finalised. Changes in social conditions will be monitored (see section 3.7.13).

A baseline survey of existing social conditions amongst communities currently in the Coega area has been undertaken, and consultation and negotiation with the community is continuing. Further surveys will also establish the criteria by which communities will be monitored to check that their conditions do not worsen. Criteria that may be monitored include:
- employment levels
- personal and household income
- health
- education
- transport and access

In addition, Coega intends to provide a job and relevant training, equivalent to a maximum of one year, to at least one person per family. Additional family members desiring jobs in the DZ will have to pass through the normal selection process.

Two assumptions regarding compensation have been made. Firstly that no more than 300 family households are present in the Core Development Area. Secondly that political organisations and statutory local government bodies shall assist the CDC or its successor in interfacing with the labour movement in order to ensure that the intended employment can be realised in a way that does not discredit the selection processes.

It is proposed to protect and preserve graves where possible. Graves will be properly fenced and will not be tampered with. The graveyards, where possible, will be fully integrated into the land-use plan. If necessary special permission will be sought from relatives to move graves. Local authorities need to make a commitment to the affected communities to use part of the monies obtained through rates and levies through developments in the DZ to development resources and infrastructure for the communities.

3.7 ENVIRONMENTAL MANAGEMENT

3.7.1 ENVIRONMENTAL POLICY
The CDC subscribes to principles intended to guide the development in a manner that is ecologically sustainable, socially acceptable and economically viable.
Furthermore, regarding environmental management of the Coega DZ and Core Development Area, the CDC will:

- apply world-class management practices;
- ensure sustainability;
- conform to legislative and regulatory requirements;
- develop, implement and maintain an (ISO 14001) Environmental Management System;
- establish baseline data with integrity; and
- maintain an integrated monitoring system.

The Environmental Policy is the instrument by which the CDC, custodian of the DZ, states its commitment to these and other principles and establishes the framework by which the principles are turned into actions. The Environmental Policy (as at August 1999) is reproduced below:

The Coega Development Corporation aims to apply world-class environmental management practices to DZ activities, and in so doing, to become the model for similar developments throughout Africa. To achieve this aim and develop the Coega DZ in a manner that is economically, ecologically and socially acceptable and sustainable, the Coega Authority undertakes to:

1. **Ensure ongoing opportunities for public and stakeholder involvement throughout all stages of DZ development.**
2. Provide beneficial economic and employment opportunities for businesses and communities in the region.
3. As a minimum, require adherence to all legislation and government policy relevant to the development of the DZ and pertaining to the environment and to the health, safety and well-being of the public and stakeholders.
4. Establish and maintain an Environmental Management System to:
   - determine aspects of the DZ development which may significantly impact on the environment;
   - plan actions to mitigate negative impacts and enhance positive impacts;
   - set responsibilities and timelines for implementing these actions;
   - periodically audit and review progress

in order to achieve a continual improvement in the:

- environmental performance of individual tenants and the zone as a whole;
- efficient utilisation of resources such as water and waste within the network of the development;
- prevention of waste and pollution where feasible

throughout all phases of the development.

5. **Work with companies operating within the DZ and harbour to ensure appropriate environmental management of the terrestrial, nearshore and marine environments.**
6. Within the scope of our authority, prevent conditions that compromise the health and safety of people within and in the vicinity of the DZ.
7. Limit potentially detrimental effects of the DZ development, including:
   - economic loss or disruption to communities due to establishment of activities within the DZ
   - nuisance due to noise or odours
   - visual impact due to structures or activities associated with the DZ
8. **Maintain environmental integrity and protect those species within the DZ that are:**
   - found in the Red Data List of endangered species
   - deemed conservation-worthy by the relevant authority
9. **Follow a phased planning and development approach, and integrate planning of the DZ with that of the Port Elizabeth-Uitenhage-Dispatch region.**

This policy will be reviewed on an annual basis, and is available to any interested party on request.

**3.7.2 ENVIRONMENTAL MANAGEMENT SYSTEM**
The Environmental Management System (EMS) for the Coega DZ is the overarching instrument by which the CDC intends to ensure that those activities which can either have a significant beneficial or detrimental effect on the environment are properly managed (see Figure 3.7). The EMS has been developed in accordance with the requirements of the internationally recognised standard for environmental management, ISO 14001.
Scope
The EMS encompasses all activities related to the design, construction and operation of the DZ and which occur within the boundary of the proposed DZ, excluding port or marine-related operational activities that fall under the responsibility of Portnet. However, due to the interdependence of the DZ and harbour, some activities within the realm of Portnet control will be given management priority within the CDC EMS, since the CDC is able to exert some influence on these matters. These include, for example, preventing alien (species) encroachment into the St. Croix Island group, and maximising economic benefits due to export activities within the port.

Figure 3.7 Aspects of the EMS designed to ensure that activities, which can either have a significant beneficial or detrimental effect on the environment, are properly managed

Roles and responsibilities
The key role-players in the Coega EMS are:

- the CDC
- Concessionaires and Tenants (see sections 3.3.2 and 3.3.3)
- the Ngqura Environmental Committee (NEC)

(i) CDC
The CDC is the body responsible for management of the DZ and related activities. As such, the CDC provides the framework for activities within the zone, co-ordinates development, provides resources and ultimately carries some accountability for the consequent outcomes, be they beneficial or detrimental. The CDC is the custodian of and driving force behind the EMS, and has appointed an Environmental Manager to ensure the effective implementation of the EMS. The CDC’s primary task is to provide an enabling environment for investment. This is mainly an administrative function, but it also includes activities such as:
• installation and maintenance of infrastructure (e.g. roads, rail links, telecommunications);
• maintenance of common areas.

The entire spectrum of activities within the DZ has been considered in the development of the EMS. Key activities which can be detrimental to the environment have been identified, and the CDC has set environmental objectives and performance targets in consideration of these key activities. These objectives and targets will establish a framework for all activities within the DZ, both for the CDC as well as for tenants and concessionaires. The CDC will assess and regularly report on environmental performance against these performance targets, and act in order to rectify breaches of these targets.

(ii) Tenants and Concessionaires

Whereas the activities of the CDC are primarily administrative in nature, those of tenants and concessionaires are not. Following the installation of basic infrastructure, tenant activities will comprise the bulk of subsequent activities, and therefore require appropriate management to prevent undue detrimental impact on the environment. Tenants must retain first-line responsibility for these environmental management actions, and may choose to employ their own EMS for this purpose. Over and above these first-line actions, the CDC will be able to transfer requirements of its overarching EMS onto specific tenants via a contractual agreement (see below).

(iii) Ngqura Environmental Committee (NEC)

A third key role-player in the EMS is a committee representing governmental departments (at all levels) which have a stake in the environmental management of the zone. This committee, the Ngqura Environmental Committee (NEC), fulfils a triple role within the EMS, namely:

• acting as an ‘independent watchdog’ over the activities of the CDC, and regularly reviewing the environmental performance of both the CDC and other activities within the DZ;
• for those members of the NEC who represent departments with a specific jurisdiction over activities (e.g. Department of Water Affairs and Forestry, Department of Environmental Affairs and Tourism), initiating when necessary any enforcement actions with respect to breaches of legal requirements;
• providing a streamlined mechanism for decision making with respect to incoming activities proposed for the zone. This decision-making process is guided by the Tenant Approval Procedure (see section 3.7.4).

Relationships between the various role-players

In terms of concessionaires and tenants within the zone, the EMS is based on the premise that their relationship with the CDC is analogous to a tenant/landlord relationship. In simple terms the CDC (the landlord) screens prospective tenants (using the Tenant Approval Procedure, see section 3.7.4), and upon acceptance, enters into a contractual agreement with the tenant. This agreement contains the conditions under which the tenant may legally conduct operations within the zone, and these conditions may include, for example, stipulations on environmental performance or conformance with specific requirements outlined in EMS documentation. Conditions which the CDC wishes to impose on the tenant which are over and above existing legal requirements (e.g. if water discharge is to conform to a level more stringent than the General Standard) must explicitly form part of this contract. Contracts will include a provision for duly authorised representatives of the CDC to enter the premises of the tenant for the purpose of verifying compliance with the terms of the contract. Thus the CDC will fulfil a role similar to that of a local authority.

In terms of the various government departments (as represented by membership on the NEC), the EMS is based on the premise that routine interactions of these departments with specific tenants and concessionaires will be on an indirect basis, through the CDC. In this non-traditional, indirect model, the primary onus and responsibility for routine management and monitoring of tenant and concessionaire activities shifts away from the relevant department toward the CDC. The CDC is thus empowered to establish minimum criteria for environmental performance, as well as facilitate the resolution of problems should non-conformance with these performance targets occur. However, in compliance with current South African legislation, the minimum acceptable level of environmental performance for the DZ will meet or improve upon the current requirements of the relevant authorities, and these departments will retain their legislated responsibilities in terms of:

• granting permits or authorisations in terms of various environmental management legislation (e.g. Environmental Conservation Act, Atmospheric Pollution Prevention Act)

---

7 For the purpose of this part of the discussion, the word ‘tenant’ is used to include both tenants and concessionaires. Concessionaires are essentially tenants who lease land and/or subcontract activities in the DZ to other tenants.
• enforcing the legal requirements as stipulated in any legislation or authorisations under their jurisdiction, including conditions contained in any such authorisations.

**EMS mechanisms for environmental control in the DZ**

Within the scope outlined above, a comprehensive set of CDC activities with the potential to cause environmental impacts has been identified. The potential environmental aspects and associated impacts for each activity has been noted, and the relative importance of these environmental aspects and impacts rated according to criteria agreed by both the CDC and NEC. The resulting set of significant aspects and impacts forms the basis for the CDC environmental objectives contained in the environmental policy (see section 3.7.1), as well as specific performance indicators and targets (see section 3.7.3). The significant aspects and impacts also form the basis for determination of control and monitoring measures which form the core of any environmental management system. The control measures are discussed in detail later in this section. Table 3.7 below contains examples of some key activities, their associated environmental aspects and potential impacts, and the EMS control measures that have been established in order to manage the environmental aspects.

**Table 3.7a Examples of activities, some environmental aspects and related control measures**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Environmental Aspects</th>
<th>Possible Environmental Impacts</th>
<th>Control Measure</th>
</tr>
</thead>
</table>
| Operation of industry or commerce within tenant or concessionaire areas | • selection and siting of activities  
• emissions to air, water | • cumulative impacts  
• degradation of air and water quality | Tenant Approval procedure (& associated guidelines) |
| Design of infrastructure and operations within DZ | • decisions regarding the nature and location of structures  
• visual impacts  
• effects on traffic  
• noise | | Environmental Design Manual  
Environmental Guidelines |
| Construction activities within the DZ | • Operation of earthmoving equipment  
• Establishment of construction sites  
• employment  
• noise  
• degradation of water quality  
• disturbance to conservation-worthy species | | EMP for Construction |
| Maintenance of open spaces | • Type of plant species used (indigenous vs. non-indigenous)  
• Labour requirements  
• water consumption  
• encroachment of alien species  
• employment | | Open Space management plan  
Environmental Guidelines |

**3.7.3 ENVIRONMENTAL TARGETS**

Environmental targets for the Coega DZ have been formulated as part of the development of the EMS. The CDC has set targets, the proposed indicators of which will be measured are available, although they have not yet been approved. The indicators are presented here as an indication of the comprehensive suite of factors that will be monitored to ensure effective environmental management within the DZ.

(A) **COMMUNICATION INDICATORS**
1. Number of communications to public per year
2. Number of communications from the public per year
3. Incorporation of communications into decision making

(B) **ECONOMIC AND EMPLOYMENT INDICATORS**
1. Capital investment per year within the DZ
2. Number of business registrations per year
3. Foreign exchange generated per year by companies in the DZ
4. Number of people employed in companies in DZ

(C) **COMPLIANCE WITH GOVERNMENT LEGISLATION & POLICY: INDICATORS**
1. Number of incidents of non-compliance with relevant legislation per year
2. Adherence to government policy
3. Number of public nuisance complaints per month

(D) **EMS INDICATORS**
1. Progress towards implementation of EMS
2. Number of non-conformances in the EMS
(E) INTEGRATED PLANNING INDICATORS
1. Progress towards an integrated plan

(F) TENANT INDICATORS
1. Ambient air quality
   - Number of exceedances of ambient air quality targets
   - SO\textsubscript{2} ground level concentrations (µg/m\textsuperscript{3})
   - Particulate matter (PM10 and TSP) ground level concentrations µg/m\textsuperscript{3}
   - Carbon monoxide
   - Particulate lead
   - Nitrous oxide
   - Ozone

2. Water quality and quantity
   - pH
   - Electrical conductivity
   - Chemical oxygen demand (COD)

3. Groundwater quality
   - pH
   - Electrical conductivity
   - COD

4. Land: waste
   - Tons of hazardous waste generated per annum
   - Volume of waste disposed per annum

5. Flora and fauna
   - Adherence to landscaping practices
   - Total open space area

6. Marine Water quality
   - Contaminants in sediments
   - Bio indicator species
   - Water column chemistry
   - Number of breeding pairs Roseate terns

(G) LIMIT DETRIMENTAL EFFECTS: INDICATORS
1. Increase in informal settlements in DZ per year
2. Displacement of communities (welfare indicators - used in social study)

(H) HEALTH AND SAFETY INDICATORS
1. Lost time (or disabling) injury rate
2. Number of lost time injuries
3. Occupational health-related diseases in workers in DZ
4. Traffic accidents

(I) MAINTAIN ECOLOGICAL INTEGRITY & CONSERVE RARE SPECIES: INDICATORS
1. Change in species habitat
   - Total open space area in ha

2. Species richness
   - Sustainability of butterfly population
   - Sustainability of Coega Kop flora
   - Sustainability of Roseate terns on the islands
   - % cover of alien plant species in open space areas

3.7.4 TENANT APPROVAL PROCEDURE
The Tenant Approval Procedure (TAP) is presently being developed to help the CDC screen tenants and to assist prospective tenants within the Coega DZ to meet requirements to comply with South African environmental legislation and current best practice. The TAP aims to:

- assist the applicant with the identification of permit requirements associated with proposed activities in accordance with the relevant environmental legislation.
- assist the applicant by streamlining the process for applying for the necessary permits.
Coastal & Environmental Services

Coega Rezoning EIA: Chapter Two

- communicate to the applicant the environmental requirements (emission levels etc.) according to the environmental legislation and the CDC's requirements.
- identify key aspects of the applicant’s proposed activities that require further assessment or further information to enable a decision to be made by the decision-making authorities.
- collect information required by the CDC to facilitate the effective environmental management of the CDZ e.g. to assist in the long term planning of the CDZ, emergency response and the provision of environmental services to tenants.
- assist the CDC and relevant authorities to assess the desirability of accepting proposed activities in the Coega DZ.

Prospective tenants are required to fill in a detailed form designed (in part) to ascertain potential environmental issues. The form focuses on:

- nature of the activity
- proposed timing (planning, construction, commission, operation, decommission, closure)
- employment potential
- land requirements: site location and size
- activities listed in the EIA regulations
- emissions and odours
- hazardous materials
- noise

There is also a separate technical component of the TAP concerned with infrastructure requirements. It is possible that certain proposed tenants will not be admitted to the Coega DZ, although the main objective of the TAP is to assist prospective tenants.

3.7.5 EIA’S/SCOPING
Activities identified in Government Notice No. R. 1182 of 5 September 1997 under Section 21 (1) of the Environment Conservation Act, No 73 of 1989, require a Scoping Study and/or Environmental Impact Assessment (EIA). No identified activities are permitted in the Coega DZ unless approved by the relevant authority - usually the Department of Economic Affairs, Environment and Tourism (DEAE&T) in the Eastern Cape.

It is expected that a number of tenants wishing to locate in the DZ will undertake activities which invoke the EIA regulations. Scoping studies/EIAs can be time-consuming exercises, but it is likely that Scoping Reports/ EIAs for activities in the Coega DZ will be expedited by existing baseline information about the Coega area. Furthermore, it is proposed that a protocol will be developed and agreed with DEAE&T, to allow for a streamlined procedure. This protocol will be based on the TAP and other guidelines, and will highlight areas of non-compliance. However, tenants locating in the DZ will not be exempted from the EIA regulations.

3.7.6 ENVIRONMENTAL DESIGN MANUAL
An Environmental Design Manual is intended as a guide to the Coega Implementing Authority (IA), tenants, developers, consulting engineers, architects, contractors and other parties likely to invest in or assist with the development of the Coega DZ. These environmental guidelines are intended as an addendum to the guidelines that typically apply in the engineering, architectural, construction, landscaping and other relevant professions. They do not replace the (technical) guidelines that are used as standard industry practice in most professions. The purpose of these guidelines is to provide a reference source of guidelines to assist professionals working in the DZ to perform their work with due regard for environmental issues.

The guidelines are presented to reflect the anticipated phasing of development within the DZ, and are as follows:

- Planning and Zoning Guidelines.
- Infrastructure Guidelines.
- Building / Architectural Guidelines.
- Landscaping Guidelines.

A copy of the Environmental Design Manual is included in Appendix B.

3.7.7 EMPS FOR CONSTRUCTION
The Construction Environmental Management Procedure (EMP) incorporates specifications to minimise negative environmental impacts and enhance the positive environmental impacts during the construction work within the CDZ. The EMP is intended for dissemination by the CDC to approved concessionaires/tenants or
persons responsible for the infrastructure works who shall ensure that it is included in the Tender Document(s) issued to the prospective contractors. The contractors shall incorporate the requirements of the EMP in their submissions to the concessionaires/tenants. A copy of the EMP is included in Appendix C.

The EMP incorporates specifications designed to limit impacts associated with the following activities/facilities:

- demarcation of environmentally sensitive areas
- location of camp and depot
- demarcation of the site
- access to beach
- toilets
- domestic waste water
- refuse
- protection of the fauna and flora
- defacement of natural features
- protection of archaeological and palaeontological sites
- effluent and stormwater management
- dust control
- noise control
- materials use, handling, storage and transport
- emergency procedures
- social issues
- site clearance
- site rehabilitation

The EMP includes a system for internal and external monitoring of the implementation of the EMP and for corrective action.

3.7.8 ENVIRONMENTAL GUIDELINES

Environment guidelines (and principles) have been formalised for air pollution and noise and are presented here:

**Air Pollution Guidelines**

Key guidelines to manage air pollution within the Coega DZ include:

- initially no industry may use a disproportionate amount of the total maximum capacity of the atmosphere
- visible plumes are to be disallowed
- create a 1 000m buffer zone around heavy industry in which no residential development occurs
- all material stores must be fully enclosed or surrounded by at least three retaining walls opening away from prevailing winds
- industries must initiate monitoring programmes for their specific concerns at least three months before commissioning
- expand list of substances subject to mandatory limit values to include lead, nitrogen oxides and ozone
- compliance with air quality guidelines presented in Table 3.7b below.

**Table 3.7b: Air quality guidelines recommended for the Coega DZ**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Averaging Period</th>
<th>Source of air quality guidelines or standards</th>
<th>Guidelines (µg/m$^3$)</th>
<th>Initial guidelines: 50% of limit value (µg/m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSP</td>
<td>24 hours</td>
<td>US Secondary (pre-1990) NAAQS</td>
<td>150 (a)</td>
<td>75</td>
</tr>
<tr>
<td>TSP</td>
<td>Annual average</td>
<td>US Secondary (pre-1990) NAAQS</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>PM10</td>
<td>24 hours</td>
<td>US Primary NAAQS</td>
<td>150 (a)</td>
<td>75</td>
</tr>
<tr>
<td>PM10</td>
<td>Annual average</td>
<td>US Primary NAAQS</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>SO$\text{2}$</td>
<td>24 hours</td>
<td>EU Standard</td>
<td>250</td>
<td>125</td>
</tr>
<tr>
<td>SO$\text{2}$</td>
<td>Monthly average</td>
<td>DEAT Guideline</td>
<td>130</td>
<td>65</td>
</tr>
<tr>
<td>SO$\text{2}$</td>
<td>Annual average</td>
<td>WHO Guideline</td>
<td>60</td>
<td>30</td>
</tr>
</tbody>
</table>

TSP: Total suspended particulate concentrators
PM10: Particulate matter with the aerodynamic diameter less than 10µg/m$^3$ which represents particles of a size that would be deposited in and damaging to the airways of lower alveoli.
NAAQS: National Ambient Air Quality Standards
(a): Value not to be exceeded more than once per year
Compliance with these guidelines will be monitored by the proposed air monitoring programme. A procedure is currently being developed to allocate pollution loads to certain areas of the DZ. A dynamic model will be used to screen each prospective tenant in terms of their predicted air pollution impacts against the recommended guidelines.

Noise Guidelines
Key guidelines to manage noise within the Coega DZ include:

- any noise from a source, or a combination of sources, measured in accordance with the SABS 0103, must not cause a rating of level of ambient noise, measured on the boundary, to exceed the maximum permissible rating level for the zone
- a noise impact investigation for certain activities will be necessary in certain circumstances, as indicated in the noise impact procedure (Jongens Keet Associates 1999b)
- aim for a “zero dB” increase in ambient noise level
- buffer zones should be established around zones with large in-zone noise levels
- noise emitted from a source should not exceed the maximum permissible rating levels of outdoor noise for land-uses within and surrounding Coega, as indicated in Table 3.7c.

<table>
<thead>
<tr>
<th>ZONE</th>
<th>MAXIMUM L_a (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
</tr>
<tr>
<td>Industry</td>
<td>70</td>
</tr>
<tr>
<td>Business; commercial</td>
<td>65</td>
</tr>
<tr>
<td>Residential; education institute; hospital</td>
<td>55</td>
</tr>
<tr>
<td>Rural; recreational</td>
<td>45</td>
</tr>
<tr>
<td>Nature reserve</td>
<td>35</td>
</tr>
</tbody>
</table>

3.7.9 STAKEHOLDER COMMUNICATION
Thus far, most communication with the public around environmental (and other) issues about the Coega Project has been through various public participation programmes designed for the SEA and other EIAs (e.g. Billiton zinc refinery) during 1997 and 1998. In addition, the formation of a stakeholder committee representing a number of organs of government has kept the authorities informed of developments at Coega.

In order to engage proactively with the broader public and I&APs, the Coega IA is developing a communications strategy which will:

- determine the discreet target audiences for communication in terms of geographic spread, appropriate communications medium, and society
- outline the core messages (including environmental) to be communicated to target audiences
- develop a programme of communication

As regards environmental information, it is proposed that a regular newsletter be distributed to I&APs. This strategy is in its formative stages and will be revised regularly to respond to the demands of the target audience.

3.7.10 OPEN SPACE MANAGEMENT PLAN
A proportion of the DZ will be retained as Open Space. The boundaries of the designated Open Space were determined during the SEA and confirmed for the Core Development Area in a subsequent site verification exercise in 1997 and 1998. Open Space boundaries were delineated, taking the following factors into consideration:

- vegetation
- rare and endangered species
- slopes
- aesthetics
- traffic
- dust
- noise
- proximity to sensitive features, e.g. wetlands
- Coega fault exclusion zone
- social impacts, e.g. community disruption
Open Space will have to be managed. At this stage it is premature to commence management of this Open Space, but Terms of Reference (ToR) have been prepared for this task. Elements of these ToR are reproduced here to indicate how these spaces will be managed.

The purpose of the Open Space Management Plan (OSMP) is to formulate a plan for the management of the already-identified open space and other non-developable areas – notably servitudes - within the Coega DZ. These spaces have been defined in the Development Framework Plan (DFP) for the Coega DZ, although it should be noted that precise boundaries will be determined during the development of the OSMP. It is probable that there will also be smaller “islands” of open space within the industrial clusters identified in the DFP, the management of which will also need to be incorporated into the OSMP. The OSMP should also link with other plans governing land-use surrounding the DZ.

The OSMP should comprise baseline information, management goals and principles, appropriate guidelines/manual, and the institutional arrangements required to implement and manage the plan, including organisational structures, responsibilities and timing.

In order to formulate the OSMP, the ToR are to:

1. compile appropriate baseline information about the Coega DZ (a desktop exercise gleaned from discussion with the relevant authorities and from information already produced for the Coega Development).
2. confirm open space boundaries
3. note any species, habitats or other areas of special conservation significance (ex previous studies)
4. formulate appropriate uses for these spaces, e.g. recreation, conservation, education, cultural, urban, agriculture and ecological services (e.g. stormwater attenuation etc) and outline steps required (legislation) to formalise land use
5. identify specific activities which are excluded in open spaces
6. identify any existing settlements in open spaces and formulate proposals for the retention and/or removal of settlements based on the results of the social studies currently being undertaken.
7. formulate guidelines for the management of open spaces, e.g. removal of alien vegetation, urban agriculture, fire management, etc. This should include interim plans for areas designated for other (industrial use) but not yet utilised – the phased development approach means that some areas may not be developed for 10 years or longer
8. formulate proposals for access to open spaces, including any areas which may need to be secured
9. consider the viability of establishing a central nursery as a repository of endemic plants removed from construction sites (for use in rehabilitation or elsewhere in the DZ)
10. formulate guidelines for managing the interface between the DZ open spaces and the surrounding area, especially links with the PE Metropolitan Open space System (MOSS) and the proposed Addo-Groendal corridor
11. formulate guidelines for managing the interface between the DZ open spaces and the marine environment (Algoa Bay) and the interface between the OSMP and proposed Algoa Bay Management Plan
12. undertake appropriate public participation with IAPs and/or consultation with the Stakeholder Committee
13. formulate methods for community involvement with regard to the management and utilisation of open space
14. formulate an appropriate management structure for the implementation and ongoing management of the OSMP. Where responsibilities are allocated to various authorities, such authorities must be consulted and must have agreed to these new responsibilities, i.e. the OSMP must be workable.

The OSMP will be commissioned once the formal go-ahead for the rezoning of the Core Development Area has been given.

3.7.11 ALGOA BAY MANAGEMENT PLAN

The Ngqura harbour may alter the nature of marine activities in Algoa Bay, especially in areas nearer the harbour. A plan is required to manage activities in Algoa Bay, by consolidating existing plans and, where necessary, formulating new plans and activity guidelines. This plan is in preparation and will probably be finished in early 2000. Elements of the ToR for this plan are reproduced here to indicate how the bay will be managed.

The purpose of the Algoa Bay Management Plan (ABMP) is to formulate a plan for the management of the marine environment in Algoa Bay, extending from Cape Recife in the south to Woody Cape in the north, including the islands in the Bay. The terrestrial limit of the ABMP is the Spring High Water mark. The ABMP should focus on the interface with the proposed Ngqura (ex “Coega”) Harbour and associated shipping activities, and shipping activities associated with the existing Port Elizabeth harbour, and other activities in Algoa Bay. The ABMP should comprise baseline information, a marine–use map/chart, appropriate guidelines/manual, and the
institutional arrangements required to implement and manage the plan, including organisational structures, responsibilities and timing.

In order to formulate the ABMP the ToR are to:

1. compile existing baseline information about Algoa Bay (a desktop exercise gleaned from discussion with relevant authorities and from information produced for the Coega IDZ SEA and Harbour EIA and other appropriate sources)
2. delineate shipping exclusion zones, in conjunction with Portnet, the environmental authorities and WPR
3. review and/or modify and incorporate guidelines from the Port EIA Update into the ABMP. These guidelines include:
   - guidelines for reducing the impacts of small craft and ships, including release of ballast water
   - guidelines for maintenance dredging operations from PE and Ngqura harbours
   - contingency plans to manage (collect, transport, clean etc) oiled seabirds
   - identifying facilities for a seabird (and small sea mammal) treatment centre - a new centre as envisaged in the SEA is unlikely, although ENGGEN is investigating alternatives as part of their social responsibility programme
   - the management of the treatment centre
   - a proposed seabird monitoring modus operandi in the event of a pollution incident
   - rat control measures for ships (mainly to prevent rats reaching Jahleel Island)
   - guidelines linking back to potential water pollution (stormwater, effluent, groundwater, etc.) from the DZ (This might mean identifying beneficial uses in the marine environment and formulating standards/activity guidelines on that basis)
   - In some instances new guidelines may need to be formulated (especially for areas some distance from Ngqura port)
4. prepare guidelines and a plan for the establishment of a marine sanctuary, if appropriate
5. incorporate and/or formulate guidelines to manage the marine environment in Algoa Bay, and where appropriate show the links to and/or recommend use zones such as recreation (e.g. fishing, swimming, diving, sailing etc), education, tourism, shipping, fishing, conservation, exclusion zones etc.
6. incorporate and/or suggest guidelines to manage the marine/terrestrial interface for the entire Algoa Bay coastline (Spring High Water Mark), including the interface with the proposed Ngqura port (see next point)
7. formulate guidelines which will allow for linkages between the marine environment and the DZ, particularly the open spaces and links with the proposed Coega DZ Open Space Management Plan. Indicate, where appropriate, guidelines to manage these linkages
8. ensure that the ABMP is consistent with Coastal Zone Management Policy: Draft White Paper
9. ensure that the ABMP links with other policies and plans for Algoa Bay and the surrounding coastline, e.g. existing oil spill emergency plans for PE and Dias region
10. link the ABMP to conservation plans for islands in Algoa Bay, including control of island visits if appropriate
11. undertake appropriate public participation with IAPs and/or consultation with the Stakeholder Committee
12. Suggest an appropriate management structure for the implementation and ongoing management and monitoring (including reporting requirements) of the ABMP. Where responsibilities are suggested for various authorities, such authorities must be consulted i.e. the ABMP must be workable
13. recommend appropriate indicators to assess pollution in Algoa Bay

3.7.12 MARINE RISK ASSESSMENT AND MANAGEMENT

It is probable that marine risks will increase once construction of the Ngqura port commences, continuing through into the operational phase. Portnet will assess these risks once approval for the project has been received (Portnet letter, 19 May 1999). The approach to risk management will be as follows:

- a hydrodynamic model will be commissioned once a decision to construct the port at Coega is taken
- a risk assessment will be completed once more quantitative information about shipping operations becomes available, and before operation of the port commences
- an oil spill contingency plan will be completed once more quantitative information about port operations is available and the relevant risk assessment has been undertaken. This plan will also be completed and implemented before operation of the port commences

3.7.13 MONITORING AND REVIEW

The traditional approach to environmental management in South Africa is the regulation of environmental performance through legislation, policed by the appropriate authorities. In contrast, an EMS is a self-regulating systems in which the organisation sets its own performance targets (which, as a minimum, must comply with
local legislation) and monitors its own performance. As a result, an important component of the EMS is regular monitoring and review of environmental performance in order to identify non-conformance and direct corrective and preventive action.

In the DZ, the following key environmental issues will be monitored:

- air quality, through a comprehensive real-time monitoring programme
- surface water, groundwater and nearshore seawater quality, through a water monitoring programme
- water use
- volumes of solid waste produced
- changes in social conditions
- economic and employment impacts
- flora and fauna

There will be annual public report-backs on (monitored) environmental performance against targets. In addition, regular internal and external reviews will be conducted to ensure that the EMS is being effectively implemented. Furthermore the EMS will be the subject of regular management review, where the CDC will evaluate the performance of the EMS and make appropriate revisions (to targets) in order to ensure continuous improvement.

3.8 EMPLOYMENT AND REVENUE/COSTS

3.8.1 EMPLOYMENT

There are no accurate investment and employment figures for the Core Development Area, mainly because the precise tenant mix cannot be known now. However, in 1997 a Cost Benefit Analysis (CBA) was undertaken, focusing on “Phase 1” of the Coega DZ. This is an area considerably smaller in size than the Core Development Area. The figures presented below are based on the CBA and should be treated with caution, and viewed as indicators of the magnitude of investment and job creation only. The estimated number of direct and indirect jobs is presented in the table below.

Table 3.8: Estimate of Jobs Created by “Phase 1” of the Coega DZ

<table>
<thead>
<tr>
<th>Number of Jobs</th>
<th>Temporary</th>
<th>Permanent</th>
</tr>
</thead>
<tbody>
<tr>
<td>E Cape</td>
<td>11 555</td>
<td>3 200</td>
</tr>
<tr>
<td>Rest of SA</td>
<td>14 370</td>
<td>11 070</td>
</tr>
<tr>
<td>Total</td>
<td>25 925</td>
<td>14 270</td>
</tr>
</tbody>
</table>

Coega DZ and Port Feasibility Study Investment Appraisal. June 1997

3.8.2 REVENUE AND COSTS

The cost for Phase 1 of the IDZ in 1997 was estimated at R500m for basic infrastructure, which included R90m for environment and social measures. Phase 2 was estimated to cost R477 m. However, the cost of the Core Development Area, which is considerably bigger than Phase 1 of 1997, will be more than Phase 1 and 2. The acquisition of land alone will cost approximately R50m.

The total increase in GDP (from Phase 1) in the first eight years of the project (including construction and operational income) amounts to R17.6 billion, with Gross Geographic Product increases over the same period amounting to R7.3 billion. Total annual tax revenue is estimated to be R654 million by 2005, comprising company tax (R77m), personal income tax (R126m) and VAT (R451m).
4. DESCRIPTION OF THE TERRESTRIAL ENVIRONMENT

4.1 INTRODUCTION

The terrestrial environment includes both the biotic (living) and abiotic (non-living) resources found on land. Both biotic and abiotic factors contribute to and form essential parts of the larger terrestrial ecosystem (CSIR 1997). This chapter gives a description of the biotic components of the terrestrial ecosystem, that is the fauna and flora that are found in the proposed Coega DZ, as well as the abiotic components including groundwater, geology, climate, soils, air quality and noise.

4.2 CLIMATE

The climate of the Eastern Cape is complex, as the region lies at the confluence of several climatic regimes, the most important of which are temperate and subtropical. There are thus many variations in temperature, rainfall and wind patterns that occur in the Eastern Cape, largely as a result of movements of air masses, altitude, mountain orientation and distance from the Indian Ocean (Stone 1988).

4.2.1 TEMPERATURE

Exceptionally high temperatures may be experienced during berg wind conditions, which occur frequently during the winter, with maxima well over 30°C not being uncommon. Extreme temperatures also occur during summer, with little accompanying wind. Areas closer to the coast experience cooling due to onshore sea breezes (Burger and Scorgie 1998). The average maximum and minimum temperatures for Port Elizabeth are shown in Table 4.2a.

Table 4.2a Average monthly temperatures (°C) for Port Elizabeth (1960-1980) (Stone 1988).

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIN</td>
<td>16.3</td>
<td>16.9</td>
<td>15.8</td>
<td>12.9</td>
<td>10.1</td>
<td>7.5</td>
<td>7.3</td>
<td>8.3</td>
<td>10.1</td>
<td>12.2</td>
<td>13.6</td>
<td>15.0</td>
</tr>
<tr>
<td>MAX</td>
<td>25.4</td>
<td>25.5</td>
<td>24.6</td>
<td>22.8</td>
<td>21.9</td>
<td>20.1</td>
<td>19.5</td>
<td>19.9</td>
<td>20.1</td>
<td>20.1</td>
<td>22.4</td>
<td>24.0</td>
</tr>
</tbody>
</table>

4.2.2 RAINFALL

Algoa Bay is situated near the junction of temperate (winter rainfall) and subtropical (summer rainfall) climate regimes and experiences a warm temperate climate. The Port Elizabeth area has a bimodal rainfall pattern, with peaks in Spring and Autumn. Rainfall ranges from 400-800mm per year in the region, but the Coega area falls at the low end of the range, averaging at 400mm per year (Coetzee et al. 1996). The average monthly rainfalls for Port Elizabeth are listed in Table 4.2b (CEN 1997).

Table 4.2b Average monthly rainfall (mm) listed for Port Elizabeth (1980-1996)

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36.5</td>
<td>33.4</td>
<td>47.7</td>
<td>40.7</td>
<td>62.9</td>
<td>65.1</td>
<td>50.0</td>
<td>60.3</td>
<td>59.9</td>
<td>57.2</td>
<td>58.7</td>
<td>41.3</td>
</tr>
</tbody>
</table>

4.2.3 WIND

The Coega area is subject to strong gradient winds with a strong prevalence from the west and west-south-west (41% combined frequency) all year round, and east (15%) from October through to March. These winds occur mainly during the day, and generate a significant amount of fugitive dust (CSIR 1997). Particulate matter may be carried for considerable distances from the source before being deposited downwind along these well-defined prevailing directions (Burger and Scorgie 1998).

In addition to seasonal shifts in the wind field, diurnal variations in the wind regime occur. These diurnal variations are due to the influence of land-sea breeze circulation on the airflow of the region. Land-sea circulation arises due to the differential heating and cooling of land and water surfaces. During the day, the land is heated more rapidly than the sea, which results in a pressure gradient that generates a sea breeze (onshore wind). During the night, the land cools more quickly than the sea, which results in an offshore wind (Burger and Scorgie 1998).

The atmosphere is neutral to very stable at night, which results in the reduction in the dispersion potential. During stable or very stable conditions with light winds, surface inversions can occur trapping pollutants below the inversion. Alternatively, during conditions of neutral stability during the day, an Internal Coastal Boundary Layer may occur. The result is that whether a plume is emitted either above or below this boundary layer, stack emissions will experience enhanced fumigation towards the surface, close to the source (CSIR 1997).
4.3 GEOLOGY

The geology of the Eastern Cape coastal belt is complex, with a number of strata and rock formations of different ages being evident (CES 1998). Most of the Eastern Cape rock formations are sedimentary, with rock types such as sandstone, mudstone, limestone, conglomerate and tillite being relatively common (CEN 1997).

The metropole of Port Elizabeth is situated on Peninsula Sandstone Formation of the Table Mountain Group (a member of the Cape Super Group). This formation consists of course-grained super-mature sandstone and is relatively resistant to erosion. It forms the bedrock of Algoa Bay and emerges as outcrops in the bay as the islands of St Croix, Jahleel, Bird and Brenton, and on land as Coega Kop. The substrates between these islands are recent marine deposits. The beaches are comprised of dune and marine sands and the whole bay is unconsolidated sand with the exception of Cape Recife, Woody Cape and Cape Padrone (CEN 1997).

The geology of area of the proposed Coega DZ is characterised by coastal limestone, overlaid by calcareous sands blown onshore. The dune and marine limestone are not all of the same age. Three marine incursions and subsequent limestone deposition phases seem to have occurred, each progressively younger and at lower altitude seawards (Marker 1988).

The upper region of the Swartkops River lies in the quartzites of the Table Mountain Group, while its tributary, the Elands River, flows over Bokkeveld Group shales, a region which tends to have well-drained acid soils. Below the confluence of these two rivers, the Swartkops River flows across shales of the Uitenhage Group, which tend to be poorly drained (CEN 1997).

4.4 SOILS

In the south-eastern coastal region, sandy soils with variable depth and deep red sandy clay loams overlying limestone are common. The southern coastal belt is characterised by coastal sands, and sandy soils, lime-containing lithosols and weakly developed soils on rock. Table 4.4 lists the various soil types particular to the different areas around Algoa Bay.

<table>
<thead>
<tr>
<th>Area in Algoa Bay</th>
<th>Description of Soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Port Elizabeth</td>
<td>Weakly development lime-rich soils</td>
</tr>
<tr>
<td>Coega area &amp; proposed DZ</td>
<td>Relatively deep, red, lime-rich sandy clay loams</td>
</tr>
<tr>
<td>Alexandria dunefield</td>
<td>Coastal sands and sandy soils</td>
</tr>
</tbody>
</table>

4.5 GEOHYDROLOGY AND HYDROLOGY

4.5.1 CATCHMENT DRAINAGE

The Coega catchment is approximately 45km long, 15km wide and has a total area of about 550km². Current land-use in the catchment area is mainly agriculture with a fair amount of natural subtropical thicket vegetation. Changes in land-use from Agricultural to Special Purposes will increase the area of paved surfaces, which will result in the substantial increase in runoff, particularly in storm events. The total annual runoff will, however, not increase appreciably because the area lies within a region of high evaporation (CSIR 1997). Various authors indicate that recharge of underground aquifers in areas where Table Mountain Group rocks are exposed at the surface may be 15% of mean annual precipitation (MAP).

4.5.2 SURFACE WATER

The Coega River, which is a relatively small sand-bed river, is the most significant surface water feature associated with the proposed Coega DZ, but the possibility that there are small temporary wetland areas associated with the coastal dunes exists. Except for the estuary and associated salt works, the river is mostly located outside the proposed Core Development Area. The river is currently used by the salt works for industrial
purposes, and to a limited degree the estuarine areas are used for recreational purposes. The Coega River is regarded as a sensitive system and is vulnerable to contamination (AES 1996).

A study was undertaken in July 1999 by AES to determine the preliminary classification of the Coega River based on the classification system presented in Table 4.5a. The Coega River was divided into 4 reaches, and each section classified according to Table 4.5a. Table 4.5b provides the classification of the four reaches of the Coega River.

**Table 4.5a Classification of rivers according to present ecological state**

<table>
<thead>
<tr>
<th>Present Ecological State</th>
<th>Description of Perceived Conditions</th>
<th>Within Desired Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Unmodified, or approximates natural condition; the natural abiotic template should not be modified. The characteristics of the resource should be determined by unmodified natural disturbance regimes. There should be no human induced risks to the abiotic and biotic maintenance of the resource. The supply capacity of the resource will not be used.</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Largely natural with few modifications; only a small risk of modifying the natural abiotic template and exceeding the resource base should be allowed. Although the risk to the well-being and survival of especially intolerant biota (depending on the nature of the disturbance) at a very limited number of localities may be slightly higher than expected under natural conditions, the resilience and adaptability of biota must not be compromised. The impact of acute disturbances must be totally mitigated by the presence of sufficient refuge areas.</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Moderately modified; a moderate risk of modifying the abiotic template and exceeding the resource base may be allowed. Risks to the well being and survival of intolerant biota (depending on the nature of the disturbance) may generally be increased with some reduction of resilience and adaptability at a small number of localities. However, the impact of local and acute disturbances must at least be partly mitigated by the presence of sufficient refuge areas.</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Largely modified; large risk of modifying the abiotic template and exceeding the resource base may be allowed. Risk to the well-being and survival of intolerant biota (depending on the nature of the disturbance) may be allowed to generally increase substantially with resulting low abundance and frequency of occurrence, and a reduction of resilience and adaptability at a large number of localities. However, the associated increase in the abundance of tolerant species must not be allowed to assume pest proportions. The impact of local and acute disturbances must at least to some extent be mitigated by refuge areas.</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Seriously modified. The losses of natural habitats and basic ecosystem functions are extensive</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Critically modified. Modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat.</td>
<td></td>
</tr>
</tbody>
</table>

**Table 4.5b Classification of the four reaches of the Coega River (AES 1999)**

<table>
<thead>
<tr>
<th>Reach</th>
<th>region</th>
<th>class index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UPPER REACHES OF THE CATCHMENT. A TYPICAL EXAMPLE OF THE REACH IS AT THE BRIDGE OVER THE COEGA RIVER ON THE R75. ± 20-30M WIDE, NOT PRISTINE BUT NOT SERIOUSLY DEGRADED OR DISTURBED.</td>
<td>c</td>
</tr>
<tr>
<td>2</td>
<td>MIDDLE REACHES OF THE CATCHMENT. A TYPICAL AREA IS REFLECTED AT THE BRIDGE ON THE ROAD TO ADDO (R355). 20-30M WIDE BUT APPEARS TO BE MORE DISTURBED THAN THE UPPER REACHES.</td>
<td>c</td>
</tr>
<tr>
<td>3</td>
<td>THIS REACH INCORPORATES THE PROPOSED COEGA DZ. THE INFLUENCE OF HUMANS IS MORE EVIDENT THAN IN THE UPPER OR MIDDLE REACHES. APPEARS TO BE SLIGHTLY MORE DEGRADED THAN THE OTHER TWO AREAS.</td>
<td>d</td>
</tr>
<tr>
<td>4</td>
<td>THIS AREA IS TO THE WEST OF THE N2 HIGHWAY AND INCLUDES THE RIVER ESTUARY. THE SALTWORKS HAS HAD A MAJOR IMPACT ON THE RIVER IN THIS REACH.</td>
<td>f</td>
</tr>
</tbody>
</table>
4.5.3 Artesian system

The Coega Ridge Aquifer Unit

The southern portion of the designated DZ is underlain at depth by an artesian aquifer formed by sandstones and quartzites of the Table Mountain Group. Confining this aquifer are a succession of eastward-thickening Cretaceous formations (Uitenhage Group) up to 1200m thick near the coast. It is one of the few artesian systems in southern Africa and the only one of practical importance in the country. This artesian system is protected under the Government Proclamation No. 260 of 1957 and No. 958 of 1958.

The Coega Ridge Aquifer covers an area of approximately 525km² and receives recharge from the exposed Winterhoek Mountains to the north-west of Uitenhage. The groundwater flow is largely controlled by the west-north-west/east-south-east strike of the bedding which parallels the anticlinal fold axis and the strike of the Coega fault. In the southern portion of the Coega DZ, the regional groundwater flow direction in the Coega Ridge Compartment is modified and has a dominant north-easterly trend. The Coega Fault forms a recharge boundary rather than an impermeable boundary to the compartment (SRK 1998).

The long-term artesian yield of the Coega Ridge Aquifer is 90l/s, irrespective of the number and yield of individual groundwater abstraction points. Average borehole yield is 3l/s. Overexploitation of the aquifer has led to several periods where artesian yields and the piezometric head have dropped, which led to the regulation of drilling and abstraction (SRK 1998, 1999).

Groundwater quality in the Coega Ridge Aquifer deteriorates relatively little along the flow path from west to east and has been C14 dated at 28 000 years near Coega Kop. In general, the water is mildly acidic due to oxidation of pyrite in the Table Mountain Group and exhibits low conductivities (average 29mS/m) because of the chemically inert nature of the aquifer host rock, but is often high in iron (Fe) and manganese (Mn). The Total Dissolved Solids are in the range of 150 to 500mg/l, with sodium chloride (NaCl) being the dominant ions. Overall, the water quality can be considered as moderate to good (SRK 1999).

Sundays River and Kirkwood Formations

The relatively impermeable clays have thin discontinuous sandstone horizons that yield low sustainable volumes of poor quality water. The only exceptions are where boreholes have yielded water from sandstone units within the clays that are connected through a system of stacked channel sands to the water under pressure in the Coega Ridge Aquifer Unit below (SRK 1998).

Groundwater flow is towards the sea in the east and down dip toward the Sundays River which forms a local base level in the north-east. The gentle groundwater gradient does not imply a highly permeable formation but represents a remnant of a groundwater system that is equilibrating slowly in the absence of significant recharge.

Groundwater derived from the Cretaceous formations in the study area is characterised by NaCl. Electrical conductivities average 860mS/m and chloride is uniformly high as a result of the marine environment of deposition of the Cretaceous formations. The water tends to be very hard (brak), unpotable and is used for stock watering purposes in the area (SRK 1998).

The Alexandria Formation

The Alexandria Formation would form an ideal aquifer if it were saturated. It is likely that with the construction of large paved surfaces, stormwater runoff and downpipes, water of variable quality will be introduced into this formation (SRK 1998).

Pleistocene and recent sediments

These semi-consolidated, variably cemented and loose sediments have significant primary porosity but the low rainfall and high evaporation rates inhibit direct recharge (SRK 1998).

4.6 AMBIENT AIR QUALITY AND NOISE

4.6.1 AMBIENT AIR QUALITY

Air quality is a broad term referring to the ambient air conditions in terms of gaseous and particulate pollutants presently experienced in the area. The recent history of Port Elizabeth air quality is one of gradual improvement. Major sources of particulate matter in the central city and industrial suburbs during the 1970s and 1980s have either ceased operation or had additional control measures implemented. This improvement in air quality was driven by international pressures from parent companies on their local subsidiaries (CSIR 1997).
Based on current South African guidelines, the air quality in the Eastern Cape and the Port Elizabeth area is relatively good, with all specific indices lying between background concentrations and less than 50% of the guidelines. There are, however, presently a number of businesses in the Markman Industrial Area creating unpleasant odours. The present air quality allows for the establishment of an industrial area, and the opportunity to manage emissions in a way that strives to maintain this standard. Any major industrial development with heavy industries will alter this present air quality. South African air quality legislation is inappropriate for sustainable development and is currently in a state of change (CSIR 1997).

4.6.2 AMBIENT NOISE
Areas that are usually detrimentally affected by noise include residences, educational institutes, places of worship, offices, hospitals, parkland and recreational areas. The proposed maximum permissible rating levels are based on national and international recommendations and guidelines. Most codes of practice and legislation relating to environmental noise incorporate the desired activity and time of day as part of the process that assesses and controls noise. In South Africa, the procedures for the measurement, assessment and control of environmental noise are contained in the Noise Control Regulations of the Environmental Conservation Act 73 of 1989 and the SABS Code of Practice 0103-1997 for “The measurement and assessment of environmental noise with respect to annoyance and speech communication” (Jongens Keet Associates 1999).

Safetech (1998) took baseline noise measurements at various locations around Coega Kop. It was found that the measurements taken at Motherwell, taken between the Addo road and the start of the township’s houses, all exceeded the rating levels for urban districts, which apply in this case. Nearby noise sources contributing to the rating level were passenger vehicles and trucks using the road. The informal settlement at the Old Mission School, which is classified as a rural district has a rating level for ambient noise of 45 decibels (daytime SABS 0103: 1994) It is probable that these levels will be exceeded when haul vehicles pass the settlement.

4.7 VEGETATION AND FLORISTICS

4.7.1 VEGETATION OF THE EASTERN CAPE
The vegetation of the Eastern Cape is complex and is transitional between the Cape and subtropical floras and many taxa of diverse phytogeographical affinities reach the limits of their distribution in this region. The region is best described as a tension zone where four major biomes converge and overlap (Lubke et al. 1988). The dominant vegetation is Succulent Thicket (Spekboomveld or Valley Bushveld), a dense, spiny vegetation type unique to this region. While species in the canopy are of subtropical affinities and are generally widespread species, the succulents and geophytes that comprise the understorey and are of karroid affinities, are often localised endemics.

4.7.2. VEGETATION OF THE COEGA AREA
The vegetation types of the proposed DZ area can be broadly divided into dune vegetation and inland vegetation types.

Dune Vegetation
No natural vegetation occurs between the Port Elizabeth harbour and Brighton Beach due to extensive erosion of the coastline in that area and the subsequent construction of a dolosse barrier which extends to the Brighton pier. However, from that point onwards, sandy beaches become more evident and the coastal strip consists of mainly salt-tolerant herbaceous vegetation with no trees. A wide area of salt marsh vegetation occurs on the southern bank of the Swartkops River. Beyond the river mouth, where foredunes occur, low hummock dunes colonised by salt-tolerant pioneer species become more prominent.

Dune vegetation can be divided into five different communities, which include pioneer dune communities, dunefield communities, dune thicket communities, dune fynbos communities and alien communities. Although this vegetation has few vulnerable or endemic species, its conservation is important in terms of its unique role in stabilising dunes and creating dune habitats. Development would eliminate vegetation that plays a vital role in maintaining the stability of the dunes.

Inland Vegetation
Further north towards the Coega River, the dominant vegetation type is Mesic Succulent Thicket (Plate 4.7a), which is in an almost pristine state. Succulent thicket is extensive along the coastal region stretching inland towards Uitenhage and Addo (CEN 1997). This succulent type is an extremely dense, impenetrable thicket in the coastal areas. Dense Mesic Succulent thicket is common along the Coega estuary and is mostly found as patches inland along the Coega River. Mesic Succulent Thicket Mosaic is evident in linear bands in the DZ, which appear to indicate slight depression areas where more dense and taller-growing thicket occurs. Denser and taller thicket occurs more often in valleys and open Bontveld (Plate 4.7b) occurs on the crests or plateau’s (CSIR 1997).
The conservation status and significance of Bontveld was a matter of some debate, but is now understood better (J. Watson, pers. comm.). A study is currently underway at the Grassridge site, where a quantitative analysis of various valley thicket and Bontveld communities showed that the species composition of Bontveld was distinct from thicket. It is therefore not a remnant of thicket or a successional state, but a separate and distinct community type (J. Watson, pers. comm.). In the EIA for the proposed zinc smelter at Coega, Campbell (1996) described and mapped Bontveld as a separate community. In addition, Bontveld was found to have three times the level of endemism (18%) of other vegetation communities in the Coega DZ and was thus given a high conservation status. Its distribution in a regional context is not clear at this time, but it is currently thought to only occur in four or five places in the Eastern Cape, most of which are under threat from mining (J. Watson, pers. comm.).

More than 30 Eastern Cape endemic species are found in the proposed DZ area. The most important of these are the endangered *Orthopterum coegana* (Plate 4.7c) and *Aloe bowiea*, a small endangered grass aloe known from only a few sites in the region. Therefore, much of the vegetation of the area is of high conservation importance. However, the presence of areas of lower conservation importance, such as areas that are already impacted by agriculture, development and alien plants, means there are areas suitable for development that do not deplete or reduce the integrity of the natural vegetation (CSIR 1997).

### 4.7.3 ALIEN INVASION

Certain areas of both dune and inland vegetation is invaded by alien plant species. The most common invader species is *Acacia cyclops* (rooikrans), which was used in the past to stabilise the dunes, and presently forms large monospecific stands in areas throughout the proposed DZ. There are several other aliens present that pose a threat to the flora of this area (Coetzee et al. 1996, CSIR 1997) including *Opuntia ficus-indica* (prickly pear) and *Acacia longifolia*.

### 4.8 TERRESTRIAL FAUNA

#### 4.8.1 BIRDS

Two bird species, the Martial eagle (*Polemaetus bellicosus*) and Stanley’s bustard (*Neotis denhami*), are listed as species of special concern in terms of their Red Data Book status. The Martial eagle is listed as vulnerable. However, it is not known whether it currently occurs in the DZ. Stanley’s bustard is listed as vulnerable and is estimated that there are fewer than 100 pairs in the Eastern Cape. They use open habitats such as provided by the open grasslands with in the DZ and are frequently recorded in the area, and are reported to use the open grassland of the Bontveld habitat on the property Grassridge to the north of the DZ. There are also three species that are considered to be of conservation concern in a regional context. These are the secretary bird (*Sagittarius serpentarius*), the African marsh harrier (*Circus ranivorus*) and the Blue crane (*Anthropoides paradisea*).

The are also six species from the coastal dune habitat identified as species of conservation concern. These are the Roseate tern\(^8\) (*Sterna dougalli*), the Chestnutbanded plover\(^*\) (*Charadrius pallidus*), the Whitefronted plover\(^**\) (*Charadrius marginatus*), the African black oystercatcher\(^***\) (*Haematopus moquini*), the Damara tern\(^**\) (*Sterna balaenarum*) and the Caspian tern\(^**\) (*Hydroprogne caspia*). The Roseate and Damara terns are two of the most endangered coastal species in South Africa. The Roseate terns breed on the offshore islands, but forage in the surf zone and have been observed roosting in the dunes along the boundary of the DZ. The Damara tern breeds in coastal dunes and is threatened by habitat loss and human disturbance (CEN 1997, CSIR 1997).

#### 4.8.2 REPTILES

The Eastern Cape supports nearly a third of the reptile species recorded in southern Africa. More than half of the Eastern Cape’s endemic reptile species occur in the Algoa Bay area, giving the region a high conservation value. Within the proposed DZ site and adjacent coastal region there are 63 known species of reptile. This includes 21 snakes, 27 lizards and eight chelonians (tortoises and turtles). The majority of these are found in Mesic Succulent Thicket and riverine habitats (CSIR 1997).

The list of reptiles of special concern is very significant since it includes five endemic species (two of which may also be endangered), four endangered sea turtles, eight species listed on International Trade in Endangered Species list, one rare species and four peripheral species (Table 4.8a). More than a third of the species are described as relatively tolerant of disturbed environments, provided migration corridors of suitable habitat are maintained to link pristine habitats.

\(^8\) *Endangered, **Rare, ***Vulnerable*
### 4.8.3 AMPHIBIANS

Amphibians play an important role in ecosystems, and are sensitive indicators of environmental deterioration. They are declining globally, and there is concern that similar declines are occurring in South Africa (Branch 1994). A total of 32 species and sub-species occur in the Eastern Cape, representing almost a third of the species recorded in South Africa. However, none of the species are endemic or Red Data Book species. Four species are listed as peripheral, but none are threatened internationally (CSIR 1997). Confirmation of species diversity in the DZ is limited. However, knowledge of species identified during a number of EIA studies and from collections housed in the Port Elizabeth and Albany museums means that the likely composition of the amphibian diversity within the DZ can be reasonably estimated (Table 4.8b).

#### Table 4.8a Reptile species listed in the International Red Data Book of Reptiles and Amphibians (CEN 1997)

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>COMMON NAME</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cordylus tasmani</td>
<td>Tasman’s girdled lizard</td>
<td>Endemic *</td>
</tr>
<tr>
<td>Scelotes anguina</td>
<td>Dwarf burrowing skink</td>
<td>Endemic *</td>
</tr>
<tr>
<td>Acontias (meleagris) orientalis</td>
<td>Eastern legless skink</td>
<td>Endemic *</td>
</tr>
<tr>
<td>Tetractus (africanus) fitzsimonsi</td>
<td>FITZSIMONS’ LONGTAIRED SEPS</td>
<td>ENDEMIC/ENDANGERED D?</td>
</tr>
<tr>
<td>Bitis (comuta)albanica</td>
<td>Albany dwarf adder</td>
<td>Endemic/Endangered *</td>
</tr>
<tr>
<td>Bradypodion ventrale</td>
<td>Southern dwarf chameleon</td>
<td>CTIES Appendix II *</td>
</tr>
<tr>
<td>Cordylus cordylus</td>
<td>Cape girdled lizard</td>
<td>CTIES Appendix II *</td>
</tr>
<tr>
<td>Pseudocordylus microlepidotus</td>
<td>Cape crag lizard</td>
<td>CTIES Appendix II</td>
</tr>
<tr>
<td>Varanus niloticus</td>
<td>White-throated monitor</td>
<td>CTIES Appendix II *</td>
</tr>
<tr>
<td>Varanus albigularis</td>
<td>Nile monitor</td>
<td>CTIES Appendix II *</td>
</tr>
<tr>
<td>Geochelone pardalis</td>
<td>Leopard tortoise</td>
<td>CTIES Appendix II *</td>
</tr>
<tr>
<td>Homopus areolatus</td>
<td>Parrot-beaked tortoise</td>
<td>CTIES Appendix II *</td>
</tr>
<tr>
<td>Cherisina angulata</td>
<td>Angulate tortoise</td>
<td>CTIES Appendix II *</td>
</tr>
<tr>
<td>Dermochelys coriacea</td>
<td>Leatherback sea turtle</td>
<td>Endangered #</td>
</tr>
<tr>
<td>Chelonia mydas</td>
<td>Green sea turtle</td>
<td>Endangered #</td>
</tr>
<tr>
<td>Eremochelys imbricata</td>
<td>Hawksbill sea turtle</td>
<td>Endangered #</td>
</tr>
<tr>
<td>Caretta caretta</td>
<td>LOGGERHEAD SEA TURTLE</td>
<td>Vulnerable #</td>
</tr>
<tr>
<td>Lamprophis fuscus</td>
<td>Yellowbellied house snake</td>
<td>Rare</td>
</tr>
<tr>
<td>Mabuya varia</td>
<td>Variable skink</td>
<td>Peripheral *</td>
</tr>
<tr>
<td>Scelotes caffer</td>
<td>Cape dwarf skink</td>
<td>Peripheral</td>
</tr>
<tr>
<td>Nucras taeniolata</td>
<td>Albany sandveld lizard</td>
<td>Peripheral</td>
</tr>
<tr>
<td>Philothamnus semivariegatus</td>
<td>Spotted bush snake</td>
<td>Peripheral *</td>
</tr>
</tbody>
</table>

* Confirmed as occurring on, or within 2km, of the Coega DZ  
# International RDB status; all are considered Vulnerable in the SA RDB

#### 4.8.4 MAMMALS

Large game makes up less than 15% of the mammal species in South Africa and much less in numbers and biomass. In developed and farming areas, such as the study area, this percentage is greatly reduced, with the vast majority of mammals present being small or medium-sized. Of the 63 mammal species known or expected to occur in the Coega area, two species are endemic, the Duthie’s golden mole (*Chlorotalpa duthiae*) and the pygmy hairy-footed gerbil (*Gerbillus paeba exilis*). Both occur in the dune vegetation, which forms only a limited area of the proposed DZ. Thirteen of the 63 species are Red Data Book species (Table 4.8c), and five of these are medium to large in size, occupying relatively large ranges, and will be adversely affected by development as their ranges become restricted (CEN 1997).

#### Table 4.8b Amphibians of the Coega DZ (CES 1997b)

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>COMMON NAME</th>
<th>MST</th>
<th>RIV</th>
<th>DUNE</th>
<th>DZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xenopus laevis</td>
<td>Common platanna</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Rana angolensis</td>
<td>Common river frog</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rana fascigula</td>
<td>Cape river frog</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strigyleopus fasciata</td>
<td>Striped stream frog</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strigyleopus grayii</td>
<td>Clicking stream frog</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Tomopterna delandii</td>
<td>Cape sand frog</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Cacosternum boettgeri</td>
<td>Dainty frog</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Cacosternum nanum</td>
<td>Bronze caco</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Phrynobatrachus natalensis *</td>
<td>Natal puddle frog</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyxicephalus adspersus*</td>
<td>Bullfrog</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>Common Name</td>
<td>SSC Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>------------------------</td>
<td>------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bufo rangeri</td>
<td>Raucoous toad</td>
<td>Y Y Y Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bufo pardalis</td>
<td>Leopard toad</td>
<td>Y Y Y Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperolius marmoratus</td>
<td>Painted reed frog</td>
<td>Y Y Y Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperolius semidiscus</td>
<td>Yellow-striped reed frog</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kassina senegalensis</td>
<td>Bubbling kassina</td>
<td>Y Y Y Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semnodactylus wealii</td>
<td>Rattling kassina</td>
<td>Y Y Y Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brevicope adspersus pantheri</td>
<td>Penther’s rain frog</td>
<td>Y Y Y Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td></td>
<td>17 14 13 3 13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>76.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Peripheral species. MST = Mesic Succulent Thicket. Riv = Riverine habitat. Dune = Dune habitat. DZ = Development zone

**Table 4.8c Red Data Book mammal species known or expected to occur in the Coega area (CES 1997b)**

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
<th>SSC Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Felis lybica</td>
<td>African wild cat</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Orycteropus afer</td>
<td>Aardvark</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Mellivora capensis</td>
<td>Honey badger</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Mystromys albicaudatus</td>
<td>White-tailed rat</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Cephalophus monticola</td>
<td>Blue duiker</td>
<td>Rare</td>
</tr>
<tr>
<td>Atelerix frontalis</td>
<td>African hedgehog</td>
<td>Rare</td>
</tr>
<tr>
<td>Proteles cristatus</td>
<td>Aardwolf</td>
<td>Rare</td>
</tr>
<tr>
<td>Poecilogale albinucha</td>
<td>Striped weasel</td>
<td>Rare</td>
</tr>
<tr>
<td>Graphiurus ocularis</td>
<td>Speckled dormouse</td>
<td>Rare</td>
</tr>
<tr>
<td>Chlorotolpa duthiae</td>
<td>Duthie’s golden mole</td>
<td>Indeterminate</td>
</tr>
<tr>
<td>Pipistrellus kuhlii</td>
<td>Kuhl’s pipistrelle</td>
<td>Indeterminate</td>
</tr>
<tr>
<td>Dasymys incomtus</td>
<td>Water rat</td>
<td>Indeterminate</td>
</tr>
<tr>
<td>Suncus infinitesimus</td>
<td>Least dwarf shrew</td>
<td>Indeterminate</td>
</tr>
</tbody>
</table>

### 4.8.5 TERRESTRIAL INVERTEBRATES

The invertebrate fauna of the coastal dunefields of Algoa Bay and its associated vegetation has not been extensively studied. The distribution of the terrestrial invertebrates found along the coast is dependent to a large degree upon the extent and composition of the natural vegetation (Gess & Gess 1988). One grasshopper species, *Acrotylos hirtus*, is endemic to the dunefields. There is one butterfly, *Lepidochrysops bacchus*, which is known from a number of scattered localities in the Western Cape, as well as from four localities in the Eastern Cape (one of which is in the Coega DZ). It is listed as rare, along with *Aloeides clarki* and *Poeciliimitis pyroes hersaleki*, in the Red Data Book for Butterflies. *Aloeides clarki* is endemic to this particular region of the Eastern Cape, and is currently known to occur in four localities (three of these localities are in the Coega region (CES 1998)). The localities of *Lepidochrysops bacchus* and *Aloeides clarki* have been mapped with regard to the proposed Coega DZ, and their distributions were taken into account when defining the open space system (CES 1998).

### 4.9 SUMMARY

Much of the vegetation of the area is of high conservation importance. However, the presence of areas of lower conservation importance, such as areas that are already impacted on by development, agriculture and alien vegetation, means that there are areas suitable for development that do not deplete or reduce the integrity of the natural vegetation. These areas could generally be developed without major implications for the conservation status of the flora. The constraint imposed by the need for viable plant and animal populations, as areas must be sufficiently large for populations to be properly conserved, has been considered in the proposed open space system.
5. DESCRIPTION OF THE COASTAL ENVIRONMENT

5.1 INTRODUCTION

In this chapter the coastal environment for the Algoa Bay area is taken to include coastal features such as estuaries, salt pans, dunes, sandy shores, rocky shores, and offshore islands (CSIR 1997). The marine environment has been included in this description as a harbour has been proposed for the Coega DZ, which has identified industrial development as its main focus. This chapter briefly describes the water circulation patterns, sediment dynamics, water quality and the marine ecosystem of Algoa Bay.

5.2 WATER CIRCULATION PATTERNS

Water circulation in Algoa Bay occurs at a variety of time and spatial scales, and is also affected by external forcing from winds and tides. Bathymetry and coastal features also affect circulation, with flows resulting from influxes from external regions also being important. In particular, the Agulhas current and coast-trapped waves are known to have substantial impacts. Density structures within the water column, primarily resulting from temperature variations, affect the manner in which the ocean responds to forcing (CSIR 1997). The Agulhas current flows seawards off the shelf break in a south-westerly direction, with maximum speeds in excess of 2.5 m/s. This influx serves to increase coastal temperatures. The associated maximum temperatures are about 26°C in summer and some 3-4°C less in winter. Cold upwelling waters are driven into Algoa Bay by westerly winds and can reduce the water temperature to below 10°C (CEN 1997).

Inshore currents are weak and variable. Tidal and inertial currents9 are an important component of the current field. Due to the nature of these currents, they do not move water masses away from the region, but tend to move water masses to and fro (CSIR 1997). The most damaging waves are those originating in strong easterly winds. These waves have been responsible at times for extensive damage to coastal structures and ships.

5.3 SEDIMENT DYNAMICS

The annual wind regime is dominated by moderate to strong westerly to south-westerly winds. The Coega dunes can be subdivided into two components:

- The mobile dune belt (transverse dunes) is transverse to the dominant south-west wind which moves the dunes along the shore towards the north-east at a rate approximately 1500 m3/y. The dunes are generally 1 – 4 m high and probably move about 4 – 20 m each year.
- The relatively fixed, vegetated dune ridge that forms a physical barrier between the coastal zone and the hinterland. The vegetation keeps the dune ridge fixed and stable, limiting its movement both landwards and otherwise.

The vegetated dune ridge and mobile dune belt are not actively involved in replenishing beach sands as they lie landward of the storm berm. Longshore drift, driven by waves, moves sand along the beach. Wave energy for longshore drift is moderate to high with net beach sand movement being northwards. The volume of sediment transported northward and eastward past the Coega River mouth is estimated at between 150 000 – 200 000 m3/year (CSIR 1997).

5.4 WATER QUALITY

Mussels within the intertidal zone are filter feeders and therefore reflect the accumulative influence of pollution on water quality. The results obtained from tests on mussel tissue were considered to be representative of an unpolluted coast in terms of trace metals (AES 1996).

5.5 THE MARINE ECOSYSTEM

5.5.1 ESTUARINE ECOSYSTEM

Salt marsh plants
Salt marsh communities occur in protected estuaries and embayments along the coast. These communities play an important role in estuarine functioning by providing a unique niche for many estuarine invertebrates. These communities represent small areas in South Africa and are being lost to development.

---

9 Inertial currents are essentially relic currents remaining once the generating forces no longer exists.
Distinct zonation of the salt marsh along a tidal gradient is not evident at Coega and the narrow intertidal area and the steepness of the riverbanks possibly restrict the development of extensive salt marsh areas. Degradation of the intertidal area has occurred as a result of trampling and the formation of tracks by cattle grazing within the estuarine environment.

**Submerged macrophytes and macroalgae**
The eelgrass *Zostera capensis* is found in patches in the intertidal zone within the estuary. The macroalgal species Cladophora sp. and Enteromorpha sp. were present (Coetzee et al. 1996), indicating favourable environmental conditions, including high nutrient status, slow water flow and fluctuating salinities (Lubke and Van Wijk 1988).

**Estuarine fauna**
The Coega estuary has a low faunal diversity (in terms of invertebrates and fish) and the salt marshes are not utilised to the same extent as in more pristine estuaries. No unique or threatened species of invertebrate or fish were recovered and all are common in eastern Cape estuaries (Coetzee et al. 1996). The saltworks attracts a large number of birds. Some 93 bird species have been recorded from the salt pans at Coega. The salt pans serve as feeding and resting grounds for a large number of Palaearctic waders during their summer migration to the Southern Hemisphere. The species of main concern are the Greyheaded gull, Lesser and Greater flamingos, Chestnutbanded plover, Caspian tern, Damara tern, Roseate tern and the Black oystercatcher. The Chestnutbanded plover is listed as rare in the Red Data Book (CSIR 1997). For marine birds see Section 5.5.2.

5.5.2 **BIRDS**
Seabirds are the most conspicuous component of marine life off the Coega coast and on the islands. Six of the South Africa’s 14 resident seabird species breed either on the islands or at the adjacent coast. The islands play a national and international role in the conservation of the Cape gannet (*Morus capensis*), African penguin (*Spheniscus demersus*) and Roseate tern (*Sterna dougallii*). A 500m-radius marine reserve has been proclaimed around each of these islands. Bird Island supports the world’s largest gannet colony and St. Croix Island supports the largest African penguin colony in the world. The African penguin, which is endemic to southern Africa, is listed internationally as vulnerable. The Roseate tern is one of the rarest and most endangered of South African seabirds. The only sites where Roseate terns breed in South Africa are on Bird and St. Croix Islands. The breeding range in southern Africa is restricted to Algoa Bay and possibly Dyer Island. The survival of the African population is dependent on the protection of the island breeding sites in Algoa Bay (CSIR 1997). For estuarine birds see Section 5.5.1.

5.5.3 **NEARSHORE ENVIRONMENT**
The presence of rich phytoplankton accumulations in the surf zone fuels the major foodwebs in Algoa Bay. A distinctive feature of the surf zone along the eastern sector of Algoa Bay is the regular occurrence of the diatom *Anaulus australis*, and along the Sundays River beach, *Anaulus* accounts for 95% of the primary production and is the basic food source in the surf zone and adjacent beach. The accumulations occur in the form of smooth foam on the water surface and are associated with rip currents during the day, disappearing at night due to the cells sinking to the bottom. During early morning, these diatoms rise to the surface and are moved towards the shore into the surf zone again.

Because the diatoms accumulate into aggregations in the surf zone, they constitute a ready accessible food resource for herbivorous fish, zooplankton and a variety of benthic filter feeders. Sand mussels attain maximum densities where phytoplankton production is high and in turn are key organisms in the nearshore foodwebs, being preyed on by a variety of organisms. The mysid shrimp *Gastrosaccus psammodytes* is extremely abundant in the subtidal breaker zone. They form an important link between the primary food supply and high levels of the microfaunal foodweb. These and other organisms within the nearshore zone may be affected by a harbour at Coega.

5.5.4 **MARINE MAMMALS**
Ten species of whale, dolphin and seal are relatively common in the Algoa Bay area. Southern Right whales use the shallow waters of Algoa Bay to give birth to and nurse their young. Between 200 to 400 Humpbacked dolphins of southern Africa’s estimated population of less than 1000 live in Algoa Bay. The Coega coast is part of their core habitat. The Humpbacked Dolphin and other mammals use the surf zone extensively as a feeding ground and for social interaction, both off the estuary and around the islands.

5.5.5 **MARINE FISH**
The fish fauna of Algoa Bay is typical of the Agulhas Bank and is made up of both South African endemics and wide-ranging species. The rocky reef areas around the islands of Brenton, Jahleel and St. Croix support a host of
fish species and these area are also part of the nurseries of some sea bream and rock cod species. Subtidal fishes of the surf zone are important in the food web of Algoa Bay (CSIR 1997), particularly the Southern mullet (*Liza richardsoni*), which makes up 50% of the surf zone fish and grazes on surf phytoplankton accumulations, but also consumes mysids and other zooplankton (CEN 1997). The influence of the marine reserves surrounding the Algoa Bay islands on improving fish stock in the eastern Cape has not been quantified, but they are undoubtedly beneficial, at least as sanctuaries. Recreational angling from the shore and boats is an important pastime of local communities (CSIR 1997).

5.6 SUMMARY

The coastal environmental is a very dynamic system and there are many interactions between the various physical processes and biological components. The presence of rich phytoplankton accumulations in the nearshore environment fuels many foodwebs, thus if this is severely impacted on it could affect many organisms and predator/prey relationships. The islands create an important niche for many organisms, whether it be breeding birds or fish, and should be conserved.
6. DESCRIPTION OF THE SOCIAL ENVIRONMENT

6.1 INTRODUCTION – REGIONAL CONTEXT

The Eastern Cape is the second largest of the nine new provinces, has the fourth highest population density and the second highest percentage of children under the age of 15. The population is expected to grow rapidly in the coming decades. The nearest city to the proposed Coega DZ is Port Elizabeth, South Africa’s fifth largest city (CSIR 1997). The highest concentrations of people in the province occur in the magisterial districts of Port Elizabeth and Uitenhage, which comprises the Port Elizabeth-Uitenhage Metropolitan area. This metropolitan area houses approximately 1 166 345 people, with 78% living in the Port Elizabeth area and 22% in Uitenhage.

The economy of the region has traditionally been relatively unbalanced, relying heavily on manufacturing (CSIR 1997). The Port Elizabeth-Uitenhage metropole is one of the country’s major manufacturing centres, with particular focus on the motor industry. Although tourism is not generally considered to be significant in economic reports of the region, SATOUR have claimed that tourism brought in 5.5% of the region’s GDP in 1993. Recent years have shown that this sector of the city has grown considerably. Port Elizabeth has considerable tourism advantages (the diverse natural environment, good climate, sites of historical interest, nature reserves, a variety of cultures, mountains etc.) and is being marketed as the ‘Gateway to the Eastern Cape’. The fishing industry offers opportunities in the Eastern Cape as well, but is regulated by the quota system that restricts the numbers of each type of fish that may be harvested.

The economic boom of the 1920’s came to an end with the withdrawal of the Ford and General Motors industries, and the ensuing economic slump left a high level of unemployment in the region, estimated at 39.8%. The Eastern Cape is one of South Africa’s most poverty stricken and least developed areas. Sixty-four percent of the Eastern Cape’s population are reported to be living in poverty (second only to the Northern Province with 69.3%). The poverty gap (the differences between the income of each poor household and the poverty line) has been estimated at 24%, the highest in South Africa. (South African Competitiveness Monitor 1996, Provincial Comparison. WEFA Group. In: Tren 1999). The province also has a high Gini coefficient, at 0.65, indicating that there is a large disparity in the distribution of wealth and resources in the province (Tren 1999).

In the Port Elizabeth-Uitenhage metropole, 60% of the potentially economically active population is employed. Forty-four percent are employed in the formal sector, and 16% in the informal sector. However, these figures are unbalanced in terms of population structure: the severity of unemployment in the township areas is estimated to be 50 – 60%.

Because of high levels of unemployment in the region, a large number of people are moving into the city area to find work. There is a lack of housing, especially low-income housing, and informal settlements have become a problem in the area (CSIR 1997). The existing house stock in 1991 was reported to be 80 420 formal houses (housing structures with a life span of 20 years or more) and 53 000 informal houses (any housing unit over which tenure is held, with access to at least basic services). Of these informal houses, the majority are the typical shackland camps that continue to grow in accessible open land throughout the country.

In 1994, the Port Elizabeth area was serviced by seven public hospitals and three private hospitals, as well as 21 clinics. The town of Coega has a small clinic.

There are considerable discrepancies in the standard of living of the different population groups: the white and Asian communities live in conditions that could be described as first world with adequate access to educational, recreational and health facilities, while black communities live in third world conditions (CSIR 1997). The black community experiences the highest levels of poverty and unemployment, with least access to facilities, particularly in the Motherwell area.

The Human Development Index (HDI) which is a composite index of life expectancy, literacy and income has been determined by the Human Sciences Research Council for a number of districts in the Eastern Cape. This index gives a good overall picture of the state of development and the standard of living in an area. The value of the HDI varies between a maximum of 1, indicating the highest level of human development, and a minimum value of 0. The Eastern Cape’s HDI was measured at 0.51 in 1991, an improvement from the 0.42 measured in 1980. This is South Africa’s second lowest HDI after the Northern Province and captures the extent of poverty and deprivation in the province (South African Competitiveness Monitor 1996, Provincial Comparison. WEFA Group. In: Tren 1999). The HDI for Port Elizabeth's disadvantaged black community is 0.32 while the HDI for the white community is 0.94. Human Development levels of 0.90 and above equals the top 25 countries in the world. The HDI of 0.32 is on a par with Rwanda at 0.33 (CEN 1999).
6.2 BIOGRAPHICAL AND DEMOGRAPHIC INFORMATION FOR THE COEGA AREA

A specialist report was commissioned by the CDC to provide baseline information on the social environment of the DZ (Rossouw et al. 1999). A synopsis of this report is provided here.

6.2.1 HEAD(S) OF HOUSEHOLD ARRANGEMENTS

Households that have a single household head are disadvantaged in terms of financial and social terms compared to households that have both a female and male head. Of the heads of households, 18.8% are headed by a single male and 23.2% by a single female. The households with female heads are viewed to be more disadvantaged than households with male heads, and they have more household members. The average household size is 4.1 persons, which compares favourably to mean household size in similar communities around Port Elizabeth (Rossouw et al. 1999).

6.2.2 HOUSEHOLD DEMOGRAPHIC INFORMATION

The population within the DZ area is relatively spread out and does not form a clear community, although the leaders claim that it should be treated as a unified community. Of the households, 16.4% live on farms, 14.4% live at the Salnova compound and 10.7% at King Neptune. The survey established that the population currently living in the proposed Coega DZ is 1221 people. Of these, 611 are male and 610 female.

Xhosa is the home language of 53.4% of these people, with 43.6% being Afrikaans. Other languages spoken include English and Sotho, although less than 2% of the population regard these as home languages (Rossouw 1999).

6.3 EDUCATION

Of the 1221 people living in the proposed Coega DZ, more than 50% of the population is functionally illiterate. The level of education in the Coega DZ is similar for male and females and is generally low, and the functional literacy rate needs to be improved. Almost half the household heads (49.4%) have a level of education below grade 7 and can therefore be classified as functionally illiterate. Only 13.2% of the household heads have a level of education of grade 10 or above (Rossouw et al. 1999).

6.4 EMPLOYMENT

The unemployment level among the employable sector of the community in the Coega DZ area is high, with only 18.1% having full-time employment and 30.8% of the community unemployed. The remainder have some form of income, or are students, scholars, pensioners, medically unfit and housewives. Of those members of the community who are employed, a high number work within the Coega DZ (53.5%). A further 26.8% work in the immediate vicinity, including St George’s Strand, Motherwell, Markman industrial area and Bluewater Bay (CSIR 1997 and Rossouw et al. 1999).

Seventy-six percent of all earners have an income less than R1000 per month. The majority of households have a disposable income of between R100-R200 per month, while some have a negative disposable income (<6%). Very little saving was detected in the community (Rossouw et al. 1999).

Pension, welfare grants and disability grants are the main source of income for 5.9% of the population in the Coega DZ. Salaries and wages form the biggest source of income in this community. This, and the fact that many people work within or in close proximity to the Coega DZ, implies that changes in the area need to consider how the employment situation of these people may be affected, and alternative employment will have to be considered if these people cannot be accommodated.

6.5 HOUSING AND RESIDENTIAL ASPECTS

The majority of the households (76.4%) in the proposed DZ have lived in the area for at least ten years, which has important implications for the rights of people in terms of re-settlement. However, a large number of households indicated that they do not need to spend money on housing. The majority of dwellings are permanent structures and are in a reasonably liveable condition. Dwellings are constructed out of a variety of substances, e.g. brick, mortar, corrugated iron, wood, clay, manure and bricks. More than half the dwellings were found to

---

10 Disposable income is the total household income minus the total expenditure on essential commodities.
have no ceilings, which is associated with weak insulation and therefore ineffective in keeping out extreme cold or hot (Rossouw et al. 1999).

### 6.6 INFRASTRUCTURE AND SERVICES

#### 6.6.1 WATER
At present, there is water available from the Orange River Scheme and the groundwater source currently in use within the area is the Uitenhage Artesian System. This is one of the few artesian systems in southern Africa, and the only one of practical importance. Part of the Coega DZ lies over the Coega compartment of this system. To date, industries have not impacted negatively on this groundwater resource (CSIR 1997). The majority of households in the area have a water supply within 100m of them. Upgrading of the water supply appears to be an issue for the community (Rossouw et al. 1999).

#### 6.6.2 WASTE DISPOSAL
The City of Port Elizabeth currently disposes its general, non-hazardous waste at two solid waste disposal sites. One of these sites, the Salt Pan near Struandale industrial area, serves the eastern part of Port Elizabeth. However, this site has been ordered to be closed by the Department of Water Affairs and Forestry. The other disposal site is at Arlington and it serves the northern, central and western portions of Port Elizabeth. This site is in the process of permit application for continuing operation (CSIR 1997). As peri-urban areas do not have the same levels of service found in urban areas, the majority of the households burn their refuse, while others take their refuse to a refuse site (10.1%), leave it as is (6%) or have a refuse disposal service (6%) (Rossouw et al. 1999).

Hazardous waste is currently disposed of at the privately owned Aloes site. The extension of the property lease for this disposal site by the Municipality is currently under consideration. This site has a remaining life span of 17 years if the current site operation and equipment is maintained (CSIR 1997). A new regional hazardous waste site will be developed for the DZ.

#### 6.6.3 SANITATION
There is a lack of acceptable toilet facilities in the households in the Coega DZ area, and this is a source of concern for the community. Some households have no sanitation facilities (30.9%), others have pit toilets (38.9%), bucket toilet systems (14.8%) and the rest have flush toilets (either septic tank or waterborne sewerage) (Rossouw et al. 1999).

#### 6.6.4 HOUSEHOLD FUELS
In general, households spend very little on fuel, with the exception of paraffin, which is the most widely used energy source among households in the proposed Coega DZ. Paraffin is used for lighting, heating (water and household) and cooking. Electricity and candles are other major fuels for lighting, and electricity is also used for heating and cooking. Wood is also used by a number of households for cooking and heating (Rossouw et al. 1999).

#### 6.6.5 TRANSPORT

**Road transport**
The Coega area is serviced by the N2 national road, secondary roads and gravel roads. The N2 is the major road link along the east coast and serves an important function in the economy of the Eastern Cape region, facilitating the movement of commercial, industrial, tourist and commuter traffic with in the Eastern Cape. The N2 was designed to carry heavy traffic and is in good condition. The old Grahamstown road (R435) within the Coega area provides a linking road from the N2 for traffic travelling to Uitenhage. This road now mainly serves the rural community in the Coega area and is in a fair condition. The Addo road (R450) is the main access road for traffic from the Addo and Kirkwood agricultural hinterland to Port Elizabeth. This road also provides access to Motherwell Residential Township and the Markman Industrial Township. The R450 was constructed to carry heavy industrial traffic and is still in good condition. The Coega-Uitenhage road (R460) carries traffic between Coega, Motherwell and Uitenhage, and is in poor condition (CSIR 1997).

**Rail transport**
The main railway line from Port Elizabeth enters the Coega DZ on the seaward side of Markman Industrial Township, which is served from the Aloes Railway Station. Spoornet stated that the maximum capacity for trains to and from Port Elizabeth on this line is 54 trains per day (CSIR 1997).
Modes of transport in the Coega DZ
The community is highly dependent on public transport. Taxis are the most commonly used mode of transport (39.9%) in the Coega DZ area. Other modes of transport include private transport (27.5%) and buses (26.2%). Trains and bicycles are hardly ever used (Rossouw et al. 1999).

6.7 HEALTH

The community in the proposed Coega DZ area appeared to be healthy, but it was found by Rossouw et al. (1999) that children were inadequately nourished (13.8%) and some were severely malnourished (5.2%) (Rossouw et al. 1999).

The most common diseases encountered in the area are mostly related to shack dwelling, including tuberculosis (11.7% of households in the proposed DZ suffer from this disease), measles, meningitis, typhoid and gastroenteritis (CSIR 1997). Within the Coega DZ, the bacteria Yersinia pestis is endemic. This bacteria is currently in a passive state and is being monitored by the Department of National Health. Fleas carried by rats and mice transmit the disease, and some species of wild rodents that occur in the Coega DZ are potential carriers (CEN 1997).
7. THE ECONOMIC ENVIRONMENT

7.1 THE PORT ELIZABETH-UITENHAGE ECONOMY IN REGIONAL AND NATIONAL CONTEXT

The Port Elizabeth-Uitenhage (PEU) metropolitan area is defined for statistical purposes as including the magisterial districts of Port Elizabeth and Uitenhage. This metropolitan area houses in the region of 1,166,345 people, with 78% living in Port Elizabeth and 22% in Uitenhage. The PEU metropole is one of the country’s main manufacturing centres. In 1993 in the region of 16.4% (between 6 and 7 million people) of the total South African population lived in the Eastern Cape (Hosking 1996).

The Development Bank of southern Africa has argued that the economic base of the Eastern Cape is limited by its distance from the main consumer markets, the relative absence of mineral resources and the fact that its primary resource base for agriculture is, on average, low-yielding in nature. The Province is, however, characterised by small but under-utilised areas of high-value agricultural land in the coastal areas, e.g. citrus farming in the Sundays River Valley. The Port Elizabeth and East London economies are primarily based on manufacturing, with motor manufacturing and related industries of particular importance (Erasmus 1994).

A further important sector that has been identified by government as a main strategic focus area in terms of facilitating economic growth in the Province is tourism. The Eastern Cape has a number of tourism advantages, including the natural environment, coasts and beaches, nature reserves, mountains, cities and towns of architectural and historical interest, a variety of cultures, and a good climate (Nel 1996). In Port Elizabeth, tourist spending rose from R185-million in 1992 to R508-million in 1995 (Pakes & Cagwe 1996). Recent years have shown the significant growth of this sector in the City, and plans are being developed to upgrade the airport and other facilities which are likely to position Port Elizabeth as a “gateway to the Eastern Cape”.

The Eastern Cape has been earmarked by government for special attention because of its consistently low ranking in terms of human development. This is particularly evident in the Transkei area. Furthermore, poverty is primarily located within the borders of the previous homelands and townships where black people live (Erasmus 1994). The Eastern Cape has the third largest population of all the provinces, the province has the second lowest nominal GGP per capita (Rand). The percentage contribution to national GDP of 7.5% is the fifth highest of all nine provinces (Erasmus 1994).

It is critical to note that although PEU experienced stagnation in the 1980s, largely due to the economic isolation during that time, the impact of disinvestment and relocation of a key motor plant in the Gauteng area presents an opportunity for PEU to utilise its locational strength due to the opening up of South Africa to global competition. Since 1994, South Africa’s increasing internationalisation combined with various changes in trade policies and agreements have positive implications for an export-led economic growth strategy for the country, and coastal industrial cities in particular. During the nineteenth century the growth of Port Elizabeth as a commercial centre depended to a large extent on the export of wool, while the automotive and components industry has been lauded as the major source of growth in the twentieth century. It is possible that the development planned in the Coega Project could play a similar role in the early 21st century.

7.2 ECONOMIC SIZE, GROWTH, SECTORAL COMPOSITION

Various sources indicate that manufacturing remains a key sector of the Port Elizabeth-Uitenhage metropole economy - and the automotive and components sector in particular. The GGP (in 1993) for each sector in the PEU Metropolitan area is shown in Figure 7.2.

In 1993 the manufacturing sector accounted for just over one-third (36%) of GGP, while the government sector accounted for the second highest contribution, at 22%. Total GGP for 1995 was expected to be in the region of R13 billion (Hosking 1996). In the 1993-94 period, the growth rate for the Port Elizabeth area and Uitenhage was 1.9% and 1.3%, respectively. In comparison, the growth rate for South Africa, during 1993-94, was 2.1%. In a similar, but more recent, study it was found that manufacturing and commerce contribute 33% and 21% to the GGP, respectively. This was followed by finance (19%), transport (12%), agriculture (8%) and electricity (2%) (Wefa, 1996 quoted in Tren, 1999).

---

11 The PEU economy, for purposes of simplifying this study due to the lack of reliable data, does not include the small town of Dispatch. However, Dispatch is important in terms of the mega-city concept, which is explained later in the document.
In Port Elizabeth, the most important industry in terms of the number of manufacturing concerns is that which involves the manufacture of fabricated metal products, except machinery and equipment (68 in 1990). However, the most important industry in terms of number of employees is that involving the manufacture of motor vehicles, parts and accessories (21 273 in 1990). In the Uitenhage magisterial district the motor vehicle, parts and accessories industry features as the most important industry both in terms of the number of manufacturing concerns and number of employees.

Other sub-sectors, besides the motor vehicle industry, that rate high in terms of number of employees are:

\( \begin{align*} &\text{Textiles} &\text{8 789} \\
&\text{Food} &\text{7 131} \\
&\text{Rubber products} &\text{6 820} \\
&\text{Footwear} &\text{4 265} \\
&\text{Fabricated metal products} &\text{4 046} \end{align*} \)

Besides the fabricated metal products industry, the other sub-sectors that rate highly in terms of number of manufacturing concerns in the area are:

\( \begin{align*} &\text{Food} &\text{44} \\
&\text{Motor vehicles} &\text{42} \\
&\text{Other non-metallic mineral products} &\text{36} \\
&\text{Textiles} &\text{31} \\
&\text{Machinery, except electrical} &\text{30} \\
&\text{Electrical Machinery} &\text{29} \end{align*} \)

7.3 SECTORAL DYNAMICS, GROWTH AND DECLINE

Over the two decades from 1970-1990, the ranking of economic sectors in terms of contribution to GGP in Port Elizabeth has changed somewhat - as shown in Table 7.3, although the manufacturing sector has retained its position in first place, the government sector and the finance sectors have become more important with time, while the wholesale and retail trade and transport sectors have become less important (Strategic Facilitation Group 1993).
Table 7.3  Ranking of importance of sectors: 1970-1990
(Source: Strategic Facilitation Group 1993)

<table>
<thead>
<tr>
<th>Economic sectors</th>
<th>Port Elizabeth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1970</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1</td>
</tr>
<tr>
<td>General government</td>
<td>5</td>
</tr>
<tr>
<td>Finance, insurance, real estate, and business services</td>
<td>4</td>
</tr>
<tr>
<td>Transport, storage and communication</td>
<td>3</td>
</tr>
<tr>
<td>Wholesale and retail trade, catering and accommodation</td>
<td>2</td>
</tr>
<tr>
<td>Other producers</td>
<td>7</td>
</tr>
<tr>
<td>Electricity, gas and water</td>
<td>8</td>
</tr>
<tr>
<td>Construction</td>
<td>6</td>
</tr>
<tr>
<td>Community, social and personal services</td>
<td>9</td>
</tr>
<tr>
<td>Agriculture, hunting, forestry and fishing</td>
<td>10</td>
</tr>
<tr>
<td>Mining and quarrying</td>
<td>11</td>
</tr>
</tbody>
</table>

Over the same period, the PEU metropole lost ground in terms of its contribution to the national economy; however, it gained ground as a contributor in the regional economy (Black & Saxby 1996).

Figure 7.3 shows which economic sectors experienced annual GGP growth from 1980 to 1991. It is clear that the mining and quarrying (-7.5%), agriculture, forestry and fishing (-4.1%) and construction (-3.1%) sectors experienced the least growth in Port Elizabeth - in fact, these sectors experienced negative growth rates. On the other hand, those sectors that achieved the highest average rates of growth were the services (4.7%), trade and catering (2.9%) and the finance and real estate (2.1%) sector. The average growth rate for all sectors for Port Elizabeth was 1.0%. In Uitenhage over the same period, the sectors with the lowest growth rates were agriculture, forestry and fishing (-5.3%), transport and communication (-3.3%) and construction (-3.1%). The sectors with positive growth rates were: the services (3.9), trade and catering (3.1%) and electricity and water sectors (1.2%). An average growth rate of 0.9% was achieved in this area.

Figure 7.3  Average annual growth in GGP by kind of economic activity (1980-1991)
7.4 POTENTIAL IMPACTS OF A REDUCTION IN TARIFFS

It is clear that the changes in trade policy - particularly the removal of the General Export Incentive Scheme (GEIS) and reduction in tariffs - will benefit the least protected primary goods producers, their immediate downstream industries and the non-traded or services sectors of the economy. The sectors that are likely to benefit from the reform of the protective system are agriculture, mining, basic metal (iron and steel and non-ferrous metal producers) and non-traded (services) sectors - largely because they have been the least protected sectors in the past. The highly protected sectors of the economy will bear the brunt of the negative impact, viz. textile, clothing, motor vehicles, rubber products, footwear and wood and wood products. The sector that will be the most negatively affected is the textile sector. The decline in output prices and the surge in imports, together with export constraints, reduce the potential output growth of this sector. In the motor vehicle industry, the lowering of tariffs yielded a surge in imports (Industrial Development Corporation and Department of Trade and Industry 1996). The industries which will experience the most severe cuts in their protection between 1995 and the year 2000 include clothing (tariff reductions of 44 percentage points), motor vehicles (41%), rubber products (13%), textiles (11%), footwear (11%), and wool and wool products (11%) (Industrial Development Corporation 1996).

In conclusion, it appears that there is likely to be a serious blow to the Eastern Cape region as a result of trade liberalisation. The changes in the General Agreement on Trade and Tariffs (GATT) provide threats and opportunities and there is a need to re-organise to combat threats and to take advantage of opportunities. The planned cuts in tariff protection are important in deciding where growth is likely to occur in future and how the Coega development is linked to the Port Elizabeth-Uitenhage economy.

7.5 EMPLOYMENT AND UNEMPLOYMENT

The manufacturing, service and informal sectors provide 70% of the employment opportunities in the area (Hosking 1996). Figure 7.5 shows the percentage distribution of formal employment by kind of economic activity in Port Elizabeth, it appears that in 1991 the highest concentration of formal employment was in the services sector (32.9%). In comparison, the 1980 figures show that the highest percentage of formally employed people was in the manufacturing sector. Between 1980 and 1991, there was an increase of formal employment in the following sectors: construction; trade, catering; finance, real estate; and services. The statistics suggest that manufacturing activity is unlikely to be a major source of employment growth in the future, unless it occurs in sub-sectors that are expanding, such as components in the automotive industry.

![Figure 7.5 Percentage change of formal employment per kind of economic activity (1980-1991)](image-url)

The Eastern Cape has been a region of high unemployment for many years. In the PEU metropole, 60.2% of the potentially economically active population is employed. Of this figure, 44.3% are employed in the formal sector, and 15.9% in the informal sector. Those numbers employed in the formal sector has decreased from 80.3% in 1980 to 44.3% in 1994 (Development Bank of Southern Africa 1995).
The unemployment rate in 1994, according to the extrapolations of Black and Saxby (1996), is set at 39.8% in Port Elizabeth - almost double the unemployment rate in 1991. However, the unemployment rate of 39.8% in Port Elizabeth hides the severity of unemployment in the township areas of the city. In these areas there is a far higher unemployment rate, sometimes as high as 50-60%.

The unemployed, whose average reservation wage (i.e. the minimum wage at which people are prepared to work) was in the region of R400.00 per week, were characterised by limited technical and other formal skills training and a history of occupying low-level positions. The main method of survival was either through financial support from friends and relatives or by undertaking some kind of income-generating activity (Pakes 1996a). Most of the unemployed fell into the 21-25 year age category, and it appears that even though the numeracy and literacy level of blacks has increased, the education and training received has been inappropriate for formal sector employment (Employment Research Unit 1995). The proposed Coega Development Zone would therefore bring much needed relief in the form of jobs to this region.

7.6 INDUSTRIAL ACTION, WAGES AND SKILLS

7.6.1 INDUSTRIAL ACTION

In 1995, there was far less industrial action than in 1994. Table 7.6 shows the extent of industrial action in the PEU metropole in the years 1990, 1991, 1994 and 1995.

Table 7.6 Extent of industrial action in PEU (Source: Durban 1996)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of strikes and stoppages</td>
<td>142</td>
<td>79</td>
<td>114</td>
<td>76</td>
</tr>
<tr>
<td>Number of workdays lost</td>
<td>258 400</td>
<td>215 419</td>
<td>262 934</td>
<td>43 535</td>
</tr>
</tbody>
</table>

In 1995, there were 31 strikes and 45 stoppages at 31 organisations. The economic sectors that appear to have been most affected by industrial action were the automotive and tyre industries (48.7%), the transport industry (21.1%) the public sector (9.2%) and the metal industry (9.2%). The most common strike trigger during 1995 was related to wages (Durham 1996). Figure 7.6 shows that, other than wages, job grading/evaluation was the main trigger.

![Distribution of industrial action according to triggers](source: Durham (1996))

**Figure 7.6** Distribution of industrial action according to triggers

12 Strikes are defined as lasting one or more days, while stoppages refer to incidents with a duration of less than one day.
From January until mid-April 1996, there were 11 strikes recorded, and they cost Eastern Cape businesses in the region of R100-million. Most of these strikes were caused by either the retrenchment of workers or the take-over of companies (Oliver 1996).

### 7.6.2 WAGES AND SKILLS

A survey indicated a shortage of certain “blue collar” skills, viz. artisan, technical, supervisory, machine-operating, basic literacy and spray-painting skills. Forty percent of the respondents indicated that, in terms of wage determination, industrial council bargaining predominated. A further one-third of the sample stated that wages and annual increases are determined by plant level negotiation with trade unions. The average gross minimum and maximum wage paid by the firms per week to each of the following categories was:

<table>
<thead>
<tr>
<th></th>
<th>Unskilled</th>
<th>Semi-skilled</th>
<th>Skilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>R297</td>
<td>R374</td>
<td>R572</td>
</tr>
<tr>
<td>Maximum</td>
<td>R616</td>
<td>R810</td>
<td>R2000</td>
</tr>
</tbody>
</table>

In comparison with the rest of South Africa, the economically active population in the PEU metropole is relatively well educated. A total of 65% of the economically active population has a primary education, while 56% have a secondary education and 11% have a tertiary education. Only 5% has no education at all (Hosking 1996).

However, the shortage of “blue collar” skills which has been reported by a number of manufacturing firms in the area is perhaps reflected in the national trend away from more “technical” subjects, such as engineering, industrial courses, trades, etc, particularly at universities, but also at technikons. In the Eastern Cape, the Universities of Port Elizabeth, Fort Hare and Rhodes offer no courses in industrial arts, trade and technology, and only the university of Fort Hare offers an extremely limited number of courses in engineering and engineering technology. The Port Elizabeth Technikon, on the other hand, offers courses in engineering and engineering technology, and a limited amount of courses in industrial arts, trade and technology (Black & Saxby 1996). The more skilled labour in the engineering and industrial arts fields needed by industry in the area are sourced in other regions of South Africa. This is of importance given that the anchor projects in the Coega development will generate a demand mainly for skilled labour as shown in a later section.

### 7.7 AREAS OF POTENTIAL GROWTH

A study (Strategic Facilitation Group 1993) has shown that there are a number of manufacturing industries which could possibly be developed in the PEU area. In particular, it was recommended that the viability and feasibility of the food industry (including pectin, citrus oils, ice cream and compound edible oils); the paper industry (especially stationery); tobacco products and wooden furniture (aimed at the export market) be investigated. It was also recommended that subcontracting, particularly in the motor industry, had potential and deserved attention. A full list of the industries that were identified as having potential for development is presented below:

- Synthetic resins, plastic, raw materials and man-made fibres
- Computers and office, calculating and accounting machinery
- Radio, television and communications equipment and machinery
- Machinery and equipment, except electrical
- Rubber products, not elsewhere classified
- Basic industrial chemicals, except fertilisers
- Aircraft
- Medicinal and pharmaceutical preparations
- Chemical products, not elsewhere classified
- Jewellery and related articles
- Tanneries and leather finishing
- Printing, publishing and allied industries
- Electrical applications and housewares

The study also found that mohair, wool and fresh fruit and vegetables all provided additional opportunities to the manufacturing sector for further beneficiation due to strong backward linkages.

Although the city was seriously affected by the withdrawal of Ford in the mid-80s due to the more attractive industrial incentives offered to motor vehicle companies that located themselves on the Reef, the city has remained a strong force in this industry. With the shift towards export-led growth and the significant investments
ploughed into local motor vehicle and component companies, the PEU metropole may regain the comparative advantage that it used to have in the industry.

The primary sectors within the PEU area are relatively small, but there is scope for linkages to agriculture and mining through the processing of agricultural goods and beneficiation of minerals. The opportunities in the agricultural sector that were identified by Wallis (1986) were in the canning, preserving and confectionery industries. A further opportunity was identified in the production of hides and skins (in terms of the backward and forward linkages with agriculture and the footwear industry). In terms of the agro-industries in the area, and the significant potential identified for further opportunities in this sector, the PEU metropole has strong linkages with the Eastern Cape hinterland - this provides a critical comparative advantage to the metropole (Nel 1994).

There are also significant opportunities offered by the fishing industry - including the freezing, preserving and canning of fish - which unfortunately remain largely in the hands of Western Cape industrialists. The traditional fishing industry in the metropole has two components - trawling and ski-boat fishing. However, the growth of this sector appears to be limited due to the quota system, which regulates the tons of each type of fish that may be harvested (Strategic Facilitation Group 1994). A more recent development is mariculture, notably the establishment of oyster, mussel and perlemoen farms along the east coast of Algoa Bay near Coega. One of the issues raised by the Coega project is the compatibility of mariculture with heavy industrial development along the coastline. Finally, there is a further important potential growth sector in the area, namely ecotourism. This sector also needs to be considered in terms of the effects of industrial development.

7.8 NEW DIRECTIONS IN INVESTMENT

In the PEU metropole there was extensive investment - R3-billion in production expansion - in the motor vehicle and component industry during 1995-1996. Delta Motor Corporation has invested R610-million, and created 1500 jobs, while Volkswagen South Africa has spent R200-million, and Ford R126-million. Some of the other major investments that took place in the area during that period included: in the motor vehicle and components industry, Cordustex (R55-million), Shatterprufe (R34-million), and Alloy Wheels (R120-million) have all invested in the area, while within the other sectors there has been significant investment by Cadbury Schweppes (R150-million), Union Spinning Mills (R120-million) and Standard Bank (R25-million) (Richardson 1996).

The attraction of foreign direct investment (FDI) to South Africa since 1994 has been mainly to the manufacturing sector. Of the two-thirds of FDI invested in manufacturing, most was directed at the food and beverages sector, while the motor and components and the electronics and information technology sectors were also favoured. As indicated by Nel (1996), each of these sectors is well represented in the main manufacturing centres of the Eastern Cape, viz. PEU and EKB (East London-King William’s Town-Bisho). Trends reported in the media appear to correlate with country-wide trends and there seems to be a particular focus on creating export capacity.

In terms of investment in other industries, there are two new hotels, and expansions to existing hotels planned. A further significant investment is that of the expansion of the airport. The Airports Company of SA announced a R1.7 million upgrade of the terminal building at the PE Airport. It was announced in 1999 that the South African Breweries has decided to construct a R750 m new brewery in Port Elizabeth. Uitenhage Catalytic Converter Industries won a six-year contract, worth R810 million, to supply Korean motor giant Daewoo with 300 000 catalytic converters a year. There are plans to refurbish the mothballed Swartkops power station, with reliable industry sources estimating the cost of the investment at R700 million. Emfuleni Resorts is about to begin construction on a R533 million casino on Port Elizabeth's beachfront. Corning Incorporated, one of the two leading substrate suppliers in the world, has announced that it is to construct a R180 million plant in PE. Asec Manufacturing, based in the US, announced that it would be investing R30 million in a new catalytic manufacturing plant in Algoa Park. R13 million is to be spent on a new Afrocentric shopping centre at the entrance to Gqebera, while R5 million is being spent on a health care distribution centre on William Moffet Boulevard (Weekend Post Business 1999).

It is clear that significant investment has taken place in the automotive and components sub-sector, if compared with the other sectors, in the PEU area. If the development at Coega is to build on the already existing investment trends in the area, the linkages between industrial development at Coega and that in the PEU area are likely to be strong. However, the scale of the proposed investment at Coega far outweighs any of the actual investments in PEU. The vast scale of this proposed project, which runs into billions of rands, gives an idea of the potential impact of such a project on the area, and on the region as a whole.
7.9 INDUSTRIAL SPATIAL DEVELOPMENT

Table 7.9 shows the approximate total area of land zoned for industrial purposes, the approximate area developed, an indication of the percentage of the township already developed and the available land zoned for industrial purposes for each of the respective major residential townships. The table shows that of the approximate total area of land in the city zoned for industrial purposes, which is 1 908 hectares, 1 484 hectares are developed. This leaves 424 hectares of vacant land zoned for industrial purposes available for development (Mentz 1995).

Unfortunately, similar figures for industrial land in the Uitenhage district were unavailable at the time of writing. The addition of industrial land in Uitenhage is certain to inflate the current total of 1 908 hectares to a certain degree.

The only recent initiative to establish industry has been the planning of an airport-related industrial area near the freight terminus at the Port Elizabeth airport. So far, only one industrialist has taken up land in that area. Discussions are being held with the view of selling the remainder of the area to private enterprise for industrial development. If the development of the Coega DZ and port had not been considered, it is likely that future industrial development would have focussed on Jagtvlakte at Uitenhage, a large flat area that has been earmarked for industrial development for many years. Other than this area, industrial development would have consisted of infill and succession processes (brown-fields developments). The Coega initiative has resulted in a new way of looking at industrial development in the city, and if this initiative does not materialise it is probable that it would be some time before Jagtvlakte develops as an industrial area.

<table>
<thead>
<tr>
<th>Existing Industrial Township</th>
<th>Approximate total area (hectares)</th>
<th>Approximate area developed</th>
<th>Approximate % developed</th>
<th>Approximate available land (hectares)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markman (Well’s Estate)</td>
<td>446</td>
<td>217</td>
<td>49</td>
<td>229</td>
</tr>
<tr>
<td>Brickfields</td>
<td>140</td>
<td>0</td>
<td>0</td>
<td>140</td>
</tr>
<tr>
<td>Perseverance (Redhouse)</td>
<td>167</td>
<td>159</td>
<td>95</td>
<td>8</td>
</tr>
<tr>
<td>Struandale (New Brighton)</td>
<td>314</td>
<td>314</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Neave/Korsten</td>
<td>250</td>
<td>249</td>
<td>99</td>
<td>1</td>
</tr>
<tr>
<td>North End</td>
<td>147</td>
<td>147</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Swartkops/Deal Party</td>
<td>398</td>
<td>397</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>Community Street</td>
<td>46</td>
<td>1</td>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1908</td>
<td>1484</td>
<td></td>
<td>424</td>
</tr>
</tbody>
</table>

As far as industrial development close to the Coega area is concerned, the only area nearby is Markman Industrial Township. No other land in this area has been considered for new industry apart from the logical expansion of Markman onto the Amsterdam Plein, as well as to the west of Markman Industrial Township. The remainder of this area was originally set aside for recreational and, in some instances, residential use. Joorst Park/King Neptune was designed as a residential area for approximately 14 000 people, supported by a family facility. This has occurred in a small way to date but there is no major facility developed (Jonathan Mercer, Forward Planning Division PEM, Pers. com.). The manner in which Coega is planned and the type of industry attracted to the area will influence prospects for development in the neighbouring areas. It is important to note that Markman Industrial Township was initially set up as an area suitable for heavy industry - however this failed to happen and the plan was modified to adapt to smaller industry.

The trend has been towards industrial development in a north-easterly and north-westerly direction. There is no industrial development, either existing or planned, occurring along the south coast of the City. The planned Coega DZ is far larger than the area occupied by all of the other existing industrial areas - more than five times the size. Thus it may be assumed that the south coast of the city is planned to fulfil the recreational needs of the city, particularly if the Coega initiative takes off. On the other hand, the east coast of Algoa Bay and its hinterland does offer considerable tourist potential and it is considered essential that any industrial development be introduced and controlled in such a way that it does not impact negatively on tourism potential. The issue that needs to be assessed is whether industry and recreation can exist side-by-side, if measures are taken to ensure adequate control over the aesthetics and the quality of the environment. It is particularly important to consider the image projected by the city to tourists and visitors as they enter from the north-east - industrial development thus needs to be planned in an attractive way.
7.10 THE COEGA DZ INITIATIVE

7.10.1 BACKGROUND TO THE DZ.
The origins of the Coega project go back to the 1970's when the potential for constructing a deep water harbour at Coega was recognised. Plans for the harbour were resurrected when, in June 1996, Gencor (now Billiton) announced its intention of establishing a new zinc refinery in the Eastern Cape. The refinery would import raw materials and export its product, and so would require bulk port facilities. Other businesses, e.g. Kynoch and PPC, also expressed interest in locating at Coega.

Industrial policy in South Africa is undergoing a change at present. A central part of South Africa’s industrial policy lies in the creation of Spatial Development Initiatives (SDI’s). The SDI programme was initiated by government as a crucial part of South Africa’s economic policy (see section 3.2.1).

The decision on where to locate SDIs is based on two fundamental criteria. Firstly, the redistribution criterion requires that SDIs are located in areas that are economically disadvantaged as a result of South Africa’s apartheid past and therefore in need of development. Secondly, the area should demonstrate the potential for economic advancement and the ability to sustain economic growth (Lewis & Bloch, 1998).

The success of SDIs, and within them DZs, rests on the local strategic advantages afforded to them by the quality of the local infrastructure. Physical, transport and communication infrastructures are vital, as are the services of a dedicated, investor-friendly DZ management.

Industrial policy in South Africa over the past few years reflects a move away from incentive based location programmes, which have often proved costly and economically unsustainable, towards programmes that build on existing industrial agglomerations. The SDI programme is premised on the presence of sustainable industrial agglomerations (or economic clusters) in a particular area (see section 3.4). This is in line with current international thinking on local economic development, which focuses on such clusters of economic and industrial activity and the competitive advantage afforded to industries in locating in these clusters.

In general, clusters depend not only on appropriate infrastructure, but also on ‘anchor’ tenants who act as catalysts for further investment and as a magnet for other economic activity. ‘Anchor’ projects are usually large scale and, in the construction and operational phases, present large-scale employment opportunities and other economic benefits for local enterprises.

The Coega DZ would require the presence of a few large “anchor” tenants. A number of forward and backward linkages exist, which stem in large from the by-products of some of the potential developments. The linkages between the various anchor tenants are vital to the success of the overall cluster development.

7.10.2 INDUSTRIAL DEVELOPMENT AT COEGA
The Coega DZ and port form part of the Fish River SDI which focuses on two nodes, one at East London and one at Port Elizabeth. Unlike many of the other SDIs in South Africa, which have large agricultural and tourism components, the Fish River SDI is fundamentally an industrial development initiative. It seeks to regenerate the industrial and economic hubs of the Eastern Cape, which have declined in recent years. The main industrial components of the Fish River SDI are in the motor industry, wood industries (including forestry production, sawmills and pulp for the paper industry), wool, mohair and textiles. The SDI in essence builds on the existing industrial base and seeks to expand on the existing competitive advantage of the area in these industries.

The motor industry in the Eastern Cape has, over a number of years experienced decline and contraction. Recently however, there has been an increase in the levels of investment and an automotive cluster initiative has been established and is being supported by government. In addition, progress has been made in developing the fibre cluster initiative that involves textile, wool and mohair producers (Jourdan, 1998).

The port and the DZ will not be at odds with the other development initiatives in the area, particularly the Markman industrial development. The existence of other industrial developments means that there is a certain amount of existing infrastructure, both physical in terms of manpower, that can compliment the Coega development.

The dominance of the motor industry in Port Elizabeth means that the strategic importance of the Coega DZ is very high. The motor industry in South Africa has been struggling for many years to become internationally competitive, and the ability to integrate with upstream industries will go a long way towards achieving this competitiveness.
7.10.3 THE CORE DEVELOPMENT AREA
Securing “anchor” tenants for the Coega DZ is a key aspect of the work currently being undertaken by the Coega Development Corporation. South Africa’s arms procurement has provided opportunities to pursue counter-trade initiatives in this regard. There is also a proposal for the establishment of a stainless steel plant at Coega by Ferrostaal. With the confirmation of the arms deal, it is likely that Ferrostaal would be the anchor tenant in the Core Development Area, replacing Billiton, which was forced to seek a new technology partner to join it in the venture after Mitsui withdrew as a result of the Asian financial crisis. Discussions are also taking place, involving the government, Coega Development Corporation (CDC) and a number of other potential investors. Thyssen SA has also considered locating to Coega for the development of its galvanised mill. In addition to the “anchor” tenants, a number of other investors have expressed interest in locating operations in the DZ.

7.10.4 DEEP WATER PORT
The transport of bulk products, and the inputs required to produce them, will rely heavily on the location of a nearby harbour. Should the projects be located far from a port, transport costs will be prohibitively expensive and would most likely result in many projects being financially unviable.

The existing port in Port Elizabeth is unable to expand because of its position and there are a number of significant opportunity costs associated with the present site and its present use. Iron ore dumps at the port are not only unsightly but are an environmental hazard as iron ore is often blown across the city. The construction of Coega would release many of the constraints associated with the existing harbour, enabling it to be developed in the same vain as the Waterfront development in Cape Town, which would act as a boost to tourism in the city centre.

There are a number of competitive advantages to the siting of a deep-water port at Coega. Firstly, Coega is equidistant between Durban and Cape Town and is therefore geographically well placed within South Africa. Secondly, the port would be on one of the busiest international sea routes and would provide access to the Americas, Europe and the Pacific and Indian Ocean Rim. Lastly, the palaeo-channel at the mouth of the Coega River means that dredging costs can be kept to a minimum. Thus the port can be developed at Coega more cost effectively than at other sites within the Fish River SDI.

7.10.5 REVENUE AND COSTS OF THE DZ
The economic benefits of the Coega DZ will be considerable for the greater Port Elizabeth area and for the country as a whole. The total investment planned for the Core Development Area is not clear at this stage but the signing of the R30 billion defence contracts and agreements worth even more have breathed new life into Coega (Herald 1999). Thyssen SA’s galvanised mill is estimated to be worth R1.8 billion. The total investment of the previously planned Gencor zinc refinery, the Kynoch phosphoric acid plant and the PPC cement works was estimated to be R3500 million. With the additional investors that showed interest in locating in the DZ, the investment could have reached as much as R4 000 million.

The building of the port is expected to cost about R1 000 million and infrastructure investments are likely to require a further R500 million investment. In addition to these expenditures, marketing, management and development are expected to require an investment of R150 million in the first five years.

As no information regarding GDP and employment could be obtained for the defence contracts and agreements, as well as the Thyssen SA mill, the previously planned Billiton zinc refinery, the Kynoch phosphoric acid plant and the PPC cement works have been as an example to illustrate the GDP contributions and employment levels. Other investments of similar capital are likely to result in comparable benefits. The GDP contribution is summarised in Table 7.10.

Table 7.10 GDP Contribution as a result of the Coega DZ (1998 – 2005)

<table>
<thead>
<tr>
<th>GDP (R million) from Construction, Operations and Induced Tourism</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
</tr>
<tr>
<td>Eastern Cape</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Source: KPMG, Economic Impact Assessment
8. SPATIALLY DEPENDENT IMPACTS

8.1 INTRODUCTION

This chapter compares the sensitivity map produced for the Coega DZ (CES 1997b) with the Development Framework Plan (DFP). The maps were compared to see if there where any differences/contradictions relating to the proposed siting of different types of development within the different sensitivity zones. It is also important to consider where industry will be located, as a particular type of industry may have a different impact depending on its location and the sensitivity of the area. Due to this possibility, spatially dependant impacts were examined.

8.2 SPATIAL PLANNING AND SENSITIVITY

In the Terrestrial Ecology specialist report for the Strategic Environmental Assessment (SEA) of the Coega DZ, CES (1997b) described the constraints that the natural environment places on planning in the DZ. After analysing the terrestrial ecology of the DZ, a sensitivity map for the whole Coega DZ was produced. This map zoned the area into high, medium and low sensitivity areas. Criteria used to determine this included:

- topography
- the extent of specific vegetation types/animal communities
- conservation status of fauna and flora in the DZ
- the presence of species of special concern that could potentially be lost from the area should the development proceed
- the number of species of special concern
- habitat fragmentation, leading to a loss of viable populations
- importance and contribution to biodiversity
- potential for invasive species to colonise disturbed sites.

Habitats of conservation importance that were identified included Dune fynbos, Valley thicket (succulent thicket), Dune regions, including pioneer communities and bush pockets, Grassland, bushclumps and succulent thicket where endangered or endemic species are prevalent and Coega Kop.

This sensitivity information was then synthesised with additional issues such as the protection of representative areas of different habitats, habitat fragmentation, etc. The end result was a map of planning zones in the DZ (Figure 8.2a) aimed at guiding development. The map includes GO, GO BUT and NO GO areas that are defined as follows:

**GO Areas:** These are areas with a low sensitivity that have been severely disturbed, and/or already contain development. Restrictions or conditions are limited to the preparation of an initial Environmental Impact Assessment (EIA), which meets current legal requirements in terms of the Environmental Conservation Act (No. 72 of 1984).

**GO BUT Areas:** These are areas with a moderate sensitivity, based on the classification described in Chapter 7 of the CES (1997) report. The vegetation and habitats in these areas have had limited disturbance. Conditions for development include the preparation of a detailed EIA that specifically addresses mitigatory measures, which at the very least meet existing environmental standards.

**NO GO Areas:** These either occur in areas with a high sensitivity, or are zones that have important ecological functions. No development should take place in these areas, but it is recognised that in certain exceptional cases, development may need to take place. This would be the case for the harbour, which needs to be located along the coast, and access routes. Conditions include the preparation of a comprehensive EIA, and mitigatory measures that exceed existing legislated environmental standards.

Site specific recommendations were also made. These included the following:

1. The dune habitat (foredunes, hummock dunes and dune slacks) of the coastal section should not be developed or disturbed, but protected.
2. Access to the dunefields should be restricted, and specific access points developed. This has been defined as a NO GO area.
3. No areas with Dune Fynbos should be damaged. A buffer zone of at least 50m should be established around the vegetation communities, defined as a NO GO area.
4. Access roads and transport corridors should be designed to link the NO GO areas by leaving an adequately wide road reserve.
5. The steep banks of the Coega estuary and the vegetated dunes adjacent to the north should not be developed.
6. The Coega Kop eastern section should not be disturbed as it contains many endemic plants, some only found on this site.
7. If possible, factories and other developments should be located in areas of maximum disturbance by alien vegetation, augmenting the NO GO and GO BUT concepts.
8. An area south of the N2 and west of the salt works was identified as a possible NO GO area (Figure 8.2a). The vegetation of this area was provisionally classified as Bontveld, but at the time of the report, the conservation status and significance of Bontveld was still a matter of some debate. Thus, the report recommended that this area be provisionally classified as a NO GO zone until such time as the status of Bontveld could be elucidated, hence NO GO?

Figure 8.2a was used as the basis for the preliminary spatial framework plan, which showed possible areas for Phase 1 of the DZ and NO GO areas for industrial development in the SEA (Figure 8.2b, CSIR, 1997). These in turn formed the basis of the Development Framework Plan (DFP) (Figure 8.2c).

8.3 THE DEVELOPMENT FRAMEWORK PLAN (DFP)

The CDC compiled, with advice from Gibb Africa and Metroplan, a Development Framework Plan (DFP) for the Coega DZ. This DFP aims to provide an overall development strategy for the Coega DZ by identifying a series of defined objectives so that the implementation of the Coega DZ can progress from concept to detailed planning and design. It achieves this by:

- providing a robust but flexible land use, transportation and infrastructure strategy for the Coega site,
- ensuring that the strategy conforms with National Policy for the planning of Development Zones,
- confirming that the strategy is consistent with local planning initiatives, commitments and objectives, and
- demonstrating that the strategy is based on previous feasibility studies, and current “best practice”, as demonstrated in similar projects.

The DFP also aims to contextualise the DZ from a regional perspective, by ensuring that its relationship to Port Elizabeth and its Comprehensive Urban Plan and surrounding development is taken into account. More importantly in the context of this report, the DFP describes the development potential of the site, identifying material and man-made constraints and opportunities. This was achieved through the creation of a series of Development Clusters, which include a wide range of industrial, business, leisure and transport activities. Each cluster has its own internal economic benefits arising from close proximity to other industries in the same development area. The clusters have been defined on the basis of current demand, international and national market analysis, experience of similar large-scale development initiatives and the opportunities provided by the site and its regional context. The proposed Development Clusters are for:

- bulk cargo deepwater port, and related development
- metal industries for refinement and production, and related development
- business and leisure activities
- electronics assembly and manufacture, with related development
- automotive assembly and manufacture and related development
- mineral processing and construction related industries
- international standard freight/passenger airport, and related development
- training and academic institutions related to the Development Zone activities.

Implementation of the DFP will be phased in response to market demand, but early implementation is planned for the Medium/Heavy Industry Cluster, the Light Industry Cluster and for the Port Cluster. Associated transport and infrastructure corridors will be designed and constructed to serve this phased development. The clusters as defined in the DFP are illustrated in Figure 8.2c. In this map NO GO areas have been defined as open space, and a set of procedures to deal with any deviations has been developed.

8.4 SPATIALLY DEPENDENT IMPACTS

8.4.1 RATIONALE

Due to the different levels of environmental sensitivity in various areas in the DZ (see section 8.2), the same type of industry may impact differently on different zones of sensitivity. For example, the cumulative impact of a heavy industry cluster on a GO zone may be low, whereas in a GO BUT zone it may be more significant. Although difficult to quantify, these potential impacts arise from land-use planning issues, which in turn result from rezoning. They must therefore be examined.
This section thus aims to assess the suitability of the spatial planning presented in the DFP (Figure 8.2c) from an environmental perspective. Although, theoretically, these concerns were incorporated into the DFP, liaison with authorities has stimulated discussion in this regard, and it was felt that a detailed examination of the spatial framework plan was required.

8.4.2 CORRELATION BETWEEN THE DEVELOPMENT FRAMEWORK PLAN AND SENSITIVITY ZONES

The spatial framework presented in the SEA (CSIR, 1997 & Figure 8.2b), on which the DFP is based, closely follows the sensitivity map presented in CES (1997), with two exceptions, namely areas C and E.

**Area A** on Figure 8.2b was designated as suitable for heavy industry, although this would be visually intrusive due to its proximity to Motherwell. This designation was given due to its close links to the port and particularly due to its geotechnical characteristics, which enable the ground to support heavy structures. This corresponds to a GO BUT zone (CES, 1997). Within the DFP, most of Area A is designated as medium to heavy industry, with some general/light industry and a training area. It is unlikely that any significant impacts will result from this zoning but levels of air pollution will need to be carefully monitored.

**Area B** did not fall into the area examined by CES (1997), but was zoned for light industry by CSIR (see Figure 8.2b). Part of this area falls within the Core Development Area (see Figure 8.2c) and has been zoned for future light industry and an undetermined use area in the DFP, and therefore complies with the SEA. Medium and heavy industry were precluded on the basis of the proximity of the area to Motherwell.

**Area C** was designated a GO area (CES 1997). The SEA (CSIR 1997) suggested that it was suitable for light industry, storage and service areas for the port, and this has not been upheld in the DFP, which designates the area as medium to heavy industry (Fig 8.2c).

**Area F** (Figure 8.2b) is visually sensitive due to its proximity to the N2 and/or the sea. It was zoned for light industry (CSIR 1997), and the DFP locates light industry clusters in this area.

**Areas D and G** (Figure 8.2b) do not form part of the Core Development Area and are therefore not addressed in this study.

**Area E:** Although most of the NO GO zones have been adhered to in the SEA and DFP, CES (1997) identified an area south of the N2 and west of the salt works as a possible NO GO area (see NO GO? in Figure 8.2a). The vegetation of this area was provisionally classified as Bontveld (see Plate 4.7b), but at the time of the report, the conservation status and significance of Bontveld was still a matter of some debate. Thus, the report recommended that this area be provisionally classified as a NO GO zone until such time as the status of Bontveld could be elucidated. The recommended studies have not been undertaken, and the SEA (CSIR 1997) incorrectly assumed that this area is a GO BUT zone, and assigned light industry to the area (designated E on Figure 8.2b), with the caveat that the area is visually sensitive. This concept has been carried through to the DFP.

Therefore, with the exception of Areas C and E (Figure 8.2b), the spatial framework as presented in the DFP has maintained and upheld the ecological sensitivities of the area as described in CES (1997b).

8.5 RECOMMENDATIONS

**Area C:** The difference in zoning of Area C in the SEA (light industry, storage and service area) and DFP (medium to heavy industry and the water reclamation works) must be addressed by the CDC as part of this area falls within the 1-in-100 year floodline. The Environmental Design Manual recommends that all facilities within the DZ should be constructed above the 1-in-100 year floodline (see Appendix B). The risks associated with having the water reclamation works as well as the medium/heavy industry below the 1-in-100 year floodline must be determined. If risks are unacceptable, then they must be located above the 1-in-100 year floodline, further to the south-west and out of the 1-in-100 floodline.

**Area E:** At present, Bontveld vegetation is assigned a high conservation value due to the number of endemic plant species it supports and its limited distribution in the Eastern Cape. Bontveld has also been recognised as a distinct community, and not a remnant of thicket or a successional state. In addition, Bontveld has three times the level of endemism (18%) of other vegetation communities in the Coega DZ and is thought to only occur in four or five places in the Eastern Cape, most of which are currently under threat from mining (J. Watson pers. comm.). Until such time as the Bontveld in Area E (Figure 8.2b) can be shown to be of low importance in terms of conservation of species and habitat, it should not be developed, and should be zoned as open space in the Core Development Area. Should Coega wish to proceed with development in this area, it is recommended that a
conservation planning study be undertaken. This would involve assessing the actual extent of Bontveld, rating the various patches of Bontveld identified in terms of their conservation value and assessing the level of threat to these patches. If it can be shown that the Bontveld in Area E (Figure 8.2b) is of low conservation value and that Bontveld is adequately protected elsewhere, then development in this area could be considered.
9. ENVIRONMENTAL ISSUES OF HIGH AND MEDIUM ENVIRONMENTAL SIGNIFICANCE

9.1 INTRODUCTION

In this chapter, environmental issues arising from project actions that will result from the rezoning of land from agricultural to special purposes are discussed. These environmental issues affect a number of systems and/or parties (see Table 2.2c). An environmental issue can be caused by a number of different project actions (see Table 2.2a) and can therefore have different environmental significance ratings (i.e. high, medium or low).

This chapter focuses on impacts of HIGH and MEDIUM significance. In developing an environmental management system (EMS) it is important to identify the cause of the impact so that it can be managed. A number of project actions cause the same impact, although the significance might differ. For example, a change in air quality (environmental issue) resulting from industrial operations (project action) has a HIGH impact on flora before mitigation, but a change in air quality resulting from the construction of the harbour has a LOW impact on flora. The important point to discuss from an EIA perspective is the impact of air pollution on flora, not the causative factor. Since this EIA was based on the database developed for the EMS, many of the LOW impacts identified as part of the EMS are in fact the same as those discussed for the MEDIUM and HIGH impacts, except that they are caused by different project actions. They would therefore already have been discussed. However, those environmental issues that are not covered by impacts with a MEDIUM or HIGH significance are discussed in section 9.3.

Residual impacts, those of HIGH significance after the implementation of various mitigatory measures defined in the EMS, are discussed in Chapter 10 (section 10.3 and Table 10.3).

In this chapter we discuss the environmental issues of HIGH and MEDIUM significance, and in section 9.3 five environmental issues of LOW significance. We also draw attention to the various mitigatory measures that have been developed in the EMS, and discuss addition mitigatory measures.

9.2 ENVIRONMENTAL ISSUES OF HIGH AND MEDIUM SIGNIFICANCE

9.2.1 EXCAVATION AND BUILDING ACTIVITIES

Excavation and building activities resulting mainly from construction activities may disturb historical and cultural sites and result in changes in landform and topography. The suggested mitigatory measures reduce these MEDIUM impacts to residual impacts of low significance.

Mitigation currently planned
Archaeological findings are protected by the National Monuments Act (Act 28 of 1969). Archaeologists will be called to investigate any possible archaeological find (shell middens, Stone Age tools, fossil bones and other artefacts) and provide guidance to the developer. Any accumulation of shells (shell middens) of 1m² and larger must be immediately reported. Significant historic/cultural sites will be incorporated into open space areas and no excavation will take place in open space areas. Graveyards, where possible, will be preserved, protected, properly fenced and not tampered with. If necessary special permission will be sought from relatives to move any graves.

9.2.2 CHANGE IN LANDSCAPE QUALITY

The establishment of the Core Development Area will result in a change to landscape quality. These changes are mainly a result of quarrying, construction activities and the provision of new services and infrastructure. These project actions impact on coastal erosion, landform and topography, and result in visual impacts.

The CDC has partial control or will be able to influence the various activities causing a potential change in landform. The mitigatory measures suggested in the EMS and EMPR will effectively reduce impacts of HIGH significance to MEDIUM (except for impacts on coastal erosion which will be reduced to LOW) and MEDIUM impacts to LOW. However, visual impacts resulting from construction activities will remain of MEDIUM significance, as these activities are visually obtrusive, but these visual impacts will be of short-term duration.

Mitigation currently planned
The design of the harbour will take coastal erosion into account to limit the interference of the harbour on coastal processes. A longshore drift sand bypass system will be installed. This will transport sand carried by longshore drift past the harbour. The investigation into the harbour design has refined the estimates of sediment transport to
provide the operational specification for the jet pump system. The engineering design of the pump has taken the natural variation of longshore drift into account.

The topography of the western Kop is already severely disturbed. However, the rehabilitation guidelines laid out in the EMPR (CES 1999) and the landscaping guidelines (Appendix B) will reduce the visual impact. The view from the northern side of the Kop must not be disturbed as this is currently in good condition.

All landscaped areas that are damaged during construction are to be reinstated to standards acceptable to the Environmental Manager (EM) in accordance with the landscaping guidelines (Appendix B) and the EMP for construction (Appendix C). Measures will be taken to control the erosion of exposed sand by wind action and rain. Slopes will be stabilised by planting or other appropriate measures (e.g. biodegradable organic geo-textiles, terraforce retaining walls, etc.). Earth mounds/berms that enhance the landscape character and help to screen facilities should be considered. Locally occurring indigenous vegetation should be used wherever possible, and lawn areas should be limited with only indigenous species such as Cynodon dactylon or Stenotaphrum secundatum used. Landscaped areas should be maintained according to normal horticultural practices and standards. All hard landscaping elements must be maintained to an acceptable standard that compliments the overall standard of the Coega development. No landscape refuse should be dumped or stockpiled or allowed to enter the Coega River, and should be composted for later use.

Rehabilitation specifications for the back of port area has been prepared for the construction phase, and will be included in the tender document (CES,1999).

Existing access roads and services through sensitive areas should be used in preference to the construction of new infrastructure. If this is not possible, land-use planning must attempt to locate these services in areas that will have the lowest possible impact on landform and topography. Before construction, all topsoil will be stripped and stockpiled in piles no more than 2m high in order to minimise compaction and composting, and they should be domed to promote run-off. An area should be designated for holding plants for transplanting in consultation with a botanical/horticultural expert for re-use. Locally occurring indigenous vegetation should be used for rehabilitation.

9.2.3 BULK MOVEMENT OF MATERIAL
The bulk movement of materials generally takes place during the construction phase, so impacts are of short-term duration. These impacts may result in a disturbance to historical or cultural sites, visual impacts, changes in landform and topography and, in the case of the harbour, coastal erosion. These impacts are generally of MEDIUM significance, except the visual impact during harbour construction, which will be of HIGH significance.

The suggested mitigatory measure included in the EMS and EMPR will effectively reduce impacts of HIGH significance to medium and those of medium significant to low.

Mitigation currently planned
The topography of the western Kop is already severely disturbed. However, the rehabilitation guidelines laid out in the EMPR (CES 1999) and the landscaping guidelines (Appendix B) will help to reduce the visual impact, as discussed in section 9.2.2.

A construction EMP developed for the Core Development Area states that all excess construction material must be removed from site at the end of the construction phase. Attempts should be made to deliver topsoil directly to its destination rather than stockpiling it. If this is not possible, stockpiling and landscaping guidelines should be followed, and stockpile sites must be fully rehabilitated after the removal of the stockpile and excess material disposed of in an appropriate manner. Any excavations and borrow pits must be fully rehabilitated. Underpass crossings will be constructed to cross the N2, which will reduce the visual impact of the bulk movement of material, as well as reduce the possibility of traffic congestion.

Significant historic/cultural sites (e.g. graveyards) that could possibility be impacted will be incorporated into open space areas. Quarry operations should be at a suitable distance from these sites so as not to impact on these due to the movement of bulk material (vibrations, material falling off trucks, etc.). If necessary, special permission will be sought from relatives to move any graves.

The harbour construction procedure, particularly the breakwater phase, will take coastal processes into account and attempt to minimise the effects on these, in particular coastal erosion to limit the interference of the harbour on coastal processes. A longshore drift sand bypass system will be installed in the form of a jet pump system (see section 9.2.2).
9.2.4 INCREASED ELECTRICITY CONSUMPTION
Electricity can either be provided by Eskom in combination with PEM, or as a private initiative. The current PE electricity capacity must not be exceeded. However, South Africa and Eskom currently have an oversupply of electricity, so no additional facilities/power stations will need to be constructed.

Electricity consumption, arising from most of the operations within the Core Development Area, from harbour and industrial operations through to lighting, results in MEDIUM negative impacts on natural resources. Coega could possibly influence these but generally exercises no control over these impacts, as the nature of industry is consumptive.

Mitigation currently planned
The cumulative energy demand must not exceed the supply capacity. However, the total supply capacity can be increased and penalties for exceeding allocated energy demands could be issued. The tenant approval procedure could control the electricity demand by limiting industries with bulk energy needs, if this became necessary.

Building/architectural guidelines (Appendix B) have been developed, which are based on sustainable construction and incorporate design guidelines as well as guidelines for the use of alternative materials, fixtures and technologies e.g. energy-efficient buildings, solar heating, utilisation of natural lighting, etc. The amount of lighting and the use of energy-efficient (solar panels) fixtures can be controlled by Coega.

9.2.5 INCREASED CONSUMPTION OF WATER
Water consumption is an important issue that results from the various construction and operational activities in the Core Development Area (CDA), and results in the depletion of resources. The suggested mitigatory measures will reduce impacts of HIGH significance to MEDIUM. However, impacts of MEDIUM significance will remain as MEDIUM, as the CDA will significantly increase the water consumption in the sub-region.

Mitigation currently planned
The CDA will be given a water consumption budget by PEM. The CDC will regulate the amount of water used in the Core Development Area and this can be done in the Tenants Approval Procedure. All prospective tenants will provide the CDC with projected water consumption requirements and the CDC must make sure that the cumulative demand does not exceed the supply. Every effort must be made to minimise water consumption during operations. A dual reticulation system will be provided for the CDA - one for potable water and the other for recycled/treated sewage effluent. Treated sewage and/or clean, captured storm water should be used for various operations, e.g. irrigation purposes, construction, etc., as opposed to potable water. PEM are also investigating the implementation of a scheme to produce approximately 20ML per day of treated effluent at the Fishwater Flats Treatment Works for distribution to the Core Development Area.

Landscaping should take the Department of Water Affairs’ “Water Wise Gardening Principles” into account. All landscaped areas should be covered with organic mulch, and underground or drip irrigation systems are encouraged rather than overhead or spray heads to reduce water loss by wind.

Roads and paved areas will be structured to allow the collection of run-off. This water could be captured and utilised wherever possible, for irrigation or industrial purposes. Water-saving fittings could be implemented wherever possible, e.g. non-return valves in the internal water supply line, dual-flush toilets and tanks that collect and store drain water can be installed.

9.2.6 INCREASED DISPOSAL OF SOLID AND LIQUID WASTE
The increased disposal of solid and liquid waste is an important environmental issue that will result from most activities in the Core Development Area, including concessionaire, harbour, storage facilities and industrial operations. The disposal of solid and liquid waste may result in a depletion of resources, is a nuisance to humans and may result in visual impacts.

Solid and liquid waste from a number of industries in the CDA will result in major biophysical impacts, which, although limited in extent, will be of HIGH significance. Mitigatory measures effectively reduce most of the impacts to MEDIUM significance, and those of MEDIUM significance to low, especially those that relate to construction activities which are generally of short-term duration. However, visual impacts of harbour operations remain of medium significance, as the visual impact of waste disposal at the harbour will be difficult to effectively mitigate. This is also the case for materials handling and storage and the operation of the sewage works.

Mitigation currently planned
Domestic and industrial waste will be disposed of at the Aloes Waste Tech site. A new (hazardous) waste site will be developed to serve the CDA and the region. A number of potential sites for the new hazardous waste site
have been identified. The selection process will not only take into account environmental variables but also social e.g. distance from residential areas. No hazardous or household wastes may be burnt with vegetation. Any materials used to assist with burning the vegetation must be strictly controlled and used in moderation with the approval of the Environmental Manager (EM). Cleared vegetation should only be burnt where it cannot be used as compost (especially in the case of cleared alien vegetation) but every effort should be made to utilise this material further.

A refuse management statement must be submitted to the EM for written approval prior to the commencement of activities. Refuse refers to all solid waste, including construction debris (wrapping materials, timber, cans etc), waste and surplus food, food packaging, etc. An on-site waste management system must be instituted in order to prevent the spread of refuse within and beyond the site. All waste shall be collected and contained immediately. No waste may be disposed of by burning or burying. Recyclable waste shall be disposed of into separate skips/bins and removed off-site for recycling.

A key opportunity of an industrial zone is the possibility of enacting ‘industrial ecology’. Incoming tenants will be obliged to provide information on their material inputs and outputs. It is envisaged that where this information is not confidential, that a register be made available to all companies within the Core Development Area so that opportunities for material and waste exchange can be identified and utilised. Waste sites should be carefully positioned so as to reduce the visual impact and should be placed in sheltered areas where refuse will not be carried by wind. Volumes of solid waste produced will also be monitored.

There will be separate pipelines for effluent and sewage waste. The effluent pipeline will incur heavy charges and go to a central effluent treatment plant where it will be treated before disposal/recycling. Operators/contractors must ensure that stormwater discharge from their sites complies with the DWAF specified standard. No chemicals, oils, process effluent, factory wash water, etc. must be discharged into the stormwater drainage system. Regular monitoring of ground water, surface water and the nearshore seawater, through a water-monitoring programme will take place. Should there be evidence of contamination, then the responsible person and the EM must agree on appropriate measures to be taken, which will be for the operator's account. Discharge of wastewater must not affect the environment into which it is released i.e. water must meet an acceptable discharge quality standard specified by DWAF before release. If marine effluent outfall is planned, allowances must be made for a separate scoping study.

Additional recommendations
It has been suggested that the water reclamation works must be above the 1-in-100 year floodline, with a buffer of 10-20m of riverine vegetation. However, the DFP (Figure 8.2c) places the water reclamation works within the 1-in-100 year floodline13 (as well as part of the medium/heavy industrial area). The risks associated with having the water reclamation works as well as the medium/heavy industry below the 1-in-100 year floodline must be determined. If risks are unacceptable, then they must be located above the 1-in-100 year floodline, further to the south-west and out of the 1-in-100 floodline.

9.2.7 GENERATION OF SUBSTANDARD WATER
The generation of substandard water may result from quarrying, construction activities and various operations within the Core Development Area. The generation of substandard water can impact on human health, flora and fauna.

The suggested mitigatory and monitoring measures and adherence to legal specifications will effectively reduce HIGH impacts to LOW. Mitigatory measures for construction activities have already been discussed, and include the establishment of conservancy tanks, controlling run-off and monitoring programmes. These effectively reduce impacts of MEDIUM significance to low. However, in the event of an upset, impacts on fauna are likely to remain of medium significance.

Mitigation currently planned
Separate effluent and sewerage systems will be designed (see section 9.2.6). Two of the key objectives for treated effluent management are to:

- use as far as practically and economically feasible the treated effluent for recycled industrial use;
- ensure that treated effluent prescribed quality standards are complied with.

The Fishwater Flats Water Reclamation Works for the treatment of effluent and sewerage can be utilised in the initial phases of DZ development. Water that is discharged from the Reclamation Works must meet DWAF's specified standards. Environmental targets have been formulated and give an indication of the comprehensive

13 As determined by Gibb Africa (Feb 1999). Project No. J80407A.
suite of factors which will be monitored. One of these are tenant indicators (Section 3.7.3) in which surface and groundwater quality will be monitored (pH, electrical conductivity, COD). There will also be monitoring of surface water, groundwater and nearshore seawater quality through a water monitoring programme. Should there be evidence that contamination of any of these systems has resulted, then the responsible person and the EM must agree on appropriate measures to be taken, which will be for the operator's account. The quality of water in the quarry void should be monitored for pH, as pyrites in the rock may cause slight acidification of the water.

The statutory requirements for wastewater discharge from land into the marine environment are integrated into the Water Act (Act 36 of 1998). Operators must ensure that polluted run-off is not discharged into the dune system, and may direct it into a local sewerage main, with written permission of the EM. Water that is disposed of into stormwater drains must meet DWAF's specified standards.

Waste water from any ablution facilities or kitchen facilities must be discharged into a suitable conservancy tank. The contractor shall be responsible for ensuring that the system operates effectively throughout the project and that the conservancy tank is emptied as required. The contractor shall ensure that polluted run-off is not discharged over land, and may direct it into a local sewerage main, with written permission of the EM. Alternatively, an earth/brick berm 0.5m high should be erected around such areas, to collect all run-off which must be stored in conservancy tanks for removal from site. Natural run-off must be diverted to stormwater drains where these are available. The contractor may discharge silt-laden water overland but no erosion may result. Limited quantities (<50l) of cement-laden water may be discharged overland per day, but not within 150m of the Coega River or other sensitive areas. Larger quantities must be stored in conservancy tanks and disposed of in an appropriate manner.

The EM must be informed immediately of any upset. The scale of the upset will be ascertained, and the surrounding biota monitored to assess the level of disturbance. The EM will determine if there are any mitigatory actions that can be undertaken. These will be for the account of the operator.

**9.2.8 INCREASE IN OCCUPATIONAL ACCIDENTS**

Occupational accidents could increase as a result of increased operations and activities within the Core Development Area and will impact on human safety. The suggested mitigatory measures below and adherence to legal requirements will effectively reduce this impact of MEDIUM significance to one of LOW significance.

**Mitigation currently planned**

All tenants/operators must comply with the Operational Health and Safety Act (Act 85 of 1993). In accordance with this act, all employees must be sufficiently trained and informed before undertaking potentially hazardous activities. Environmental targets have been formulated as part of the development of the EMS. Targets include a number of indicators, which will be monitored. These include health and safety indicators (e.g. lost time, injury rate, occupational health related diseases, and traffic accidents). All accidents and incidents resulting in injury and death are to be recorded by the responsible people in accordance with that act, and the EM must be informed of these incidents, together with steps taken to treat injuries and prevent repeat occurrences. Ambulance/paramedic facilities will be provided in the Core Development Area.

**Additional recommendations**

Emergency numbers should be displayed at prominent points. A first aid kit should be available, and a trained first aid practitioner should be available.

**9.2.9 INCREASED RISK OF RADIATION**

Radiation may result from certain industrial activities operating in the Core Development Area and impact on human health. However, the implementation of the EMS and good safety practices will reduce this potentially HIGH impact to LOW.

**Mitigation currently planned**

All tenants/operators must comply with the Operational Health and Safety Act (Act 85 of 1993) to ensure the safety of all staff (see section 9.2.8 above). A list of all hazardous substances must be submitted to the EM.

Targets formulated in the EMS include a number of indicators that will be monitored, including health and safety indicators (see section 9.2.8 above).

**Additional recommendations**

Warning signs should be displayed at strategic points warning employees of the possible dangers. Emergency numbers should be displayed at prominent points and employees must be familiar with emergency routines. Storage facilities must comply with all relevant national, regional and local legislation, and must be designed to minimise the risks of spillage, dispersal or damage to materials.
9.2.10 GENERATION OR USE OF HAZARDOUS SUBSTANCES
The generation of hazardous substances could result from a number of operations within the CDA and impact on human health and safety, and flora and fauna. The possible impact of HIGH significance resulting from the harbour operation will be reduced to LOW following the implementation of the EMS and good safety practices. The implementation of the EMS will effectively reduce most MEDIUM impacts to LOW. However, impacts resulting from serious marine spills (e.g. oil) will result in residual impacts of MEDIUM significance. Similarly, impacts resulting from accidents (e.g. road) involving hazardous wastes will also result in residual impacts of MEDIUM significance.

Mitigation currently planned
The Occupational Health and Safety Act (Act 85 of 1993) must be complied with to ensure the safety of all staff. Environmental targets have been formulated as part of the development of the EMS (see section 9.2.8).

Hazardous materials/fuels must be appropriately stored i.e. in a secured, sealed, roofed area that is clearly marked. A list of all hazardous substances on site must be given to the EM, together with storage procedures for these materials. If necessary, the advice of a specialist waste expert must be obtained with regard to the storage of hazardous waste. Such waste must be disposed of off-site by a specialist waste contractor, at a licensed hazardous waste disposal site and not into the sewage system. Servicing and refuelling should preferably occur off-site. However, if these activities occur on-site, that must take place in a designated, appropriately bunded site agreed upon by the EM. Appropriate materials and equipment to deal with ground spills of any materials used must be kept on site. In the event of a spill, the EM must be notified. Any spills should be cleared and the contaminated soil/sludge disposed of in an appropriate manner. All equipment that leaks onto the ground shall be repaired or removed immediately. Due to the high pH and chemicals contained in cement and concrete, these materials are regarded as highly hazardous. During construction, the contractor must ensure that concrete is mixed on mortar boards, all visible remains of concrete are removed and disposed of as waste and that all aggregate is removed.

Hazardous substance storage and waste disposal sites and operations involving hazardous substances must not be situated close to residential areas. Precautions will be taken in the planning of sites to eliminate the possibility of contamination of residential areas by hazardous substances.

It is probable that marine risks will increase once construction of the new port commences, through into the operational phase. An Algoa Bay Management Plan is in the process of being formulated to manage the marine environment. Guidelines will include recommendations regarding the release of ballast water. An oil spill contingency plan will be completed once more quantitative information about shipping operations become available and the relevant risk assessment has been undertaken.

9.2.11 GENERATION OF ACUTE TOXIC RELEASES
Acute toxic releases could result from various operations in the Core Development Area and from any upset that might occur in these operations. These will generally impact on fauna, flora, human health and safety, but none of these are of HIGH significance.

The suggested mitigatory measures will effectively reduce impacts on human health and safety to low. However, impacts on fauna and flora resulting from upsets and spillages at storage facilities and industrial operations, should they take place, will remain of medium significance as the biological environment will be impacted if preventative measures are not effective. Upsets will, however, depend on the nature of the substance involved/released.

Mitigation currently planned
Major hazard installation risk assessment will be undertaken at the application stage (Tenant Approval Procedure). Environmental targets have been formulated and a number of indicators will be monitored. One of these indicators includes health and safety indicators. (Section 3.7.3). All tenants/operators must comply with the Operational Health and Safety Act (Act 85 of 1993). In accordance with this act, all employees must be sufficiently trained and informed before undertaking potentially hazardous activities.

Operators must ensure that polluted run-off is not discharged over land or into watercourses, and may direct it into a local sewerage main, with written permission of the EM. Water that is disposed of into stormwater drains etc. must meet DWAF's specified standards. The statutory requirements for waste discharged from land into the marine environment are integrated into the Water Act (Act 54 of 1965). Ships must ensure that polluted run-off is not discharged into the sea, but kept in conservatism tanks and disposed of in the correct manner on land. The Dumping at Sea Act (Act 58 of 1973) controls the disposal and dumping of substances in South African territorial waters. All marine traffic must adhere to this Act. The Algoa Bay Management Plan is preparing guidelines for reducing the impacts of small craft and ships.
Appropriate materials and equipment to deal with ground spills of any materials used must be kept on site. In the event of a spill, the EM must be notified. Any spills should be cleared and the contaminated soil/sludge disposed of in an appropriate manner at a licensed hazardous waste disposal site. All equipment that leaks onto the ground must be repaired or removed immediately. Monitoring will take place and two of the key environmental issues that will be monitored include:

- surface water, groundwater and nearshore sea water quality, through a water monitoring programme; and
- air quality, through a real time monitoring programme.

Should there be any evidence that contamination of any of these systems has taken place, then the responsible person and the EM must agree on appropriate measures to be taken, which will be for the operator's account.

**9.2.12 INCREASED RISK OF EXPLOSIONS**

Explosions may result from unforeseen upsets in industrial and shipping operations, leading to impacts on human safety. Compliance with the suggested mitigatory measures and adherence to legal specifications will effectively reduce this MEDIUM impact to LOW.

**Mitigation currently planned**

All the necessary precautions to prevent explosions must be taken by the tenant/operator who must comply with the requirements of the Occupational Health and Safety Act (Act 85 of 1993). Fires and smoking should also not be permitted near any potential source of combustion, and spot fines will be imposed on transgressors. Spillages of flammable substances must be cleaned up immediately. Every possible precaution must be taken when working with spark-generating equipment, especially close to potential sources of combustion. Lost time injuries will be monitored. Safety back-up, in the form of ambulance and/or paramedic support, will be established in the Core Development Area.

**Additional recommendations**

Fire extinguishers and fire hoses must be maintained in good working order and should be situated at accessible points. The tenant/operator will be responsible for familiarising his employees with emergency evacuation procedures. Exits must be well sign-posted.

**9.2.13 INCREASED RISK OF FIRES**

The various operations within the Core Development Area could increase the risk of fires, which could result in impacts of MEDIUM significance on the flora and fauna. The mitigatory measures are similar to those in section 9.2.12 and, coupled by the fact that succulent thicket is generally a fire resistant plant community, will result in the residual impact of a fire having a low significance on fauna and flora.

**Mitigation currently planned**

A fire station will be established in the Core Development Area. All the necessary precautions to prevent fires must be taken by the contractor/operator in accordance with the construction EMP. He must ensure that fires are not started on site as a result of his activities, and should also comply with the requirements of the Occupational Health and Safety Act (Act 85 of 1993). No open fires shall be permitted on or off site. Closed fires or stoves shall only be permitted at designated safe sites in the construction camps. Recommendations in section 9.2.12 are also applicable.

**Additional recommendations**

In addition to the recommendations made in section 9.2.12 above, the contractor should be liable for any expenses incurred by any organisations called to assist with fire-fighting, and any costs relating to rehabilitation.

**9.2.14 CHANGE IN AIR QUALITY**

One of the most important environmental issues that will result from the Core Development Area is a change in air quality. Air quality by its nature affects a wide area and has an impact on a number of systems and/or parties. Harbour operations, industrial operations and harbour construction are some of the many project actions that cause air pollution. The planning and siting of operations within the zone determines the extent of the impact. These actions impact on human health, are regarded as a nuisance to humans, and will impact on flora and fauna.

Since the CDC has partial control or will be able to influence the various activities causing a potential change in air quality, the suggested mitigatory measures included in the EMS will effectively reduce impacts of HIGH significance to medium and those of medium significance to low.
Mitigation currently planned
The environmental principles and guidelines that have been formulated for air pollution are:

- initially no industry may use a disproportionate amount of the total maximum capacity of the atmosphere;
- visible plumes are to be disallowed;
- a 1 000m buffer zone must be created around heavy industry in which no residential development occurs;
- all material stores must be fully enclosed or surrounded by a minimum of three retaining walls opening away from prevailing winds;
- industries must initiate monitoring programmes for their specific concerns at least three months before commissioning;
- the list of substances subject to mandatory limit values must be expanded to include lead, nitrogen oxides and ozone.

A thorough, comprehensive real-time monitoring programme will monitor compliance with these guidelines.

Environmental targets have also been formulated as part of the EMS. The following indicators will be monitored: number of exceedances of ambient air quality; SO2 ground level concentrations; particulate matter ground level concentrations; carbon monoxide; particulate lead; nitrous oxide and ozone.

In addition, cumulative emissions will be regulated in the Tenant Approval Procedure. Prospective tenants are required to fill in a detailed form to ascertain potential environmental issues. One of the focuses will be on emissions and odours.

Land-use planning has attempted to locate all operations resulting in air pollution away from sensitive areas (including sensitive habitats, residential areas and farms). The siting of operations that generate unpleasant odours must be carefully considered (see Section 9.2.16).

A construction Environmental Management Procedure (EMP) has been developed and is designed to limit impacts associated with many activities/facilities including dust (section 3.7.7). A Dust Control Method Statement must be submitted to the environmental manager (EM) by the contractor, who is responsible for the continued control of dust arising from his operation. The contractor must advise the EM at least 48 hours in advance of ‘unavoidable’ dust-generating activities. The EM should inform adjacent landowners, tenants and communities of such activities. Suggested control measures include spraying of water on bare areas; rotovating straw bales, planting of bare areas and the scheduling of dust-generating activities.

9.2.15 INCREASED LIGHTING
Increased lighting as a result of the various operations and security and safety measures could result in visual impacts and could possibility be a nuisance to humans. There are presently no guidelines to reduce this potential impact and thus this impact remains of MEDIUM significance.

Additional recommendations
Guidelines for lighting should be developed to minimise light scatter and pollution, thereby reducing this potential impact. Guidelines could include restrictions on the number of spotlights used, colour of light (orange bulbs should be used), overhead lights rather than laterally orientated spotlights, which could impact on residential areas and road traffic. Where possible, buffers of natural vegetation, especially along roads, should be put in place.

9.2.16 GENERATION OF ODOURS
The generation of odours from the Core Development Area could be a nuisance to humans, especially to those working in the Core Development Area or living in the close proximity, e.g. Motherwell, Blue Water Bay, Swartkops, etc. If such odours are generated it is likely that there will still be residual impacts of MEDIUM significance.

Mitigation currently planned
Land-use planning should place any operations with potential for nuisance to humans as a result of odour as far from residential areas as possible, taking the prevailing wind into account. Air quality guidelines have been developed, and air quality will be monitored. (section 3.7.3 and 3.7.13).

9.2.17 INCREASED NOISE LEVELS
The increase in noise levels is an important environmental issue that results from various activities within the Core Development Area, ranging from quarrying, construction and various operations. These have an impact on human health and can be a nuisance to humans. The mitigatory measures suggested in the EMS will effectively reduce impacts of HIGH and MEDIUM significance to LOW.
The proximity of the harbour to the residential area at St Georges Strand is potentially problematic. Transport by rail/conveyor belt is likely to be a major source of noise.

**Mitigation currently planned**
Noise guidelines (section 3.7.8) have been developed to manage noise in the CDA and will be enforced via the tenant approval procedure, ensuring that all operations meet the requirements of the Environmental Conservation Act (Act 73 of 1989) and the SABS Code of Practice 0103-1997 regulations.

Land-use planning has taken noise-sensitive areas outside the Core Development Area (e.g. St. Georges Strand, Motherwell) into account by siting particularly noisy operations with care. Buffer zones of 1000m will be created around heavy industry in which no residential development will occur. Not only is this mitigation for air pollution, but it will also help to mitigate noise.

People will be advised in advance of noisy activities and working hours will be controlled. All residents within a 1000m radius of the quarry will be relocated. Blasting will only be during daylight hours and the quarry operator will comply with the noise guidelines (Jongens Keet Associates 1999) as developed for the Core Development Area. Sound attenuation measures will be put into practice (see EMPR), and all vehicles will comply with the Noise Control Regulations in the Environmental Conservation Act (Act 73 of 1989). The quietest process and machinery related to the process should be chosen. Sources of noise should be enclosed wherever possible.

**Additional recommendations**
If dredging of the approach channel is planned for the harbour it should take place outside the breeding season of the birds that are present on the islands.

### 9.2.18 CHANGE IN VISUAL QUALITY DUE TO TALL OR LARGE STRUCTURES

The various operations to be established in the Core Development Area will result in tall or large structures that have a visual impact. The visual impact will be difficult to mitigate and the residual impact is regarded as high, as it will affect a wide area, will be permanent and will definitely occur.

**Mitigation currently planned**
Wherever possible, land-use planning (DFP) has aimed to reduce the residual impact of such structures. Heavy industry has been mostly located in the centre and screened from the N2. Smaller scale or lighter industries are located in the outer portion of the Core Development Area.

**Additional recommendations**
Screens of vegetation could be placed strategically to minimise the visual impact.

### 9.2.19 REDUCTION IN HABITAT

A reduction in habitat will take place due to a number of activities, including the clearing and burning of vegetation, quarrying, construction activities and various operations planned for the Core Development Area. These activities impact by depleting resources and biodiversity, and also impact on flora and fauna.

The mitigation provided in the EMS and EMPR effectively reduce impacts of HIGH significance to MEDIUM. The impacts of MEDIUM significance remain MEDIUM after mitigation, due to the fact that there will be a reduction in habitat.

**Mitigation currently planned**
Land-use planning of the CDA will ensure that sensitive areas are not included in the areas zoned for development (these will be included in an open space management plan which has not yet been formulated). This will minimise the impacts on environmentally sensitive areas. Environmental targets have been formulated, and these include certain indicators which will be monitored, such as ecological integrity and conservation of rare species (section 3.7.3). The sustainability of Coega Kop flora will be monitored, as well the percentage cover of alien plant species in open space.

The contractor must inform the DEAET or a specialist three weeks in advance before site clearance to provide them (or their selected consultant, at the cost of the developer) with the opportunity to visit the site, and to instruct the contractor within one week of the visit whether rare and endemic plant species are to be removed from the site. Clearing and burning of vegetation should be planned in conjunction with site architects to ensure that the minimum amount of vegetation is removed from each site in accordance with the construction EMP (Appendix C). All plants that can be utilised for landscaping must be relocated prior to clearing of the vegetation to a suitable holding site or directly to areas being landscaped.
The quarrying of the western Kop will result in the reduction of the calcarenite substrate available to the endangered plant species, Orthopterum coegana. This highly localised endemic is restricted to three localities on Coega Kop. The habitat on the western Kop is already in a highly disturbed state. However, the knowing destruction of a species represents a contravention of the Biodiversity Convention of which South Africa is a signatory, and it is therefore imperative that the remaining specimens of this species be relocated to a secure site (proposed Swartkoppen site) prior to the commencement of quarrying. This secure site must fall within the open space and be given reserve status under the Coega Authority, and could ultimately be handed over to local or provincial authorities. Clearance of succulent thicket on the site must be kept to a minimum and all plant specimens that can be utilised in rehabilitation of the site must be relocated to a holding facility before the commencement of operations. All alien vegetation must be removed from the site.

The social and economic implications that arise from a possible closure of popular fishing grounds used mainly by recreational fishermen in the vicinity of the proposed harbour has been investigated. Representatives of the local fishing fraternity have been consulted in order to solve such a conflict and to avoid negative impacts on the communities that earn their livelihoods from fishing in the bay. As far as the abalone farm is concerned, the intention is that if they are not able to continue to operate they will be compensated and/or relocated.

**9.2.20 REDUCTION OF THE DUNE RIDGE**

A reduction of the dune ridge will take place during various construction activities, mainly associated with the harbour. Disturbance to this sensitive environment is inevitable and any disturbance to these areas must be kept to a minimum. A reduction of the dune ridge will impact on landform and topography.

As most construction impacting on the dune ridge will take place within the precinct of the harbour, the residual impact will be LOW. Similarly, impacts of MEDIUM significance will be reduced to LOW.

**Mitigation currently planned**

Access to the dune vegetation habitat will be via designated pathways that are indicated by signboards. Disturbance to these sensitive areas by bulldozers and earth-moving equipment during the construction of the harbour walls etc. must be kept to a minimum. Encroachment into these areas by adjacent development must be strictly monitored and curtailed, and clearly visible fences should be erected to designate the boundaries. The construction phase will be monitored at all times by the EM and the dune ridge will be fully rehabilitated and stabilised at the conclusion of construction. Rehabilitation specifications for the back of port area and roads sides have been prepared for the construction phase, and will be included in the tender document. Vegetation on adjacent dune ridges must be maintained to reduce management problems. These areas should be designated No-Go areas and fenced accordingly to limit access of people, prevent access of livestock, etc.

**9.2.21 PHYSICAL DESTRUCTION OR HARM TO VEGETATION**

The physical destruction or harm to vegetation will result mainly from quarrying, construction activities and the provision of services and infrastructure in the Core Development Area. Much of the vegetation in the area is of high conservation importance, however, the mitigatory measures suggested in the EMS and EMPR, and the land-use planning done in the DFP, reduce impacts of HIGH significance to MEDIUM. However, those of MEDIUM significance remain at this level of significance. It remains difficult to control the impact of informal settlements, which are likely to be established around the precincts of the CDA (mainly on the Motherwell side of the Core Development Area). The destruction or harm to vegetation may also impact on cultural or historic sites, as these sites may be disturbed in the process of vegetation clearance. However, mitigatory measures reduce this impact to LOW.

**Mitigation currently planned**

Land-use planning of the Core Development Area has ensured that sensitive areas are not included in areas zoned for development (these will be included in the Open Space Management Plan (section 3.7.10). The habitats of the two rare and endemic butterfly species will be fenced off by the CDC and this habitat must not be entered, used or disturbed under any circumstances. Environmental targets have been formulated, which include indicators that will be monitored. One of the indicators that will be monitored is the ecological integrity and conservation of rare species (section 3.7.3).

The construction EMP (Appendix C) incorporates a number of specifications designed to limit impacts associated with a number of activities/facilities. It is important that activities are conducted within a limited area so as to facilitate control and to minimise the impact on the existing natural environment. The contractor must demarcate the boundaries of the site in order to restrict his construction activities to the site. In order to minimise impacts on environmentally sensitive areas, access must be restricted during construction unless a written motivation is submitted to the EM and approved. Damage caused by the contractor to environmentally sensitive areas will be cause for the contractor to make good the damage and re-vegetate the area in accordance with the particular specifications. The contractor shall fence any environmentally sensitive area located within 20m of the
The fencing should extend along the boundary for sufficient distance to ensure that the location of the sensitive area is obvious from the contractor’s site and from the approach to the contractor’s site. Indigenous fauna and flora is to be protected within and around the site. The CDC must control the spread of informal settlements within its area of jurisdiction.

The quarrying of the western Kop will result in loss of remaining individuals of the endangered plant species, Orthopterum coegana, on the western Kop. As described in section 9.2.19 all specimens of this plant must be relocated to a secure site (proposed Swartkoppen site) prior to the commencement of quarrying.

Archaeological finds that could be disturbed during vegetation clearance are protected by the National Monuments Act (Act No 28 of 1969). Archaeologists will be called to investigate any possible archaeological find (shell middens, Stone Age tools, fossil bones and other artefacts) and provide guidance to the developer. Any accumulation of shells (shell middens) of 1m² and larger must be immediately reported. Graveyards, wherever possible, will be protected and preserved. If necessary, special permission will be sought from relatives to move any graves. Significant historic/cultural sites will be incorporated into open space areas.

9.2.22 INTRODUCTION OF ALIEN SPECIES
The introduction of alien species could result from the presence of a harbour (faunal species) and landscaping activities (floral species). The close proximity of the harbour and related infrastructure will increase the chances of alien organisms, especially rats, from entering the islands, and this will have a large impact on the breeding bird colonies. Incorrect landscaping procedures could result in the increase in alien plant species.

Implementing monitoring programmes and the use of guidelines suggested in the EMS can mitigate these impacts. However, the mitigatory measures suggested for the prevention of alien species from impacting on the islands will not be completely effective as the risk of introduction still exists. Thus, the HIGH impact will only be reduced to MEDIUM significance. The mitigatory measures to prevent the introduction of floral species effectively mitigate this impact, thus reducing its significance to LOW.

Mitigation currently planned
An Algoa Bay Management Plan (section 3.7.11) is presently being prepared, which will manage activities in Algoa Bay, including guidelines for the control of alien species. (e.g. rats). Environmental targets have been formulated by which proposed indicators will be monitored to ensure effective environmental management. These include the maintenance of ecological integrity and conservation of rare species (see section 3.7.3), e.g. the sustainability of Roseate terns on the islands, and the monitoring of the percentage cover of alien plant species in open space areas.

Disturbed areas are prone to alien species invasion, both plant and animal. These sites will be carefully monitored by the EM to ensure that alien species do not become established, thus limiting indigenous species and reducing faunal habitats. Alien plant species eradication must be carried out on an ongoing basis.

Landscaping guidelines (Appendix B) have been developed for the Core Development Area. Aside from landscaping principles, there are also guidelines pertaining to site preparation, vegetation, irrigation and maintenance. Species must be carefully selected for landscaping purposes, ensuring that no potentially invasive exotic species are used. The guidelines encourage the use of indigenous vegetation endemic to the area, monitoring of unused open space in each tenant site and the removal of alien vegetation, etc.

Additional recommendations
The Algoa Bay management plan (ABMP) should place emphasis on the potential introduction of alien species onto the islands.

9.2.23 CHANGES IN FOOD WEBS AND PREDATOR/PREY RELATIONSHIPS
Various operations in the Core Development Area could possibly result in changes to food webs and effect predator/prey relationships. The close proximity of the harbour and related infrastructure will increase the chances of alien organisms, especially rats, from entering onto the islands, which will impact on breeding birds (see section 9.2.22). The suggested mitigatory measures reduce these MEDIUM impacts to impacts of LOW significance. However, the various mitigatory measures coupled with ongoing monitoring is likely to reduce the risk of rat invasion on the islands, but realistically one cannot eliminate the possibility of this occurring. Thus, the residual impacts from harbour operations remains of MEDIUM significance.

Mitigation currently planned
The Open Space Management Plan, which has not been formulated yet, will mitigate the terrestrial ecological impacts.
The harbour may alter the nature of marine activities in Algoa Bay. One of the guidelines that will be developed as part of the Algoa Bay Management Plan (ABMP) will relate to rat control measures on ships. There will be ongoing monitoring by UPE on the phytoplankton community.

**Additional recommendations**
The Algoa Bay management plan (ABMP) should place emphasis on the potential introduction of alien species onto the islands.

**9.2.24 INTRODUCTION OF BARRIERS TO PLANT AND ANIMAL DISPERSAL AND MOVEMENT**
The establishment of industrial operations, roads and other infrastructure will introduce barriers to plant and animal movement, impacting on both fauna and flora. The suggested mitigatory measures will reduce this impact of MEDIUM significance to LOW.

**Mitigation currently planned**
Green corridors will be incorporated into the land-use planning for the Core Development Area to ensure that open spaces are linked. The position of these green corridors and a relatively wide road reserve helps to mitigate these impacts. These green corridors will allow animal species to move between patches of open space and allow cross-pollination of plant species, rather than isolating potentially non-viable populations in ecologically non-viable ‘islands’. Corridors will be sufficiently wide to maintain ecological functioning. A 15-20m road reserve should be sufficient to achieve this, in addition to being aesthetically pleasing, and should be addressed during the formulation of the Open space Management Plan (see section 3.7.10).

**9.2.25 IMPROVED ACCESS TO AND FROM THE AREA**
Due to the integration of the Core Development Area with Port Elizabeth and the provision of new services and infrastructure, access to the Core Development Area will be improved, which will result in economic impacts and changes in social behaviour and interactions.

Changes to social behaviour and interactions cannot be mitigated, and economic impacts from the planning and siting of roads within the Core Development Area are, in reality, also difficult to mitigate. The new services and infrastructure will enable operations to function properly, and provided the siting of roads is done in accordance with the DFP, the residual impacts (of the HIGH impacts) will remain HIGH and positive. The MEDIUM impacts will remain mainly of MEDIUM significance.

**Mitigation currently planned**
The siting of the services/infrastructure has been done in the DFP. One of the key objectives of the transport system is to provide an efficient road and rail network, which will allow for the easier transportation of goods to the harbour for export. The design of the harbour will take this into account, e.g. loading facilities, etc. The improved access will benefit the surrounding communities and will cater for the expected influx of people into the area, whether working or seeking jobs.

Transportation planning is not yet complete. Items which are planned for or may be constructed for the Core Development Area include:

- iron ore and manganese railed in from Northern Cape to the bulk storage area, transported by conveyor to the port;
- oil and petroleum products transported via pipeline from port to the proposed tank farm east of the saltworks;
- cement from PPC brought to port by road;
- a conveyor and access road for the transport corridor;
- public transport provided by buses and taxis (which will facilitate the expected influx of people).

A commuter rail service is being investigated; and an airport may be constructed in the future.

Archaeological finds and other cultural or historic sites, which may be disturbed due to the siting of roads and infrastructure, are protected by the National Monuments Act (Act No 28 of 1969). Archaeologists will be called to investigate any possible archaeological find (shell middens, Stone Age tools, fossil bones and other artefacts) and provide guidance to the developer. Any accumulation of shells (shell middens) of 1m2 and larger must be immediately reported. Significant historic/cultural sites must be incorporated into open space areas. Graveyards, wherever feasible, will be protected and preserved, and will be fenced off and included in open space areas. If necessary, special permission will be sought from relatives to move any graves.
Additional recommendations
All planning of the DZ has been dovetailed with planning of the greater Port Elizabeth area and liaison with Port Elizabeth Municipality is ongoing. It is recommended that this arrangement continue for the duration of the project.

9.2.26 EMPLOYMENT OF PEOPLE
Unemployment in Port Elizabeth is estimated to be around 40% (see section 6.1), thus employment of people is one of the major positive issues resulting from the Coega DZ. The employment of people has both an economic impact (positive) but also results in a change in social behaviour and interaction, which may be positive and/or negative.

The CDC has partial control over the economic impacts, but can only influence the change in social behaviour and interactions that result from employment. The mitigatory measures will not effectively optimise economic impacts, nor mitigate any negative impacts in social behaviour or interactions. The HIGH economic impacts remain high positive, whereas changes in social behaviour and interactions are both positive and negative, but generally positive and of high significance. The MEDIUM impacts remain the same after mitigation (i.e. of MEDIUM significance).

Mitigation currently planned
The Coega Implementing Authority is engaged in a detailed programme of identifying, developing and matching the available skills against the human resource needs of potential tenants. The key human resource objectives include:

- Developing and co-ordinating systems for registration and recruitment of job seekers
- Identifying training providers in the region
- Assessing and training work seekers to facilitate fair and equal access to work
- Developing an industrial relations policy for the Core Development Area.

Local employment should be a priority with equal opportunity between men and women. A minimum wage must be negotiated with trade unions. Employees from businesses that need to be compensated as a result of closure/relocation should be considered first. Coega’s intentions are to provide one job per family that is relocated; however, it is not sure when this would be implemented. Other members of the Coega community will be subject to the procedures and rules that would normally regulate selection. A local recruitment office will be established to facilitate this. An audit of the type of skills required for the industries and a system of validation of the local status of workers has been done.

A vocational training centre is planned for the Core Development Area and training will be undertaken as soon as possible. Coega intends to train, equivalent to a maximum of one year, at least one person per family of the people relocated. If other members acquire jobs through the normal selection procedure they will be trained.

Additional recommendations
In order to maximise local employment, training facilities and programmes should be put in place. Institutions such as the East Cape Training Centre, Russell Road Technical College and BIFSA should be brought on board.

9.2.27 INFLUX OF PEOPLE INTO PORT ELIZABETH AND THE DZ
The influx of people is a difficult aspect to manage. It results from the various activities that will take place in the Core Development Area, and leads to economic impacts and changes in social behaviour and interactions. This in-migration has negative economic impacts as it might place strain on existing municipal services, health services, schools, etc. The provision of basic services to accommodate this in-migration has negative economic impacts, as the tax payer will have to pay for the provision of these services. Although employment opportunities are a natural mitigation, some social impacts will not be able to be mitigated. Local employment should be encouraged, however, this could cause tension between locals and out-of-town job seekers.

The HIGH impacts remain HIGH, as this issue is difficult to mitigate, and similarly, MEDIUM impacts will remain MEDIUM.

Mitigation currently planned
Infrastructure of at least a basic nature (roads, water, waste disposal, etc.) will be in place before any significant in-migration occurs. A series of infrastructure position papers have been prepared and an important principle adopted is that of phased construction of services and infrastructure in the Core Development Area.
Employment will be done through the establishment of a local recruitment office. This would discourage job seekers from entering the Core Development Area.

**Addtional recommendations**

Certain services may have to be upgraded to accommodate the influx of people, for example health facilities, schools, etc.

**9.2.28 INCREASED CRIME AND VANDALISM**

The various operations and developments planned for the Core Development Area may lead to an increase in crime and vandalism. These issues may result in economic impacts and changes to social behaviour and interactions.

These impacts can only be influenced and not controlled by the CDC. If the mitigation measures suggested below are followed, the impacts of HIGH and MEDIUM significance will be reduced to impacts of LOW significance.

**Additional recommendations**

All tenants should be responsible for securing their properties (fencing, security guards etc.). A satellite police station should be established in the Core Development Area, and police should be a visible presence patrolling the area, particularly at night. Security guards could be used at access control points and lighting should be provided to discourage crime/vandalism. Fencing and securing properties will have a positive effect on income and jobs in the security business in the Eastern Cape.

**9.2.29 INCREASED TRAFFIC CONGESTION**

Traffic congestion due to the establishment of the Core Development Area could result in a nuisance to humans. These impacts will reduce the residual impact to medium significance after the final transportation planning is complete.

**Mitigation currently planned**

Some of the key objectives of the transport system are to:

- provide an efficient road and rail network
- cater adequately for commuters

Final transportation planning is not yet complete, but some of the items which are planned for the Core Development Area include:

- the provision of public transport mainly by buses and taxis;
- the possibility of a commuter rail service is being investigated by the SA Rail Commuter Corporation.

Appropriate signage will be in place to allow road users advanced warning of potential congestion. Wherever possible, industrial vehicles will not use the N2 and will use underpass crossings.

**9.2.30 RELOCATION OF PEOPLE OR COMMUNITIES**

The CDC intends on purchasing all the land in the DZ, resulting in the relocation of people or communities, as residential land-use is incompatible with activities planned for the Core Development Area. The relocation of people or communities has economic impacts and results in changes to social behaviour and interactions.

Relocation will impact negatively on social behaviour and interactions, even though people will be compensated, as the relocation process can be very disruptive. Thus, impacts with a HIGH significance will remain HIGH. Similarly, impacts with a MEDIUM significance will remain MEDIUM.

**Mitigation currently planned**

Displacement of communities will involve their participation and consultation, and with minimum social disruption. Individuals will not be “worse off” after relocation than they were in the Core Development Area in terms of homes, lifestyle, schools, travel, medical services etc. Changes in social conditions will be monitored (Section 3.7.13). The Human Development Index (HDI) which is a composite index of life expectancy, literacy and income has been determined by the Human Sciences Research Council for a number of districts in the Eastern Cape. This index gives a good overall picture of the state of development and the standard of living in an area, and will be monitored.

The precise level and form of compensation options (e.g. cash pay-outs, housing subsidies, rental agreements, etc) has not been finalised. However, Coega intends to:
provide one job per family (other family members will be subject to normal selection procedures), however, it is not sure when this would be implemented;
provide training, equivalent to a maximum of one year, to at least one person per family;
give a financial compensation of R3000 per family regardless of whether the family may qualify for a housing subsidy from the Provincial Housing Board or not;
compensate communities that are worse off; and
protect graves and integrate these into the land-use plan wherever feasible. However, if necessary special permission will be sought from relatives to move any graves.

The core assumption concerning compensation is that there are no more than 300 family households in the Core Development Area.

**Additional recommendations**

Local authorities should make a commitment to the affected communities to use part of the monies obtained through rates and levies through developments in the Core Development Area to development resources and infrastructure for the communities. A relocation and compensation plan for affected parties must be formulated in consultation with these affected parties. The impacts of relocation on both the relocated communities and host communities must be monitored. This monitoring should also assess the effectiveness of the recommended compensation provided to relocated communities.

Box 9.2.30 provides details on the objectives and characteristics of the relocation and compensation plan that should be implemented.

### Box 9.2: Characteristics of a Relocation and Compensation Plan

A RCP should form an integral part of the Environmental Management Procedures presently being developed for the Coega DZ. The RCP is a standard planning and management tool for practically all large projects that need a degree of resettlement. An RCP typically includes the following features.

- Detailed situation report of socio-economic status prior to project implementation. This culminates in a database that includes details for each household impacted upon. This phase has already been completed for the Coega DZ.
- Organogram of consultative and negotiating structures at local, sub-regional and regional level.
- Detailed description of the magnitude and significance of impacts. This is also done at a household level.
- Detailed design of mitigation strategies and compensation measures. This usually culminates in a suite of options.
- Detailed description of the mitigation measures (by household) that will be undertaken to ensure that the impacts are managed.
- Detailed description of compensation packages available and agreed upon by each impacted household.
- Step by step plan for resettlement and the handing over of compensation. This should precisely detail individual responsibilities for 'when', 'what' and 'who'.
- Detailed plan for monitoring and evaluating the socio-economic status of impacted households over the duration of the project.
- Detailed plan for the mitigation of negative sub-regional impacts (e.g. containment of spread of social pathologies).
- Detailed plan for the optimisation of potential sub-regional impacts.
- Detailed plan for monitoring and evaluation of sub-regional impacts.

**9.2.31 LOSS OR DISRUPTION OF ESTABLISHED BUSINESSES**

There will be the loss or disruption of certain established business due to certain activities in the Core Development Area, for example construction activities. Those businesses that do not have to be relocated and can carry on as normal will obviously not be impacted. This issue may result in economic impacts (of HIGH significance) and changes to social behaviour and interactions (of MEDIUM significance). The mitigatory measures suggested in the EMS will reduce the significance of the HIGH impact to MEDIUM. However, the EMS does not effectively mitigate the social impacts of MEDIUM significance and these therefore remain at this level of significance.
Mitigation currently planned
If an existing business has to be relocated it must not be worse off than before. However, relocation should be a last option. As far as businesses/organisations are concerned the intention is that:

- they shall remain in the Core Development Area wherever possible and be governed by laws, guidelines etc. applicable to the Core Development Area.
- businesses that are not able to comply will be relocated.
- existing businesses no longer able to operate with in the Core Development Area owing to adverse environmental impacts will be relocated.
- some businesses will sell their properties at market-related prices.

Addition recommendations
A relocation and compensation plan for affected businesses must be formulated in consultation with these affected parties. IAPs have consistently highlighted as a source of great concern the fact that they have had very little or no direct contact with the CDC, and that their concerns are not being addressed. As the proposed Coega development is common knowledge, it is strongly recommended that representatives from the CDC make contact with affected businesses and land owners in the area.

9.2.32 INCREASED BUSINESS OPPORTUNITIES WITHIN THE DZ
The development of the Core Development Area could result in negative economic impacts on other areas due to increased business opportunities within the Core Development Area. These negative economic impacts are offset by positive economic benefits. Increased opportunities in the CDA would allow the existing harbour to specialise in container traffic and other "clean" activities, which would increase the tourism potential of the harbour itself, adjacent city centre and Kings Beach. It would further add momentum to the planned linking/integration of the harbour into the CBD as part of a "waterfront"-type development. The residual negative economic impacts from the concentration of various businesses in the Core Development Area are LOW.

Mitigation currently planned
Incentives will reduce the risk of the Core Development Area from failing. Scoping/EIAs for activities in the Core Development Area will be expedited by existing baseline information about the Coega area. This together with the tenants approval procedure and guidelines, will highlight areas of non-compliance, thereby streamlining the process. However, tenants locating to the Core Development Area will not be exempted from the EIA regulations. Clear guidelines regarding compliance with existing EIA regulations (DEAT 1998) should be formulated for the Core Development Area, in order to streamline the Tenant Approval Procedure.

Coega has influence by streamlining the application process to reduce costs to applicants, reducing tariffs, skills training, etc. Other incentives are being considered by the CDC and the government to entice businesses to establish themselves in the Core Development Area.

9.2.33 ESTABLISHMENT OF NEW BUSINESSES
Once the land has been rezoned and the basic infrastructure is in place, the establishment of new businesses will be encouraged. Stakeholders need to consider the cost of relocation or establishment (does it justify the benefits of moving to the Core Development Area?). Some businesses have already shown interest in establishing themselves in the Core Development Area. The establishment of business results in positive economic impacts of HIGH and MEDIUM significance.

Mitigation currently planned
See section 9.2.32.

9.2.34 INCREASED EXPORTATION OF GOODS
The increased exportation of goods will result in economic impacts of HIGH significance, resulting from various operations in the Core Development Area. As the main rationale for the DZ is economic growth, the residual impacts remain high positive.

Mitigation currently planned
New export businesses will be encouraged to establish themselves in the Core Development Area and businesses outside the Core Development Area will also be encouraged to use the harbour for exportation. Incentives are being considered by the CDC and the government, which should lead to the establishment of businesses. The DFP will have a positive impact on export companies, e.g. they could be sited close to transport facilities (rail), etc. to facilitate the exportation process. The storage of goods should be efficient and storage areas should be designed to reduce the risk of damage to goods.
9.2.35 CHANGE IN RECREATION AND/OR TOURISM POTENTIAL
The Eastern Cape has a number of tourism advantages, including the natural environment, coasts and beaches, nature reserves, mountains, cities and towns of architectural and historical interest, a variety of cultures, and a good climate (Nel 1996). Various activities within the Core Development Area result in possible changes to the recreation and/or tourism potential of the area, which result in economic impacts and possible changes in social behaviour and interactions.

The projected revenue from the Core Development Area should exceed the current revenue (recreation, tourism, agriculture, etc) within the area, so the HIGH and MEDIUM economic impacts resulting from the loss of recreation/tourism will be reduced to residual impacts of LOW significance. However, due to the fact that the recreational usage of the Core Development Area will be lost as a result of its development, the HIGH social impacts will remain HIGH. Similarly, the Medium impacts will remain MEDIUM.

Additional recommendations
The change to recreation and tourism brought about by the rezoning could be minimised by the possibility of locating recreational land-use along the coast, with industrial land-use further inland (landward side of N2). The only development that would have to be located on the seaward side of the N2 is the harbour and back of port area. However, at the moment, light industry has been proposed on the seaward side of the N2. It is strongly recommended that the location of this cluster be reconsidered, not only from a recreation/tourism point of view, but also from a conservation point of view (see section 8.4). If the harbour alone is located on the seaward side of the N2, the coast could still be used for recreation, e.g. fishing, walks, etc., and this will add to the revenue earned by the area. Should this be implemented it will reduce the HIGH and MEDIUM social impacts to LOW, as some recreational usage will be possible.

9.2.36 GOVERNMENT EXPENDITURE TO ESTABLISH THE DZ
The costs of establishing the Core Development Area and harbour, and the provision of various services result in economic impacts. This is an inevitable cost and it assumes that revenue of DZ and harbour will exceed costs. The residual impact is LOW. However, if the Coega Development Zone does not go ahead the impact will remain of MEDIUM significance.

9.3 ENVIRONMENTAL ISSUES OF LOW SIGNIFICANCE THAT HAVE NOT BEEN COVERED IN THE HIGH AND MEDIUM IMPACTS

9.3.1 INCREASED RISK OF TRAFFIC ACCIDENTS
Traffic accidents could increase as a result of increased operations and construction activities in the Core Development Area. Some of these impact on human safety, and can be mitigated by the various mitigation measures discussed below. The residual impacts from traffic accidents are regarded as LOW.

Mitigation currently planned
Roads in the Core Development Area will have appropriate pedestrian facilities and crossings, etc. (ensuring that the needs of pedestrians are provided for is one of the key objectives of the transport system). Speed limits will be advertised and enforced.

Wherever possible, construction vehicles will not use the N2 to avoid causing congestion. Underpass crossings will be constructed to cross the N2. Detours will be used wherever possible around the construction site. Construction vehicles using public roads must be roadworthy and adhere to speed limits, and traffic control measures should be put in place during construction. All vehicles carrying potentially harmful substances must be covered to prevent their contents blowing off and creating a traffic hazard. Any upsets that create a potential traffic hazard must be cleared immediately. Access should be restricted by the use of manned booms.

To avoid accidental collisions with whales, it has been suggested that ships in the bay must maintain speeds not exceeding five knots, and a whale watch must be on duty on all ships in the bay. Only current shipping lanes may be used, and all ships must be fully insured against accidents. All ships waiting outside the proposed new harbour must use the holding area for the existing harbour at PE.

Additional recommendations
- Speed limits in the vicinity of waste disposal sites should be decreased.
- All small construction vehicles should be fitted with amber safety lights to increase their visibility.
- Traffic control measures should be put in place e.g. red flags, traffic lights, speed bumps, etc.
- Intersections should be well lit at night. Roads must be maintained in a good condition and, during repairs, appropriate signage should be in place to allow road users advanced warning of potential congestion.
- The possibility of placing lights or boys at the perimeter of the marine reserves must be investigated.
9.3.2 INCREASED RISK OF ELECTROCUTION
Electrocution might result from various operations including the provision of lighting and telecommunications. The residual impacts after mitigation is regarded as LOW.

Mitigation currently planned
All employers must conform to the Occupational Health and Safety Act 85 of 1993. All accidents or incidents resulting in injury or death are to be recorded and reported in accordance with the Act. Environmental targets have been formulated and a number of indicators will be monitored. One of these indicators include health and safety indicators. (section 3.7.3). All employees must be sufficiently trained and informed before undertaking potentially hazardous activities. An ambulance/paramedic service will be provided in the Core Development Area.

Additional recommendations
Power and telecommunication cables should be underground wherever possible. Access to potentially dangerous sources of power must be restricted and well signed. Emergency numbers must be displayed at prominent points. A first aid kit must be available, and it is recommended that an employer/ee is trained in first aid.

9.3.3 LONGSHORE DRIFT
Longshore drift might be affected by harbour construction, resulting in a change in landform or topography, or coastal erosion. This aspect has been addressed in the design of the harbour to limit interference with coastal processes, resulting in residual impacts of LOW significance.

Mitigation currently planned
The impacts of the harbour could be mitigated by the installation of a longshore drift bypass system in the form of a jet pump system. This will transport sand carried by longshore drift past the harbour. The engineering design of the pump will need to take the natural variation of longshore drift into account.

Additional recommendations
The investigation into the harbour design must refine the estimates of sediment transport to provide the operational specification for the jet pump system.

9.3.4 INCREASED WAVE ACTION
Wave action will result from marine traffic and could cause coastal erosion. However, this impact is unlikely due to the level of wave action that already exists due to natural processes. The residual impact of this is regarded as LOW.

Mitigation currently planned
Appropriate measures to reduce this impact, e.g. breakwater, dolosse, etc, will be incorporated into the design of the harbour.

9.3.5 OPPORTUNITY COST
The acquisition of land for the DZ, and reduction in various tariffs result in an opportunity cost. This LOW economic impact is naturally mitigated, as the revenue of the DZ is expected to exceed the revenue generated from other land uses such as recreation and agriculture. This will provide an incentive for the establishment or relocation of businesses to the Core Development Area, which will create employment, increase revenue of the area, etc. However, no incentives have been instated thus far other than providing a more streamlined process. If the Coega DZ does not go ahead there is no opportunity cost, as the other land uses, e.g. agriculture, recreational, etc, will persist in the area.

Mitigation currently planned
Incentives are being considered by Coega and the government to entice businesses to establish themselves in the Core Development Area, as discussed in section 9.2.32.
10. CONCLUSIONS AND RECOMMENDATIONS

10.1 INTRODUCTION

In the previous chapter, environmental issues arising from various project actions that cause impacts of HIGH and MEDIUM significance were discussed. Mitigatory measures have been suggested, which primarily centre on the establishment of an Environmental Management System (EMS), which is currently being developed. This EMS incorporates recommendations made in various environmental reports prepared for the Coega project, and establishes mechanisms and instruments to effectively manage the environmental issues of the Core Development Area. To a large extent, the effectiveness of the EMS will influence the significance of residual impacts, and the level of control that the Coega Development Corporation (CDC) has over a particular activity, product or service influences its effectiveness. For example, environmental issues for which there is direct or partial control can be more effectively managed in the EMS, whereas those activities which can only be influenced or for which there is no control cannot be as effectively mitigated, leading to residual impacts of higher significance.

In this chapter we provide an overview of the most significant environmental issues that could result from the rezoning of land from agriculture to special purposes, which have been discussed in more detail in Chapter 9. We also summarise and discuss any residual impacts of HIGH negative significance, and discuss the effectiveness of the EMS. Recommendations then flow from this analysis, with the final section drawing conclusions regarding the environmental implications of rezoning this area from agricultural to special purposes for the establishment of the proposed Coega Development Zone.

10.2 ENVIRONMENTAL ISSUES OF HIGH SIGNIFICANCE THAT CAN BE MITIGATED

10.2.1 INTRODUCTION

Table 10.2 summarises the environmental issues which result in impacts of HIGH significance that can be effectively managed. Specific impacts and the project actions that cause them are not presented, as these were discussed in Chapter 9. Before discussing these impacts we reiterate the significance ratings used (as described in Table 2.2d). These ratings are briefly described below.

Environmental impacts that have a HIGH environmental significance:
- will result in major biophysical or socio-economic changes
- will affect wide areas or a large group(s) of people
- will last for more than five years or be permanent
- will probably or definitely take place.

Environmental impacts that have a MEDIUM environmental significance:
- will result in major biophysical or socio-economic changes which are limited in extent OR will result in minor biophysical or socio-economic changes that affect wide areas or large groups of people
- will last for one to five years
- will be possible, i.e. might occur.

Environmental impacts that have a LOW environmental significance:
- will result in minor biophysical or socio-economic changes
- are limited in extent
- will last for less than one year
- are unlikely to occur.

10.2.2 IMPACTS OF HIGH SIGNIFICANCE THAT CAN BE MITIGATED

Activities that take place as a result of establishing the DZ will result in the permanent change in landscape quality, the destruction of flora and the loss of habitat. The most important environmental issues of HIGH significance that result directly from the operation of various industrial activities in the Core Development Area relate to the increased disposal of solid and liquid waste, the generation and use of hazardous materials and a reduction in air quality due to atmospheric pollution (Table 10.2). Noise levels could also increase, and water quality could decrease. Certain businesses may have to be relocated or may be disrupted in order to establish the Core Development Area. Secondary effects include increased crime and vandalism, and the introduction of alien vegetation. These impacts are effectively mitigated after implementation of the EMS and after consideration of the additional recommendations presented in Chapter 9.
Four social and economic benefits of HIGH significance result from the establishment of the DZ (Table 10.2). These are employment opportunities, the establishment of new businesses, the export of goods and the provision of improved access (road, rail and sea).

One of the major benefits arising from the establishment of the Coega DZ is the employment of people. Activities such as construction and the various operations that will take place lead to economic benefits from employment. This residual impact remains HIGH as it is optimised by means of a local employment strategy and equal opportunity for work seekers. The establishment of new businesses within the Core Development Area results in positive residual impacts of HIGH significance, as the streamlining of application processes to reduce costs to applicants, the implementation of skills training and the use of local suppliers ensure that these benefit remains HIGH. Similarly, the export of goods from the Core Development Area will result in a number of economic benefits of HIGH significance, arising from the various operations that will take place in the Core Development Area. These activities will increase revenue into the area, resulting in the establishment of new exportation businesses and increased utilisation of the harbour. The DFP has been designed to ensure that transport costs are minimal. Improved access to and from the area flows from a number of services provided in the Core Development Area. These result in positive residual economic benefits of HIGH significance, as the improved access will benefit surrounding communities and new services and infrastructure will enable operators to function more efficiently.

Since all these impacts can be managed, none will result in negative impacts of HIGH significance after mitigation. Residual impacts that cannot be effectively managed are discussed in section 10.3.

**Table 10.2** Summary of environmental issues which result in impacts of HIGH significance that can be effectively managed by the implementation of the EMS and other guidelines.

<table>
<thead>
<tr>
<th>Environmental Issue</th>
<th>Significance</th>
<th>Comment/Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Negative Impacts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Change in air quality</td>
<td>H</td>
<td>Affects most of CDA, and areas immediately adjacent. EMS effectively mitigates impacts</td>
</tr>
<tr>
<td>2. Change in landscape quality</td>
<td>H</td>
<td>Most of the 4120 ha of CDA affected. EMP for construction and landscaping guidelines reduce impacts</td>
</tr>
<tr>
<td>3. Increased crime and vandalism</td>
<td>H</td>
<td>Will occur within and possibly around the CDA. Additional security measures, including satellite police station</td>
</tr>
<tr>
<td>4. Increased disposal of solid and liquid waste</td>
<td>H</td>
<td>EMS, EMP and proposed services and infrastructure mitigate this impact</td>
</tr>
<tr>
<td>5. Excavation and building activities</td>
<td>H</td>
<td>Will take place over significance portions of the CDA. Architectural guidelines and construction EMP developed</td>
</tr>
<tr>
<td>6. Generation and use of hazardous substances</td>
<td>H</td>
<td>Environmental targets formulated as part of EMS and establishment of a hazardous waste site</td>
</tr>
<tr>
<td>7. Introduction of alien species</td>
<td>H</td>
<td>Areas cleared within the CDA will be affected. Environmental target is to maintain ecological integrity</td>
</tr>
<tr>
<td>8. Increased noise levels</td>
<td>H</td>
<td>CDA and its immediate environs will be affected. Noise guidelines have been developed</td>
</tr>
<tr>
<td>9. Destruction of flora</td>
<td>H</td>
<td>Approximately 3000 ha (75%) of the CDA will be affected. Open space system and rehabilitation guidelines</td>
</tr>
<tr>
<td>10. Reduction in habitat</td>
<td>H</td>
<td>As above</td>
</tr>
<tr>
<td>11. Generation of sub-standard water</td>
<td>H</td>
<td>Affects confined to the CDA. Must meet DWAF’s specified standard. Environmental targets have been established and monitoring will take place.</td>
</tr>
<tr>
<td>12. Loss/disruption of established businesses</td>
<td>H</td>
<td>At least 4 businesses affected. EMS effectively mitigates impacts</td>
</tr>
</tbody>
</table>
Significance

Positive impacts

1. Employment of people  | H | H | 11 555 temporary and 3 200 permanent jobs in the Eastern Cape. Local employment strategy optimises benefits.

2. Establishment of new businesses  | H | H | Require incentives to encourage new businesses

3. Increased exportation of goods  | H | H | Significant increase in revenue for sub-region

4. Improved access  | H | H | Road, rail and port facilities

10.3 RESIDUAL IMPACTS OF HIGH SIGNIFICANCE

After implementation of the EMS there are nevertheless four environmental issues that result in residual impacts of HIGH significance (Table 10.3). This assessment makes the key assumption that the EMS will be effectively implemented, and that the Ngqura Environmental Committee will be effective in its function as independent “watchdog”. It also assumes that the additional recommendations outlined in Chapter 9 will be considered, and that the recommendations suggested in section 10.5 will be implemented.

Although the DZ will be integrated with the planning of the greater Port Elizabeth area, there will be a change in recreational and tourism potential along the shoreline. Approximately 5 km of the 50 km of shoreline of Algoa Bay will be affected. Minimising the possibility of locating industrial land-use along the coast could mitigate this effect. However, the development framework plan indicates that certain industrial activities are located seaward of the N2, leading to a residual impact of HIGH significance.

The influx of people into the area results in residual impacts of HIGH significance, although we are unsure of the magnitude of this impact. Mitigatory measures such as the provision of basic services to improve the social conditions of informal settlements does not effectively mitigate the social consequences of in-migration. The establishment of these various informal settlements therefore has HIGH negative social impacts.

The development of the Core Development Area will result in the need to relocate 1276 people, causing social impacts. This displacement will have full community participation to minimise social disruption, and the communities will not be worse of than before the development. However, despite this, the residual impacts are still likely to be HIGH, as relocation is a very disruptive social process.

The DZ will host a number of industrial operations, which out of necessity will need to be large and possibly tall. The overall landscape will change significantly, and these facilities will be visually intrusive, resulting in visual impacts of HIGH significance that cannot realistically be mitigated.

<table>
<thead>
<tr>
<th>Environmental issues</th>
<th>Project action</th>
<th>Impact</th>
<th>Risk (for definitions see section 2.3.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Change in recreation/tourism potential</td>
<td>Establishment of DZ</td>
<td>Change in social behaviour</td>
<td>Likely</td>
</tr>
<tr>
<td>2. Influx of people</td>
<td>Concessionaire activities</td>
<td>Change in social behaviour</td>
<td>Likely</td>
</tr>
<tr>
<td></td>
<td>construction activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>industrial operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>provision of labour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Relocation of people or</td>
<td>DZ planning</td>
<td>Change in social behaviour</td>
<td>Definite</td>
</tr>
<tr>
<td>communities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Change in visual quality</td>
<td>Various operation/ DZ planning</td>
<td>Visual impact</td>
<td>Definite</td>
</tr>
<tr>
<td>due to tall or large structures</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10.4 EFFECTIVENESS OF THE EMS

It is evident from the above section that the EMS is very effective at mitigating most of the significant environmental impacts that will result from the establishment of the Core Development Area. The residual impacts of HIGH significance discussed in the above section cannot effectively be mitigated by the EMS, as they are generally not possible to control. These are generally secondary or induced environmental issues such as an influx of people to the area around the DZ and the effect on visual (landscape) quality.

In our detailed review of the database developed during the formulation of the EMS, it is our opinion that the EMS has identified all potentially significant impacts, as discussed in the preceding chapter. In general there is a close correlation between the significance ratings for the EMS, and those assessed in this EIA. In a few cases, the EMS identified a number of impacts of high significance that we have rated as MEDIUM, as we regard the effect of the impact less significant than the overall rating in the EMS. For example, the EMS recognised increased electricity consumption as having a high environmental impact. However, since South Africa has a surplus of electricity and no new power stations will have to be built, we have rated this impact as medium.

During the review of the EMS database, we did not identify any additional impacts of high or medium significance that the authorities should consider when reaching a decision.

10.5 RISK OF THE NO GO OPTION

Rezoning of the land from Agricultural to Special Purposes can only take place subsequent to the land being purchased by the CDC. However, there is a risk that the proposed Coega DZ may not proceed. Should this occur after the purchase and rezoning of the land to Special Purposes, the land would be available for industrial development, but with the demise of the CDC controls in the form of the EMS and other guidelines would not be in place. Should the Coega DZ not proceed subsequent to the rezoning of the land, one option is that rezoning be revoked so that the land could be returned to agricultural. An alternative option is that Government puts measures in place to prevent the unchecked development of industries in the area.

10.6 ADDITIONAL RECOMMENDATIONS TO BE CONSIDERED BY THE CDC

Clear guidelines that ensure compliance with existing EIA regulations (DEAT 1998) but streamline the Tenant Approval Procedure should be formulated for the Core Development Area. This streamlined approach must be approved by DEAT, and is not intended to circumvent existing regulations, but rather to build on the environmental work that has been undertaken for the Coega DZ.

Economic incentives could be developed to encourage development within the Core Development Area, as this will reduce the risk of the DZ failing.

Interested & Affected Parties have consistently highlighted their concern with regard to the fact that they have had very little or no direct contact with Coega, and that their concerns are not being addressed. As the proposed Coega development is common knowledge, it is strongly recommended that representatives from Coega make contact with all affected businesses, land owners and NGO’s in the area, and that the proposed communications strategy (see section 3.7.9) be developed and implemented as a matter of urgency.

A relocation and compensation plan (RCP) for affected communities must be formulated in consultation with these affected parties. This should form a specific component of the EMS, in the same way that the EMP for Construction has been developed. Box 9.2.30 in section 9.2.30 provides further details on the recommended RCP. Relocation should also be monitored in order to assess the changes in social conditions of those being relocated. However, the impacts of relocation on both the relocated communities and the host communities must be monitored. This monitoring should also assess the effectiveness of the recommended compensation provided to relocated communities.

A decision needs to be made by CDC and PEM as to whether certain services should be upgraded to accommodate the anticipated influx of people into the area, e.g. health facilities, schools, etc. This re-inforces the need to ensure that all planning of the DZ be dovetailed with planning of the greater Port Elizabeth area, and that liaison with Port Elizabeth Municipality is ongoing.

Clear guidelines, objectives and targets should be developed to ensure that local suppliers and contractors are used during the building operations, in order to maximise the economic benefits to the sub-region and the Eastern Cape.
The Algoa Bay management plan (ABMP) should place emphasis on the potential introduction of alien species onto the islands.

A decision needs to be made by the CDC and local government as to whether a satellite police station, with visible patrolling of the area particular at night, should be established as part of the proposed service centre within the DZ. Security guards could be used at access control points and lighting could be provided to discourage crime and vandalism.

Guidelines for lighting should be developed to help minimise light scatter and resultant light pollution. Guidelines could include restrictions on the number of spotlights used, colour of bulb used, the orientation of spotlights, etc. It must be noted that lighting is a mitigatory measure with regard to crime and vandalism and these guidelines should mainly be enforced in areas close to residential areas and public roads (e.g. N2).

10.7 RECOMMENDATIONS TO BE CONSIDERED AS CONDITIONS OF APPROVAL

The following recommendations should be considered as conditions of approval:

1. The CDC must adhere to its own Environmental Policy, which includes the implementation the EMS, including associated guidelines and procedures. CDC must demonstrate adherence to its EMS by receiving certification to the ISO 14001 standard before the commencement of construction of any infrastructure within the Core Development Area.

2. The implementation, as part of the EMS, of the following guidelines and reports developed for the Coega DZ, namely:
   - Noise guidelines
   - Air pollution guidelines
   - Tenant Approval Procedure
   - Environmental Design Manual (see Appendix B)
   - Construction Environmental Management Procedure (see Appendix C)
   - Algoa Bay Management Plan

3. The development of an Open Space Management Plan must be commissioned if the project gets the go ahead.

4. The recommended Relocation & Compensation Plan must be commissioned and finalised before construction, and there must be adequate consultation with affected communities.

5. Until such time as the Bontveld in Area E (Figure 8.2b) can be shown to have a low importance value in terms of conservation of species and habitat, it should not be developed (i.e. the NO-GO recommendation should be upheld), and it should be zoned as open space in the Core Development Area. Should Coega wish to proceed with development in this area, it is recommended that a conservation planning study be undertaken, as described in section 8.4 (Chapter 8). If it can be shown that the Bontveld in Area E (Figure 8.2b) is of low conservation value and that it is adequately protected elsewhere, then the proposed development as planned in this area could be considered.

6. The Environmental Design Manual recommends that all facilities within the DZ should be constructed above the 1-in-100 year floodline (see Appendix B). However, the DFP (see Figure 8.2c in Chapter 8) places the water reclamation works within the 1-in-100 year floodline (as well as part of the medium/heavy industrial area). The risks associated with having the water reclamation works as well as the medium/heavy industry below the 1-in-100 year floodline must be determined. If risks are unacceptable, then they must be located above the 1-in-100 year floodline, further to the south-west and out of the 1-in-100 floodline.

7. Should the Coega DZ not proceed subsequent to the rezoning of the land, the rezoning could be revoked and the land returned to Agriculture to prevent the unchecked development of industries in the area.

10.8 CONCLUSIONS

The approach adopted in developing an EMS for the Coega DZ, coupled with a Tenant Approval Procedure and various other guidelines and reports is an effective way of dealing with the large range of environmental impacts that will result from this development. This EIA has utilised the database developed as part of the EMS, and concludes that the various measures incorporated into the EMS will effectively mitigate most impacts.

Despite this, the establishment of the Core Development Area will permanently alter almost all components of the environment in and around the Core Development Area. The area will change from a partially developed (rural) area to an industrial one, having major visual impacts and significantly altering the landscape character. Certain industrial activities will lead to increased levels of air pollution. Changes in landscape quality, various impacts arising from the increased disposal of solid and liquid waste, increased energy and water consumption,
the possible introduction of alien species, noise, physical destruction or harm to biota and a reduction in habitat are all negative impacts that result from the establishment of the Core Development Area. Establishing a robust EMS can effectively mitigate most of these. Nevertheless, an EMS cannot mitigate all the negative impacts arising from this significant change in land-use. In particular visual impacts, the relocation of people or communities, the loss of recreation and tourism potential and the important secondary impact of in-migration of potential job seekers into the Core Development Area and surrounding areas cannot be mitigated effectively. These are regarded as the most important residual impacts resulting from the establishment of the DZ.

It is important to recognise that a large number of benefits will result from the rezoning of agricultural land to special purposes. Of particular importance are the potential employment opportunities the Coega DZ presents, both during construction and operational phases, which leads to positive economic and social impacts. The establishment of new businesses, the export of goods and improved access to the area also result in significant benefits. Thus, most of the benefits accrue to the economic environment, whereas the biophysical environment is negatively affected. For the most part, negative and positive impacts on the social environment are similar, except for the over-riding benefit of employment opportunities and concomitant improvements to social wellbeing.

From this analysis it is evident that the rezoning of land from Agricultural to Special Purposes will result in a number of HIGH negative impacts on predominantly the biophysical environment, but will result in a larger number of benefits of HIGH significance on the economic and social environments. If the additional recommendations, suggested in Chapters 9 and 10, as well as the suggested conditions of approval are incorporated into the management strategy for the Core Development Area, positive impacts seem to outweigh the negative impacts.

Figure 10.8  Positive impacts seem to outweigh negative impacts after the implementation of the EMS and the incorporation of the suggested recommendations.
11. References

Coastal and Environmental Services 1997a. Strategic Environmental Assessment of the Coega IDZ – Specialists report on ecological impacts of the proposed conveyor route. Coastal & Environmental Services, Grahamstown.
Coastal and Environmental Services 1997c. Coega port study: Environmental impacts of a quarry at Coega Kop. Coastal & Environmental Services, Grahamstown.
Coastal & Environmental Services 1999b. Stabilisation specifications and environmental management plan for the back-of-port area of the proposed Ngqura (ex Coega) harbour. Coastal & Environmental Services, Grahamstown.


Hosking, S. 1996. in Port Elizabeth and Environs, SA Today Publications.


Industrial Development Corporation of South Africa Limited. 1996. Data faxed through re: Manufacturing data for the PE Magisterial district, 2 April.


Mentz, M. 1995. Proposed land use planning policy for the provision and development of industrial areas in the Port Elizabeth One-city area, Draft Report, Forward Planning Division, City Engineer’s Department, Port Elizabeth Municipality, 23 November.


Nel, H. 1996. Opportunities and constraints for economic growth in the eastern Cape. Paper delivered at the NPI Conference, University of Port Elizabeth.

Oliver, R. 1996. “East Cape strikes have already cost R100m this year”, Weekend Post - Business Post, April.


Pakes, T.K. 1996b. The formal manufacturing sector in the Port Elizabeth Metropole: its relationship with the formally employed, the unemployed and the self-employed, Research Report No. 64, Institute for Development Planning and Research, University of Port Elizabeth.


Port Elizabeth Regional Chamber of Commerce and Industry. 1996. Port Elizabeth-Uitenhage: Gearing up for export-orientated industries, December.


SRK Consulting Engineers and Scientists 1999. Coega Implementing Authority, Groundwater impact study: Coega Quarry. SRK Consulting, Port Elizabeth.

SRK Consulting Engineers and Scientists. 1999. Groundwater impact study: Coega quarry. SRK Consulting Engineers and Scientists, Port Elizabeth.


Steffen Robertson and Kirsten 1998 Chapter 7: Hydrogeology

Weekend Post Business. 4th September 1999
REFERENCES USED IN CHAPTER THREE BUT NOT CITED

COEGA DEVELOPMENT ZONE

ENVIRONMENTAL DESIGN MANUAL

Task 14 000
SubTask D

November 1998

Prepared for:
Coega IA
Sports Bar Office Complex
Oakworth Rd
Humerail
6000

by:
African Environmental Solutions (Pty) Ltd
PO Box 53577
Kenilworth 7745
South Africa
Tel.: +27 21 797 8479
Fax: +27 21 797 8482

Report No: 14 000 D/1
INTRODUCTION

This manual is intended as a guide to the Coega Implementing Authority (IA), tenants, developers, consulting engineers, architects, contractors and other parties likely to invest in or assist with the development of the Coega Development Zone (DZ).

These environmental guidelines are intended as an addendum to the guidelines which typically apply in the engineering, architectural, construction, landscaping and other relevant professions. They do not replace the (technical) guidelines which are used as standard industry practice in most professions. The **purpose of these guidelines is to provide a reference source of guidelines to assist professionals working in the DZ to perform their work with due regard for environmental issues.** For example, the architectural guidelines do not relate to aesthetics and technical specifications, but suggest factors which should be considered in design. This is in compliance with the environmental policy of the Coega DZ which includes a commitment to environmental sustainability.

The guidelines have been assimilated from a number of sources and, wherever possible, customised to reflect the unique conditions at Coega. However, in many instances, standard guidelines which apply irrespective of location, biophysical conditions, local architectural, building and landscaping practices, and the scale and type of development, have been presented. Professionals will need to apply their own professional judgment to assess which guidelines are applicable to which developments, or parts of developments.

These guidelines are also applicable at different phases of development within the Coega DZ. Again, professionals should assess which guidelines are applicable to their work. For example, the infrastructure guidelines are mostly relevant during the initial phases of the development of the DZ, while landscaping guidelines might be applicable continuously; architectural guidelines, clearly, would only apply during the design of buildings.

The guidelines are presented to reflect the anticipated phasing of development within the DZ, and are as follows;

A. Planning and Zoning Guidelines.
B. Infrastructure Guidelines.
C. Building / Architectural Guidelines.
D. Landscaping Guidelines.

ADMINISTRATION

The Coega IA and the future Coega Development Corporation (CDC) – probably represented by the Coega Environmental Manager (EM) - will retain copies of this manual and is responsible for distribution of the manual to appropriate individuals and organisations. The Coega IA should also indicate which guidelines are obligatory, in consultation with potential developers, planners and their consultants. The Coega EM may add guidelines to this manual if appropriate; guidelines added in this way should be highlighted.

The Coega IA will be responsible for establishing a quality control system to ensure that any designated obligatory guidelines are implemented. The final, approved version of these guidelines will form part of the CDC’s Environmental Management System.
A PLANNING AND ZONING GUIDELINES

Planning for the Coega DZ will proceed in a tier “package of plans” approach, incorporating four phases:

- the compilation of a Development Framework Plan.
- masterplanning.
- land-use planning and zoning.
- site/precinct layout.

These guidelines are intended for consideration during the masterplanning and land-use/zoning phases. They can also be used to a lesser extent to guide on-site factory and plant layout. It is standard practice for planners to consider environmental opportunities and constraints; as a consequence these guidelines are brief.

I GUIDELINES

i. Avoid industrial, commercial and residential development in open spaces.

ii. Locate buildings to minimise environmental impact: Cluster buildings to preserve open space, avoid especially sensitive areas including wetlands, and keep roads and service lines short. Leave the most pristine areas untouched and look for areas that have been previously damaged to build on. Seek to restore damaged Eco-systems.

iii. Establish setback lines and buffer strips between and within clusters and sites. The SEA recommended a buffer of natural vegetation (50m wide on N2) along the edge of the roads.

iv. Consider the potential to use constructed wetlands for waste water attenuation and treatment.

v. No developments must be allowed in any way to contaminate the Coega aquifer.

vi. The potential for other economic activities must not be lost through the IDZ. In particular, care is needed not to foreclose the development of mariculture, ecotourism and fishing or citrus production. This can be achieved through careful planning and a phased approach to development.

vii. Zone industry within the IDZ such that large scale or heavy industries are located in the centre and screened from the N2. Small scale or lighter industries should be located in the outer portion of the IDZ.

viii. Development should be concentrated in nodes to avoid urban sprawl.

ix. All development should be planned to reduce visual impacts and enhance the visual quality of the DZ. Where possible, precincts of industrial development should be developed as industrial parks. Detailed guidelines for these aspects should be included in the EMS.

x. Co-ordinate air quality, transportation and land use planning for long-term sustainability.
xi. Create a buffer zone around heavy industry in which no residential development occurs.

xii. Integrate DZ planning with planning for Port Elizabeth-Uitenhage.

xiii. Clearly define open spaces and ensure that no industrial development occurs in this area. Open spaces must be linked to surrounding open space and the Port Elizabeth MOSS (Metropolitan Open Space System).

xii. Make allowance for open space and recreation within industrial clusters.

xiii. Adopt a phased approach to planning in order to avoid limiting land use in the short term and the provision of infrastructure which serves no purpose in the short-medium term.

xiv. Seek stakeholder approval for planning.

xv. Keep the public informed about land-use and zoning proposals in the DZ.

xvi. Make allowance for Scoping Reports (EIAs) in rezoning processes.
(i).1.3  B  INFRASTRUCTURE GUIDELINES

These guidelines are intended to guide the location of infrastructure and to propose infrastructural alternatives where appropriate. Landscaping guidelines directly applicable to infrastructure are also provided. In part, the guidelines have been formulated in response to existing proposals for infrastructure. It is anticipated that technical considerations (especially slopes) will work in concert with these environmental guidelines thereby promoting environmentally sustainable and technically efficient development of infrastructure. These guidelines should assist the engineering team planning infrastructure and the contractors appointed to construct this infrastructure.

In addition to generic guidelines, which apply to all infrastructure, guidelines for stormwater, water reticulation, and transport corridors (rail, road, conveyor, and pipelines) are also presented.

I  GENERIC GUIDELINES

i. Servitudes should accommodate as many services as possible, as opposed to a number of separate servitudes per service.

ii. Servitudes should be kept as narrow as possible and should be (temporarily) fenced during construction activities.

iii. Access to servitudes and transport corridors should be controlled (by using fences).

iv. Servitudes cleared for construction purposes should be rehabilitated afterwards (e.g. pipelines, road fringes).

v. Major servitudes (e.g. from Coega Kop to the harbour) may need to be landscaped (see landscape guidelines).

vi. Servitudes should avoid sensitive areas, including No Go areas (in open spaces), wherever possible.

vii. Before clearing for the infrastructure is done, ensure that endangered and endemic plant species are removed.

viii. Place power and telecommunications cabling underground wherever possible.

ix. Plant (indigenous trees) along the roads – where possible.

x. Make allowance for Scoping Reports (and EIAs) prior to construction of some infrastructure (e.g. Water Reclamation Works).
xi. Infrastructure designed for the DZ should also consider servicing surrounding communities and areas.

xii. The specifications in the Coega DZ Environmental Management Plan (EMP) for infrastructure should be implemented in order to mitigate environmental impacts during the construction of infrastructure.

2 **STORMWATER**

i. Stormwater retention ponds should be kept as small as possible.

ii. Natural stormwater retention areas should also be considered, e.g. by utilising floodplains. These areas will also help to filter and purify stormwater.

iii. Stormwater must not discharge directly into the saltworks.

iv. The stormwater system must be kept separate from the sewerage and effluent systems.

v. Dirty stormwater must be captured on site in settling ponds so that only the overflow is discharged from sites.

vi. Contaminated stormwater must be captured on site and treated prior to release.

vii. Keep stormwater drainage as short as possible, i.e. distance stormwater must travel to (artificial and natural) retention ponds/flood attenuation areas must be as short as possible.

viii. Absorption systems must be in place to enable storm water to be absorbed as fast as possible.

ix. Grid filters or similar should be used in stormwater drains to prevent contamination of the Coega River, Ngqura port and other sensitive areas by debris and litter.

x. Stormwater quality should be monitored at key points (to be determined by the water monitoring consultant).

xi. Stormwater should preferably be discharged into Ngqura port (in order to monitor and control discharges) rather than immediately outside of the port breakwaters.

xii. Facilities within the DZ should be constructed above the 1-in-100 year floodline.

(i).1.1.4 3 **WATER RETICULATION**

i. Consider implementing a dual reticulation system providing water to the DZ – one for potable water and another for recycled/treated sewerage/effluent.

ii. Water reservoirs should not be located in sensitive areas (e.g. parts of Coega Kop and No Go areas).
Coega Rezoning EIA: Chapter Two

iii. Provision should be made for the use of treated effluent from the Fishwater Flats Water Reclamation Works (e.g. as make-up water for factories and for use in landscaping and irrigation).

iv. Water consumption should be minimised.
4 SEWERAGE AND EFFLUENT

i. Separate effluent and sewerage systems should be designed.

ii. Utilise Fishwater Flats Water Reclamation Works for the treatment of effluent and sewerage in the initial phases of DZ development.

iii. Make allowance for a Scoping Report (EIA) of the proposed Coega Water Reclamation Works.

iv. The proposed Coega Water Reclamation Works should be as small as possible (but able to expand to meet the planned demands of the DZ and Motherwell extension).

v. Water discharged from the proposed Coega Water Reclamation Works must meet DWAF’s general standards (and any other standards required by DWAF).

vi. If treated sewerage is discharged from the proposed Coega Water Reclamation Works into the Coega River, allow for and establish a series of reed beds to assist with purification of water.

vii. If treated sewerage is discharged from the proposed Coega Water Reclamation Works via pipeline directly into the sea, the location of the outfall must aim to minimise impacts on and around Jahleel Island. More stringent discharge quality standards may be required.

viii. Effluent must be treated prior to discharge from sites and effluent quality should be monitored at key points (to be determined by the water-monitoring consultant).

ix. If a marine effluent outfall is planned, make allowance for a Scoping Report (EIA).

5 TRANSPORT CORRIDORS

i. Access to transport corridors should be restricted, especially to conveyors and pipelines.

ii. Facilities (e.g. pedestrian bridges, underpasses) should be provided to allow movement across transport corridors.

iii. Conveyors and pipelines must be designed to minimise spillages.

iv. Transport corridors should be inspected regularly, especially conveyors and pipelines.

v. Underpasses beneath the N2 should be used, rather than overhead crossings.

vi. Measures must be taken to ensure safety at intersections with existing transport routes in the DZ.
C BUILDING / ARCHITECTURAL GUIDELINES

These guidelines are intended for consideration by the Coega IA, tenants, architects and building contractors. The guidelines are based on the principles of sustainable construction and incorporate design guidelines as well as guidelines for the use of alternative materials, fixtures and technologies. A set of principles – some of which may not have practical application – precede the guidelines per se.

In many cases implementation of these guidelines will be most suited to SMEs (Small and Medium Enterprises), which can more easily take advantage of labour intensive construction methods. The guidelines relate to:

- materials procurement.
- guidelines applicable to all buildings.
- guidelines applicable to offices and service industries.

1 PRINCIPLES

i. **Optimise material use**: avoid waste from structural over-design. Simplify building geometry.

ii. **Minimise resource consumption**: conserve and reduce use of resources.

iii. **Design for durability**: to spread the environmental impacts of building over as long a period as possible, structures should be durable.

iv. **Pursue quality in creating the built environment**: higher quality materials and buildings receive greater social acceptance and can reduce vandalism.

v. **Design for future reuse and adaptability**: make the structure adaptable to other uses, and choose material and components that can be reused or recycled.

vi. **Create a healthy, non-toxic environment**: a healthy working environment leads to increased productivity.

vii. **Employ local people and resources where possible**: promote labour intensive methods, skills training and capacity enhancement of local people.

2 MATERIALS PROCUREMENT

i. **Avoid ozone-depleting chemicals in mechanical equipment and insulation**: CFCs (chlorofluorocarbons) & HCFCs (hydrochlorofluorocarbons) damage the ozone layer and should be avoided where possible. Avoid foam insulation made with HCFC’s. Reclaim CFC’s when servicing or disposing of equipment.

ii. **Use durable products and materials**: manufacturing is energy-intensive, so products that last longer or require less maintenance usually save energy and also contribute less to solid waste problems.
iii. **Choose low maintenance building materials**: where possible, select building materials that will require little maintenance (painting, re-treatment, waterproofing, etc).

iv. **Maximise the use of building materials and fittings that are not easily corroded.**

v. **Choose building materials with low embodied energy**: heavily processed or manufactured products and materials are usually more energy intensive, so alternatives should be preferred, assuming that durability and performance are not be sacrificed.

vi. **Choose locally produced building materials and fittings**: this helps to support local business and promote skills enhancement and the viability of SMEs (Small and Medium Enterprises).

vii. **Materials should be acquired in an environmentally responsible way**: where possible obtain materials from sources known to be operating on a sustainable basis, e.g. where wood is used, ensure that it originates from sustainable forests. In particular, tropical hardwoods should not be used unless there is certainty that these originate from forests that are managed in a sustainable manner.

viii. **Use building products made from recycled materials**: building products made from recycled materials reduce solid waste problems, cut energy consumption in manufacturing, and save on natural resource use. An example of material with recycled content is cellulose insulation.

ix. **Use salvage building material when possible**: reduce landfill pressure and save natural resources by using salvaged material: wood, certain plumbing fixtures.

x. **Avoid materials that will release pollutants**: solvent-based finishes, and adhesives should be avoided as these emit formaldehyde and VOCs (volatile organic compounds) which affect indoor air quality.

xi. **Minimise packaging waste**: avoid excessive packaging, such as plastic-wrapped plumbing fixtures or fasteners that aren’t available in bulk.

xii. **Consider energy efficient lighting systems**: the use of compact fluorescent lights. Higher capital costs are balanced by significant saving in the medium term.

xiii. **Use renewable energy sources and devices wherever possible**: for example, solar water heating, solar lighting and photovoltaic cells.

xiv. **Heat recovery systems should be used wherever possible**: for example, to generate hot water and for use in production processes.

xv. **Use water saving fittings**:
   - non-return valves in the internal water supply line.
   - dual flush toilets.
   - tanks to collect and store drain water and retention ponds to collect stormwater for further use (e.g. landscaping irrigation).
3 GUIDELINES FOR ALL BUILDINGS

i. **Design energy-efficient buildings:** insulation serves to prevent heat loss in winter and heat gain in summer. The greatest potential for heat loss and gain is through the roof and glazing. Insulation should therefore be provided in roofs and through the construction of double cavity walls and glazing with low solar heat gain should be chosen.

ii. **Design buildings to use renewable energy:** passive solar heating, use of natural light and natural cooling can be incorporated cost-effectively into most buildings.

iii. **Orient and shape buildings to take account of heat load:** buildings with the longest sides facing north-south are recommended.

iv. **Solar radiation should be considered in the building design:** for example, direct solar radiation may be desirable for most of the day in winter, whereas in summer, it may need to be restricted, especially in the afternoons. West facing windows that receive the hot afternoon sun should be reduced in size.

v. **Design should maximise natural lighting:** place workspaces close to windows and providing atriums, fanlights etc.

vi. **Design buildings to maximise wind protected areas and minimise wind tunnels:** an example is through the use of courtyards and by ensuring that entrances are not orientated in the direction of the prevailing winds (westerlies). Create wind shelter areas between buildings where more wind-sensitive plants can be established, and where employees and visitors can get shelter from the wind.

vii. **Provide separate, ventilated enclosed areas for smokers.**

viii. **Reflecting surfaces near windows and glazed doors should be avoided:** surfaces such as asphalt and paved surfaces near windows should be avoided.

ix. **Roofing materials that reduce solar gain should be used:** aluminium, for example, absorbs and emits little heat. Walls and roofs should be light-coloured, with the exception of areas exposed to sunlight only during winter.

x. **Summer night ventilation:** leave windows or doors of factory buildings and warehouses open during the night, where security permits this.

xi. **Setback lines:** adhere to setback guidelines formulated for the Coega DZ and make allowance for soft landscaped areas on each site.

4 OFFICES AND SERVICE INDUSTRY

i. **Solar access will be influenced by the placement of trees:** careful consideration should therefore be given to landscaping close to buildings.

ii. **Space allocation within buildings should take account of heat load:** for example, ablution facilities which are occupied intermittently can be placed where there is potential for the indoor environment to be uncomfortable (either too hot or too cold).
Inhabited rooms should face north. Uninhabited areas (e.g. storerooms) should be placed on the west and south sides where they can act as thermal barriers.

iii. **Diffuse light is often preferred to direct solar radiation**: consideration should be given to designing windows under eaves or in courtyards where they will receive diffuse light rather than direct solar radiation. Diffuse light is usually preferred by employees and has energy conservation benefits.

iv. **Energy efficiency should be a selection criterion where air conditioners are concerned**: care should also be taken to ensure that the system is designed to respond to internal conditions, i.e. is thermostatically controlled.
D LANDSCAPING GUIDELINES

These guidelines will apply during all phases of the development and operation of the DZ, both across the entire DZ and on individual tenants’ sites. They are intended for consideration by the Coega IA, tenants, landscapers and contractors. Aside from landscaping principles there are also guidelines pertaining specifically to:

- site preparation.
- vegetation.
- irrigation.
- maintenance landscaping.

1 PRINCIPLES

i. A proportion of each tenant site (to be determined in consultation with site owners and the Coega IA) must not be developed and should be retained in its natural condition and/or set aside for landscaping.

ii. Adhere to setback guidelines formulated for the Coega DZ.

iii. Landscaping should respond to the natural conditions and land forms and specifically should encourage the use of indigenous vegetation endemic to the area.

iv. Water is an increasingly scarce resource requiring optimal management. Reducing water demand through water conservation is a key component of the national water conservation strategy and the Coega IA and tenants should include water conservation measures in their planning.

v. All landscaped areas which are damaged during construction are to be reinstated, to standards acceptable to the Coega IA.

vi. Measures should be taken to control the erosion of exposed sand by wind action and water, particularly during the rainy season; slopes to be stabilised with planting of other suitable measures.

vii. Earth mounds/berms, which may enhance the landscape character and help screen facilities, should be considered. Such mounding should be so constructed to allow for effective vegetative stabilisation and have a natural aesthetic form.

viii. Landscaping should take account of the Department of Water Affairs “Water Wise Gardening Principles”.

ix. Unused open spaces in each tenant site should be managed and invasive alien vegetation removed.

x. The specifications in the Coega DZ Environmental Management Plan (EMP) for tenants’ sites should be implemented in order to mitigate environmental impacts during the construction of infrastructure.
2 SITE PREPARATION GUIDELINES

i. Designate an area for holding plants for transplanting in consultation with a botanical/nursery specialist/ECNC (Eastern Cape Nature Conservation). Remove all plant material that can be re-used for the development prior to the commencement of clearing operations. A botanical or horticultural specialist (e.g. from ECNC) should be consulted to assist in this regard.

ii. Strip all topsoil and stockpile it for re-use or re-vegetation. Piles should be no more than 2m high in order to minimise compaction and composting, and they should be domed to promote runoff.

iii. Fence sensitive areas along the boundary of construction sites to prevent unnecessary loss of natural vegetation outside of the sites.

iv. Prevent construction workers from lighting fires close to flammable material.

v. Provide the Search and Rescue Programme of the National Botanical Institute and other similar organisations with the opportunity to remove from the site any vegetation not required by the site owner prior to commencing clearing operations.

3 VEGETATION GUIDELINES

i. Re-establish Red Data and conservation-worthy species that have horticultural potential, from areas designated for development.

ii. Encourage the use of local indigenous vegetation in landscaping proposals. Added advantages of using local indigenous vegetation are that it requires less watering, less fertilising and less maintenance. Note that rehabilitation of Valley Bushveld is very difficult.

iii. Do not use potentially or known invasive plants in soft landscaping.

iv. Lawns should be limited and only indigenous grasses should be used, viz.
   • Buffalo grass (*Stenotaphrum secundatum*).
   • Kweek (*Cynodon dactylon*).

v. Plant species with similar water requirements should be grouped together.

vi. Consider the location of endemic species before finalising site layouts.

4 IRRIGATION GUIDELINES

i. Provide responsible on-site water management: Design landscapes to absorb rainwater runoff (stormwater) rather than having to carry it off-site in stormwater sewers.

ii. *Utilise treated sewage and/or clean captured stormwater for irrigation purposes, as opposed to potable water.*

iii. Once the landscaping is completed, all landscaped areas should be covered with mulch (e.g. bark, gravel, compost, leaves, nutshells) to reduce water demand.
iv. Avoid over-watering of locally occurring vegetation.

v. Underground or drip irrigation systems are encouraged, rather than overhead or spray heads, as these will limit water wastage caused by wind action.

5 MAINTENANCE LANDSCAPING GUIDELINES

i. Landscaped areas should be maintained according to normal horticultural practices and standards.

ii. Locally occurring indigenous vegetation should be used wherever possible.

iii. Organic fertilisers should be given preference over inorganic fertilisers.

iv. Maintain all hard landscaping elements to an acceptable standard that compliments the overall standard of the Coega development.

v. No landscape refuse should be dumped, stockpiled or be allowed to enter the Coega river.

vi. Landscaping refuse should be composted for later use.

REFERENCES

1. Internet Environmental Building News – Checklist for Environmentally Responsible Design and Construction.


APPENDIX A

Preliminary List of Rare, Endangered, Endemic and Protected Flora in the Coega DZ

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>FAMILY</th>
<th>PLANT COMMUNITY</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentaschistis heptamera</td>
<td>Poaceae</td>
<td>Dunethicket, grassland</td>
<td>Endemic</td>
</tr>
<tr>
<td>Chondropetalum microcarpum</td>
<td>Restionacea</td>
<td>Dune pioneer, dune Fynbos, grassland</td>
<td>Protected</td>
</tr>
<tr>
<td>Aloe africana</td>
<td>Asphodelaceae</td>
<td>Bush clumps, dune thicket</td>
<td>Endemic</td>
</tr>
<tr>
<td>Aloe striata</td>
<td>Asphodelaceae</td>
<td>Bush clumps, dune thicket</td>
<td>Endemic</td>
</tr>
<tr>
<td>Gasteria crouckeri</td>
<td>Asphodelaceae</td>
<td>Dune Thicket</td>
<td>Endemic</td>
</tr>
<tr>
<td>Veltheimia bracteata</td>
<td>Hyacinthaceae</td>
<td>Grassland, bushclump</td>
<td></td>
</tr>
<tr>
<td>Brunsvigia gregaria</td>
<td>Amaryllidaceae</td>
<td>Grassland</td>
<td>Endemic</td>
</tr>
<tr>
<td>Cyrtanthus spiralis</td>
<td>Amaryllidaceae</td>
<td>Dune thicket</td>
<td>Rare</td>
</tr>
<tr>
<td>Haemanthus albiflos</td>
<td>Amaryllidaceae</td>
<td>Bushclumps, dune thicket</td>
<td>Protected</td>
</tr>
<tr>
<td>Hypoxis stellipilis</td>
<td>Hypoxidaceae</td>
<td>Grassland</td>
<td>Endemic</td>
</tr>
<tr>
<td>Hypoxis zeyheri</td>
<td>Hypoxidaceae</td>
<td>Grassland</td>
<td>Endemic</td>
</tr>
<tr>
<td>Arista anceps</td>
<td>Iridaceae</td>
<td>Dune thicket, grassland</td>
<td>Protected</td>
</tr>
<tr>
<td>Arista pusilla</td>
<td>Iridaceae</td>
<td>Dune fynbos, grassland</td>
<td>Protected</td>
</tr>
<tr>
<td>Babiana patersoniae</td>
<td>Iridaceae</td>
<td>Grassland</td>
<td>Protected</td>
</tr>
<tr>
<td>Chasmanthe aethiopica</td>
<td>Iridaceae</td>
<td>Dune Pioneer</td>
<td>Protected</td>
</tr>
<tr>
<td>Gladiolus maculatus</td>
<td>Iridaceae</td>
<td>Grassland</td>
<td>Protected</td>
</tr>
<tr>
<td>Gladiolus maculatus Var. meridionalis</td>
<td>Iridaceae</td>
<td>Grassland, dune thicket</td>
<td>Protected</td>
</tr>
<tr>
<td>Micranthus alopecuroides</td>
<td>Iridaceae</td>
<td>Grassland</td>
<td>Protected</td>
</tr>
<tr>
<td>Tritonia Lineata var. pariflora</td>
<td>Iridaceae</td>
<td>Grassland</td>
<td>Protected</td>
</tr>
<tr>
<td>Thesium scadens</td>
<td>Santalaceae</td>
<td>Dune thicket, bushclumps</td>
<td>Endemic</td>
</tr>
<tr>
<td>Lampranthus productus</td>
<td>Mesembryanthemanceae</td>
<td>Bushclumps</td>
<td>Endemic</td>
</tr>
<tr>
<td>Andromischus cristatus</td>
<td>Crassulaceae</td>
<td>Grassland</td>
<td>Endemic</td>
</tr>
<tr>
<td>Cotyledon venlutina</td>
<td>Crassulaceae</td>
<td>Dune thicket</td>
<td>Endemic</td>
</tr>
<tr>
<td>Crassula intermedia</td>
<td>Crassulaceae</td>
<td>Bush clumps</td>
<td>Endemic</td>
</tr>
<tr>
<td>Crassula mesembranthoides</td>
<td>Crassulaceae</td>
<td>Bush clumps</td>
<td>Endemic</td>
</tr>
<tr>
<td>Crassula perfoliata</td>
<td>Crassulaceae</td>
<td>Bush clumps</td>
<td></td>
</tr>
<tr>
<td>Indigofera glaucescence</td>
<td>Fabaceae</td>
<td>Dune fynbos, dune thicket</td>
<td>Endemic</td>
</tr>
<tr>
<td>Indigofera sulcata</td>
<td>Fabaceae</td>
<td>Dune fynbos, dune thicket</td>
<td>Endemic</td>
</tr>
<tr>
<td>SPECIES</td>
<td>FAMILY</td>
<td>PLANT COMMUNITY</td>
<td>STATUS</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------</td>
<td>----------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Zygophyllum uitenhagense</td>
<td>Zygophyllacea</td>
<td>Bushclumps, dune thicket</td>
<td>Endemic</td>
</tr>
<tr>
<td>Muraltia squarrosa</td>
<td>Polygalaceae</td>
<td>Dune fynbos, grassland dune thicket</td>
<td>Endemic</td>
</tr>
<tr>
<td>Polygala ericaefolia</td>
<td>Polygalaceae</td>
<td>Dune thicket</td>
<td>Endemic</td>
</tr>
<tr>
<td>Euphorbia coerulescens</td>
<td>Euphorbiaceae</td>
<td>Bush clumps</td>
<td>Endemic</td>
</tr>
<tr>
<td>Euphorbia fimbriata</td>
<td>Euphorbiaceae</td>
<td>Bushclumps</td>
<td>Endemic</td>
</tr>
<tr>
<td>Euphorbia globosa</td>
<td>Euphorbiaceae</td>
<td>Grassland</td>
<td>Endemic</td>
</tr>
<tr>
<td>Euphorbia ledienii</td>
<td>Euphorbiaceae</td>
<td>Bush clumps</td>
<td>Endemic</td>
</tr>
<tr>
<td>Euphorbia meloformis</td>
<td>Euphorbiaceae</td>
<td>Bush clumps</td>
<td>Endemic</td>
</tr>
<tr>
<td>Phylica guidoiodes</td>
<td>Rhamnaceae</td>
<td>Dune thicket, grassland</td>
<td>Endangered, Endemic</td>
</tr>
<tr>
<td>Hermannia sulcata</td>
<td>Steruliaceae</td>
<td>Dune, thicket</td>
<td>Endemic</td>
</tr>
<tr>
<td>Erica cerinthoides</td>
<td>Ericaceae</td>
<td>Dune, thicket</td>
<td>Endemic</td>
</tr>
<tr>
<td>Erica glumiflora</td>
<td>Ericaceae</td>
<td>Dune fynbos</td>
<td>Endemic</td>
</tr>
<tr>
<td>Rapanea gilliana</td>
<td>Myrsinaceae</td>
<td>Grassland, dune fynbos</td>
<td>Endemic</td>
</tr>
</tbody>
</table>

CONSTRUCTION OF BULK INFRASTRUCTURE AND TENANT/CONCESSION AIRE PROJECTS

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROCEDURE

FINAL

Task 14 000

SubTask E

April 1999
## TABLE OF CONTENTS

(i).1.1.5 **PART 1 EMP OVERVIEW**

<table>
<thead>
<tr>
<th>Part</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BACKGROUND TO THE CONSTRUCTION EMP</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>PURPOSE OF THE EMP</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>IMPLEMENTATION OF THE EMP</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>STRUCTURE OF THE EMP</td>
<td>1</td>
</tr>
</tbody>
</table>

### PART 2 – EMP

#### LIST OF ABBREVIATIONS

- EP1 INTRODUCTION

#### 5

- EP2 ORGANISATIONAL REQUIREMENTS

#### 5

- EP3 METHOD STATEMENT

#### 8

- EP4 GENERAL SITE PROCEDURES

#### 8

- EP5 SITE CLEARANCE

#### 18

- EP6 SITE REHABILITATION

---

Coega Rezoning EIA: Appendix C
<table>
<thead>
<tr>
<th></th>
<th>MANAGEMENT AND MONITORING:</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>MEASUREMENT AND PAYMENT</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PART 1 EMP OVERVIEW

1 BACKGROUND TO THE CONSTRUCTION EMP

It is the stated goal of the Coega Development Corporation (CDC) to implement sustainable environmental management practices within the Coega Development Zone (CDZ). This applies to the planning, design, construction and operation of the CDZ.

The Strategic Environmental Assessment (SEA) for the CDZ - completed in June 1997 by African Environmental Solutions (Pty) Limited (AES) - recommended that a series of conditions and guidelines be applied to minimise negative environmental impacts and enhance the positive environmental impacts during the construction works within the CDZ. These conditions and guidelines (as part of the Draft SEA) were submitted for public comment and, thereafter, revised accordingly. The recommendations and revisions thereof were subsequently consolidated in a report called *Review of Environmental Conditions and Guidelines* (ISO14000A/1, AES, August 1998).

The Construction Environmental Management Procedure (hereafter the EMP) incorporates specifications derived from recommendations in the SEA, together with specifications for ‘good environmental practice’ for construction work. It has been prepared by AES in consultation with GIBB Africa project engineers, who will be responsible for the preparation of the tender documents for the construction of infrastructure.

2 PURPOSE OF THE EMP

The purpose of the EMP is to translate the recommendations of the SEA into a contractual environmental specification for application during construction, typically construction of CDZ infrastructure and construction on Concessionaire/Tenant sites.

3 IMPLEMENTATION OF THE EMP

The EMP is intended for dissemination by the CDC to approved Concessionaires/Tenants or persons responsible for the infrastructure works (hereafter referred to as the ‘Client’) who shall ensure that it is included in the Tender Document(s) issued to the prospective Contractors. The Contractors shall incorporate the requirements of the EMP in their submissions to the Concessionaires/Tenants.

The EM will be responsible for updating the EMP as required, auditing the implementation of the EMP for each construction project and for maintaining the document control and record systems associated with the EMP.
4 STRUCTURE OF THE EMP

The EMP report has been structured to be incorporated into a standard engineering tender document as the *Environmental Particular Specification*.

A ‘Particular Specification’ is the terminology used for a specification that covers activities that are not adequately covered in the standardised SABS 1200 series specifications for engineering contracts, where the specification is sufficiently detailed to make it inappropriate for inclusion as a variation or addition to a standardised specification.

The EMP is a generic document applicable to both construction projects for individual Tenant sites and infrastructure within the CDZ. The majority of the specifications within the EMP will apply to all construction work, although it is anticipated that variations to this specification may need to be included for some specific developments. Variations would be made by the EM, prior to the issue of the EMP to the Client.
Index to Environmental Particular (EP) Specifications

<table>
<thead>
<tr>
<th>Clause</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP1</td>
<td>INTRODUCTION</td>
</tr>
<tr>
<td>EP2</td>
<td>ORGANISATIONAL REQUIREMENTS</td>
</tr>
<tr>
<td>EP2.1</td>
<td>Organisational overview and structure</td>
</tr>
<tr>
<td>EP2.2</td>
<td>Roles and responsibilities</td>
</tr>
<tr>
<td>EP3</td>
<td>Method statements</td>
</tr>
<tr>
<td>EP4</td>
<td>GENERAL SITE PROCEDURES</td>
</tr>
<tr>
<td>EP4.1</td>
<td>Demarcation of Environmentally Sensitive Areas</td>
</tr>
<tr>
<td>EP4.2</td>
<td>Location of camp and depot</td>
</tr>
<tr>
<td>EP4.3</td>
<td>Demarcation of the site</td>
</tr>
<tr>
<td>EP4.4</td>
<td>Access to beach</td>
</tr>
<tr>
<td>EP4.5</td>
<td>Toilets</td>
</tr>
<tr>
<td>EP4.6</td>
<td>Domestic waste water</td>
</tr>
<tr>
<td>EP4.7</td>
<td>Refuse</td>
</tr>
<tr>
<td>EP4.8</td>
<td>Protection of the fauna and flora</td>
</tr>
<tr>
<td>EP4.9</td>
<td>Defacement of natural features</td>
</tr>
<tr>
<td>EP4.10</td>
<td>Protection of archaeological and palaeontological sites</td>
</tr>
<tr>
<td>EP4.11</td>
<td>Effluent and stormwater management</td>
</tr>
<tr>
<td>EP4.12</td>
<td>Dust control</td>
</tr>
<tr>
<td>EP4.13</td>
<td>Noise control</td>
</tr>
<tr>
<td>EP4.14</td>
<td>Materials use, handling, storage and transport</td>
</tr>
<tr>
<td>EP4.15</td>
<td>Emergency procedures</td>
</tr>
<tr>
<td>EP4.16</td>
<td>Social issues</td>
</tr>
<tr>
<td>EP5</td>
<td>SITE CLEARANCE</td>
</tr>
<tr>
<td>EP5.1</td>
<td>Removal of endemic and endangered species</td>
</tr>
<tr>
<td>EP5.2</td>
<td>Removal of top soil</td>
</tr>
<tr>
<td>EP5.3</td>
<td>Stabilisation of steep slopes</td>
</tr>
<tr>
<td>EP5.4</td>
<td>Removal of alien vegetation</td>
</tr>
<tr>
<td>EP6</td>
<td>SITE REHABILITATION</td>
</tr>
<tr>
<td>EP6.1</td>
<td>Scoping</td>
</tr>
<tr>
<td>EP6.2</td>
<td>Landscaping and preparation for revegetation</td>
</tr>
<tr>
<td>EP6.3</td>
<td>Seeding</td>
</tr>
<tr>
<td>EP7</td>
<td>MANAGEMENT AND MONITORING:</td>
</tr>
<tr>
<td>EP7.1</td>
<td>Monitoring and reporting</td>
</tr>
<tr>
<td>EP7.2</td>
<td>Environmental awareness training</td>
</tr>
<tr>
<td>EP7.3</td>
<td>Non conformance and corrective actions</td>
</tr>
<tr>
<td>EP7.4</td>
<td>Documentation</td>
</tr>
<tr>
<td>EP7.5</td>
<td>Incentives and penalties</td>
</tr>
<tr>
<td>EP7.6</td>
<td>External audit</td>
</tr>
<tr>
<td>EP8</td>
<td>MEASUREMENT AND PAYMENT</td>
</tr>
</tbody>
</table>
### List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDC</td>
<td>Coega Development Corporation</td>
</tr>
<tr>
<td>CDZ</td>
<td>Coega Development Zone</td>
</tr>
<tr>
<td>EM</td>
<td>Coega Environmental Manager</td>
</tr>
<tr>
<td>EMP</td>
<td>Construction Environmental Management Procedure</td>
</tr>
<tr>
<td>EMS</td>
<td>Environmental Management System for the Coega Implementing Authority</td>
</tr>
<tr>
<td>ESA</td>
<td>Environmentally Sensitive Areas</td>
</tr>
<tr>
<td>NEC</td>
<td>Ngqura Environmental Committee</td>
</tr>
<tr>
<td>SSSI</td>
<td>Sites of Special Scientific Interest</td>
</tr>
</tbody>
</table>
(i).1.1.5.1

(i).1.1.5.2 EP1 INTRODUCTION

(i).1.1.5.3
The EMP has been prepared and is to be implemented as part of the Environmental Management System for the CDC.

The EMP provides specifications that the Contractor shall adhere to, in order to minimise adverse environmental impacts and optimise opportunities associated with construction activities.

The EMP is provided to the Contractor at the tender stage so that the costs of implementing the EMP are included into the Contract cost and so that the Contractor is aware of his environmental responsibilities prior to commencing work.

The aim of this EMP is to ensure that environmental management of site activities is integrated into the other management systems implemented by the Contractor e.g. quality management, health and safety. For this reason, the EMP includes a requirement for the Contractor(s) to develop their own system (i.e. roles, responsibilities, timing) for ensuring that the requirements of the EMP are met and a requirement for the Contractor to check by means of an internal audit that this system is operating effectively.

(i).1.1.5.4 EP2 ORGANISATIONAL REQUIREMENTS

(i).1.1.6 EP2.1 Organisational Structure

This section outlines the required management structure for the administration of the EMP, with particular emphasis on the roles and responsibilities of key individuals.

The organisational structure for the implementation of the EMP is presented in Figure 2 and should be viewed in conjunction with the roles and responsibilities below.

EP2.2 Roles and responsibilities

(i).1.1.6.1 EP2.2.1 Coega Development Corporation

The CDC is ultimately responsible for ensuring effective environmental management of the CDZ in terms of the conditions in the Environmental Management System as approved by the NEC.

EP2.2.2 Environmental Manager (EM)

The EM has been appointed by the CDC. The EM is responsible for monitoring the implementation of the requirements of the EMP by the relevant parties as specified in the EMP.

The EM shall:

a. Review and approve in writing valid method statements.
b Inspect the Contractor’s site to check compliance with method statements and the requirements of the EMP (at least monthly & more frequently if thought to be warranted by the EM) and maintain inspection reports on file.

c Meet with the Responsible Person for the Concessionaire and/or Tenants, whereby the Responsible Person reports on the implementation of the ES (at least monthly) and keep a record of minutes of the above meetings.

d Provide material/manuals and assistance to the Responsible Person for the initial environmental training sessions.

e Report in writing any problems related to conformance with the ES which cannot first be resolved in co-operation with the relevant Responsible Person to:
   • the CDC
   • the relevant Concessionaire/Tenant
   • if necessary, the NEC

(i).1.1.6.2 EP2.2.3 Client

The Client shall:

a Include the ES with any revisions in any tender document related to construction activities on site.

b Designate in writing a Responsible Person for the proper implementation of the EMP. This person must have sufficient authority to issue site instructions to any and all Contractor staff on their site. It is probable, though not a requirement, that the Responsible Person will be the Engineers Representative.

c Send a copy of the letter of appointment of the Responsible Person the EM.

(i).1.1.6.3 EP2.2.4 Responsible Person

The Responsible Person for each building site or infrastructure installation shall:

a Develop a system to ensure that the EMP is effectively implemented.

b Audit this system so that he/she can demonstrate to the EM that the EMP is being effectively implemented.

c Ensure that employees of contractors, sub-contractors, suppliers etc. receive appropriate environmental awareness training prior to commencing work on the project and maintain records of training. It is anticipated, though not a requirement, that the Responsible Person will deliver training sessions.

d Ensure that responsible persons for sub-contractors or sub-sub contractors are designated to carry out the requirements of the EMP.

e Submit method statements to the EM for approval as specified in the EMP and maintain approved method statements on file.
EP2.2.5 Ngqura Environmental Committee (NEC)

The Ngqura Environmental Committee (NEC) comprises National, Provincial and Local Authorities as well as representatives from the Department of Water Affairs and Forestry and is responsible for ensuring that any conditions imposed by the governing authorities on development zones are being followed.

The NEC may:

- At their discretion, undertake periodic reviews on site to ensure that the appropriate measures and monitoring related to implementation of the procedures and specifications contained on this document are in place and effective.

- As representatives of the government, order the suspension of all, or part of the work, should they believe that it is in the interests of the development zone/environment to do so.

Figure 2: Organisational structure showing lines of responsibility and communication during the construction of infrastructure and the tenant sites within the CDZ.
The Responsible Person shall submit written method statements to the EM, covering those activities which are identified (in this document and/or by the EM), as being potentially harmful to the environment.

Method statements indicate how compliance with the Environmental Particular Specification will be achieved.

Method statements shall state clearly:

- timing of activities;
- materials to be used;
- equipment and staffing requirements;
- the proposed construction procedure designed to implement the relevant environmental specifications;
- the system to be implemented to ensure compliance with the above; and
- other information deemed necessary by the EM and Responsible Person.

Method statements shall be submitted at least five working days prior to projected commencement of work on an activity, to allow the EM time to study and approve the method statement. The Contractor shall not commence work on that activity until such time as the method statement has been approved in writing by the EM (and also signed by the Responsible Person), which shall be done within five working days of receipt.

Due to changing circumstances, it may be necessary to modify method statements. In such cases, the proposed modifications must be indicated and agreed upon in writing between the EM and Responsible Person.

The EM and Responsible Person must retain records of any amendments and ensure that the most current version of any method statement is being used.

**EP4 GENERAL SITE PROCEDURES**

**(i).1.1.8 EP4.1 Demarcation of Environmentally Sensitive Areas**

The Contractor is advised that certain areas within the CDZ have been identified as being Environmentally Sensitive Areas (ESAs). The ESAs are indicated on Figure 1. The ESAs include the following:

- dune vegetation (includes Dune Thicket, Dune Valley Fynbos and Valley Thicket);
- steep slopes which are prone to erosion when vegetation is removed or disturbed and which support areas of pristine indigenous vegetation; and
- the Coega River.

In order to minimise adverse impacts to the ESAs during construction activities, the ESAs shall not be entered or used for any purpose unless a written motivation has been submitted to the EM by the Responsible Person, and a written approval has been received from the EM.

The Contractor shall exercise special care when working close to the ESAs in order to avoid physical disturbance or pollution of these areas. The EM may instruct the Responsible Person to restrict the number of construction personnel and equipment operating near ESAs.
Damage caused to ESAs by the Contractor shall be cause for the Contractor to make good any damaged areas to the written satisfaction of the EM.

The Contractor shall note the proximity to the site of any designated ESAs. The Contractor shall fence any ESAs located within 20 m of the site boundary. The fencing shall extend along the boundary of the ESA for sufficient distance to ensure that the location of the ESA is obvious from the Contractor’s site and from the approach to the Contractor’s Site.

The Contractor shall make provision for the demarcation of ESAs with fencing to the following specifications:

Posts shall be wooden droppers or steel standards where the ground is too hard for wooden droppers to be driven in. The posts shall be long enough and spaced closely enough to support a strand of 12 gauge wire at 750 mm above the ground level. The top 300 mm of the posts shall be painted white for easy visibility.

Within the ESAs there are sites of greater sensitivity for which additional precautions may be required. The EM will identify these sites to the Contractor if relevant.

(i).1.1.9 EP4.2 Location of camp and depot

The location of the Contractors’ Camp shall be approved by the EM prior to establishment and will be located away from ESAs unless agreed by the EM.

(i).1.1.10 EP4.3 Demarcation of the site

It is important that activities are conducted within a limited area so as to facilitate control and to minimise the impact on the existing natural environment, existing tenants, other construction activities in the vicinity, public thoroughfares and residential areas.

The Contractor shall demarcate the boundaries of the site in order to restrict his construction activities to the site. The method of demarcation and the location of the demarcated area shall be determined by the Contractor and approved by the EM prior to any work being undertaken. The Contractor shall ensure that all his plant, labour and materials remain within the boundaries of the site. Failure to do so may result in the Contractor being required to fence the boundaries of the site at his own expense to the satisfaction of the EM.

If additional areas (e.g. for laydown, rest areas for workers) are required, these must be approved in writing by the EM, in consultation with the Contractor. The Contractor is advised that it may take approximately one week to obtain such permission from the EM.

Suitable temporary fencing, may need to be erected during construction (particularly excavations for servitudes) to minimise the risk of injury to the public, livestock and wild animals. If necessary, the specification for this fencing is provided in the Project Specification.

(i).1.1.11 EP4.4 Access to beach
Due to the sensitivity of the dune vegetation habitats, Contractors are advised that access to the beach is limited to designated pathways only. The Contractor should contact the Coega EM for further information.

(i).1.1.12  EP4.5  Toilets

The Contractor shall provide the necessary ablution facilities for all his personnel.

Where possible, temporary connection to the Coega IDZ sewerage system for use during construction shall be made a priority.

Otherwise, chemical toilets shall be provided, with a minimum of one toilet per 15 persons. Toilets shall be easily accessible and shall be transportable. The toilets shall be secured to prevent them from blowing over, and shall be provided with an external closing mechanism to prevent toilet paper from being blown out. Toilet paper dispensers shall be provided in all toilets. Toilets shall be cleaned and serviced regularly by a reputable toilet servicing company. Toilets shall be emptied before long weekends and builders’ holidays.

The Contractor shall ensure that chemicals and/or waste from toilet cleaning operations are not spilled on the ground at any time. Should there be repeated spillage of chemicals and/or waste (i.e. more than three), the EM shall require the Contractor to place the toilets on a solid base with a sump at his own expense. Accumulations of chemicals and waste will have to be removed from the site and disposed at an approved waste disposal site or sewage plant.

Abluting anywhere other than in the toilets shall not be permitted. Repeated use of the veld, the river or other areas for ablution purposes may result in the guilty party being given a spot fine. The Contractor shall also be responsible for cleaning up any waste deposited by his personnel.

(i).1.1.13  EP4.6  Domestic waste water

Waste water from any other ablution or kitchen facilities on site shall be discharged into a suitable conservancy tank. The Contractor shall be responsible for ensuring that the system continues to operate effectively throughout the project and that the conservancy tank is emptied as required during the project. The Contractor shall employ a suitable qualified sub-contractor or the local authority to empty the conservancy tank.

(i).1.1.14  EP4.7  Refuse

A Refuse Management Method Statement must be submitted to the EM for written approval prior to the commencement of construction activities.

Refuse refers to all solid waste, including construction debris (wrapping materials, timber, cans etc.) waste and surplus food, food packaging etc.

The Contractor shall institute an on-site waste management system that is acceptable to the EM in order to prevent the spread of refuse within and beyond the site. The Contractor is reminded that wind velocities on the construction site can be extremely high.
All waste shall be collected and contained immediately. The Contractor shall institute a weekly clean-up of the site if so instructed by the EM. This daily/weekly clean-up shall be for the Contractor’s account.

The Contractor shall not dispose of any waste and/or construction debris by burning or burying. The use of waste bins and skips is recommended. The bins shall be provided with lids and an external closing mechanism to prevent their contents blowing out. The Contractor shall ensure that all waste is deposited by his employees in the waste bins for removal by the Contractor. Bins shall not be used for any purposes other than waste collection and shall be emptied on a regular basis. All waste shall be disposed of off site at approved landfill sites.

Waste generated at the construction camps shall be separated into recyclable and non-recyclable waste, and shall be separated as follows:

- Hazardous waste (including old oil, diesel, petrol tins, paint, bitumen, etc.)
- Recyclable waste (paper, tins, glass)
- General waste
- Reusable construction material

Recyclable waste shall be deposited in separate skips/bins and removed off site for recycling. The Contractor may wish to enter into an agreement with the surrounding communities and/or his staff with regard to the collection and sale of recyclable and reusable materials.

Hazardous waste, including waste oil and other chemicals (e.g. paints, solvents) shall be stored in (an) enclosed area(s), and shall be clearly marked. If deemed necessary by the EM, the Contractor shall obtain the advice of a specialist waste expert with regard to the storage of hazardous waste. Such waste shall be disposed of off site by a specialist waste contractor, at a licensed hazardous waste disposal site.

The EM shall be consulted about, and agree to, the method of storage and disposal of hazardous waste.

The Contractor is advised that spot fines for littering have been included in this document. Offenders found littering will be liable for the spot fine.

(i).1.1.15 EP4.8 Protection of flora and fauna

Indigenous flora is to be protected throughout the areas surrounding the site. All fauna within and around the site is protected.

It is illegal, in terms of Eastern Cape Nature and Environmental Conservation Ordinance 19 of 1974, to remove or pick any protected or unprotected indigenous flora without the written permission of the land owner. Offenders will be prosecuted in terms of the above Ordinance 19 of 1974.

Wild animals shall not be caught or killed by any means, including poisoning, trapping, shooting or setting of snares. Offenders shall be prosecuted in terms of the above Ordinance 19 of 1974.

(i).1.1.16 EP4.9 Defacement of natural features
Defacement of any features outside of the Concessionaire/Tenant’s demarcated site shall not occur without the prior written permission of the EM. Any features defaced by the Contractor shall be restored to the satisfaction of the EM.

(i).1.1.17 EP4.10 Protection of archaeological and palaeontological Sites

If any possible palaeontological/archaeological material is found during excavations, the Contractor shall stop work immediately and inform the EM. The EM will inform the National Monuments Council (NMC) and arrange for a palaeontologist/archaeologist to inspect, and if necessary excavate, the material, subject to acquiring the requisite permits from the NMC. Costs incurred will be for the Concessionaire/Tenant’s account.

(i).1.1.18 EP4.11 Effluent and stormwater management

An Effluent and Stormwater Method Statement must be submitted to the EM for written approval prior to the commencement of construction activities.

(i).1.1.19 EP4.11.1 General

The Contractor must ensure that pollution of the ground or surface water does not occur as a result of site activities. Pollution could result from the release, accidental or otherwise, of contaminated runoff from construction camps, discharge of contaminated construction water, chemicals, oils, fuels, sewage, run off from stockpiles, solid waste, litter, etc.

(i).1.1.20 EP4.11.2 Run off from construction camps

The Contractor shall ensure that polluted runoff (excluding silt “pollution”), such as runoff from construction camps where equipment is cleaned and/or serviced, fuel stores, workshops, etc. is not discharged overland. The Contractor may direct it into the local sewerage main, with the written permission of the EM. Alternatively, the Contractor shall erect an earth/brick berm 0,5 m high around such areas and shall collect all runoff from these areas and store it in a conservancy tank for removal from the site. The Contractor shall ensure that silt laden water is not discharged directly into any surface water courses (i.e. streams, rivers, vleis etc.), and shall take suitable measures to prevent this.

Natural run-off shall be diverted away from any camps towards the stormwater drains where these are available. Special care must be taken in areas susceptible to erosion, e.g. steep slopes. The Contractor shall ensure that excessive quantities of sand, silt and silt-laden water do not enter the stormwater drain system, or any surface water course. The Contractor shall take appropriate measures, e.g. the erection of silt traps, or drainage retention areas, to prevent silt and sand entering drainage or water courses. Any partial or complete blockage of the stormwater drainage system shall be cleared by the Contractor for his own expense.

(i).1.1.21 EP4.11.3 Discharge of construction water

Construction water refers to all water dirtied as a result of construction activities.
The Contractor may discharge silt laden water overland and allow this water to filter into the ground. However, he shall ensure that he does not cause erosion as a result of any overland discharge.

The Contractor may discharge limited quantities (less than 50l) of cement-laden water overland, i.e. washings from trowels, wheelbarrows and the like. No concrete washing shall take place within 150 m of the Coega River or any other area identified as being a sensitive area, unless suitable measures have been implemented to protect these features. The Contractor shall ensure that all construction water is directed away from the Coega River and other sensitive areas.

Water from washing large concrete-mixing equipment (mixers and the like) shall not be discharged overland. Such water shall be collected in a conservancy tank, removed from the site and disposed of in the correct manner. The Contractor may consider reusing such water for washing other concrete equipment to minimise the amount required to be removed off site.

Trucks delivering concrete shall not wash the trucks or the chutes on the site. All washing operations shall take place off site at a location where waste water can be disposed of in the correct manner.

(i).1.1.22  EP4.11.4  Servicing/fuelling of construction equipment

Servicing and fuelling should preferably occur off site.

However if these activities occur on site, the Contractor shall ensure that all servicing of vehicles and equipment takes place in designated areas agreed upon by the EM. All waste shall be collected and disposed of off site at an appropriately licensed landfill site. All equipment that leaks onto the ground shall be repaired immediately or removed.

Similarly, no vehicles or machines shall be refuelled on site except at designated refuelling locations, unless otherwise agreed with the EM. The Contractor shall not change oil or lubricants anywhere on site except at designated locations, except if there is a breakdown or an emergency repair. In such instances, the Contractor shall ensure that he has Drizit pads (or equivalent) and/or drip trays available to collect any oil, fluid, etc.

(i).1.1.23  EP4.11.5  Fuels and chemicals

The Contractor shall take all reasonable precautions to prevent the pollution of the ground and/or water resources by fuels and chemicals as a result of his activities.

The Contractor shall keep the necessary materials and equipment on site to deal with ground spills of any of the materials used or stored on site.

The Contractor shall ensure that no oil, petrol, diesel, etc. is discharged onto the ground. Pumps and other machinery requiring oil, diesel, etc. that are to remain in one position for longer than two days shall be placed on drip trays. The drip trays shall be emptied regularly and the contaminated water disposed of off site at a facility capable of handling such waste water. Drip trays shall be cleaned before any possible rain events that may result in the drip trays overflowing, and before long week ends and holidays.
The Contractor shall remove all oil-, petrol-, and diesel-soaked sand immediately and shall dispose of it as hazardous waste.

Should the EM and/or the relevant authorities deem it necessary to institute a programme for the removal of contaminated ground resulting from the non-compliance of the controls detailed above, these costs will be for the Contractor's account. Remedial action shall be approved by the EM and relevant authorities, if appropriate.

(i).1.1.24 EP4.12 Dust control

A Dust Control Method Statement must be submitted to the EM for written approval prior to the commencement of construction activities.

The Contractor shall be responsible for the continued control of dust arising from his operations, through measures including, but not limited to, spraying of water on bare areas, rotovating straw bales and the scheduling of dust-generating activities. Overhead sprayers shall not be used in windy conditions, because too much water will be lost to evaporation. The use of water carts is preferred.

The Contractor shall inform the EM 48 hours in advance of anticipated “unavoidable” dust-generating activities. The EM may inform adjacent land users, tenants and communities about the possibility of dust pollution and the approximate duration of the problem.

Special precautions should be taken to minimise the generation of dust in the vicinity of the following sensitive areas:

- Salt works
- Public thoroughfares
- Residential areas
- ESAs

(i).1.1.25 EP4.13 Noise control

The Contractor shall take all reasonable precautions to minimise noise generated on site as a result of his operations, especially when working in areas or on activities that may impact on neighbouring land users.

The Contractor shall comply with the applicable regulations with regard to noise.

The Contractor shall inform the EM 48 hours in advance of anticipated “unavoidable” noise-generating activities. The EM may inform adjacent land users, tenants and communities about the possibility of noise pollution and the approximate duration of the problem.

(i).1.1.26 EP4.14 Materials use, handling, storage and transport

A Materials Handling Method Statement must be submitted to the EM for written approval prior to the commencement of construction activities.
(i).1.1.27  **EP4.14.1  General**

The Contractor is advised that the site is prone to strong winds. All material storage areas should be designed so as to reduce the risk of spillage, dispersal or damage of or to materials as a result of strong winds. Methods of protection of stored materials should be included in the method statement.

(i).1.1.28  **EP4.14.2  Use of cement/concrete**

The Contractor is advised that cement and concrete are regarded as highly hazardous to the natural environment on account of the very high pH of the material, and the chemicals contained therein. Therefore the Contractor shall ensure that:

- concrete is mixed on mortar boards, and not directly on the ground;
- the visible remains of concrete, either solid, or from washings, are physically removed immediately and disposed of as waste. Washing the visible signs into the ground is not acceptable; and
- all aggregate is also removed.

(i).1.1.29  **EP4.14.3  Cement stabilisation**

The Contractor shall not undertake cement stabilisation during windy periods. Special care shall be taken when working in the vicinity of the Coega River or Algoa Bay because of the possible damage caused by cement entering the water. Special care shall also be taken to avoid creating dust in the vicinity of the following areas:

- Salt works
- Public thoroughfares
- Residential areas
- ESAs

(i).1.1.30  **EP4.14.4  Fuel storage and use**

Tanks containing fuels shall have lids and shall remain firmly shut. Only clean, empty tanks may be stored on the bare ground. Fuel stores shall be placed on a bunded sealed base - the bunds shall have a volume of 110% of the volume of the largest tank in the storage area. Any waste water or spilled fuel collected within the bund shall be disposed of as hazardous waste.

The Contractor shall take all the necessary precautions to prevent fires or spills at the fuel stores. No smoking shall be allowed in the vicinity of the stores. Failure to adhere to this specification shall be cause for a spot fine being imposed on the offender.

The Contractor shall ensure that there is adequate fire-fighting equipment at the fuel stores.

(i).1.1.31  **EP4.14.5  Hazardous materials**
The Contractor shall comply with all relevant national, regional and local legislation with regard to the transport, use and disposal of hazardous materials. If necessary, the Contractor shall obtain the advice of the manufacturer with regard to the safe handling of hazardous materials.

The Contractor shall provide the EM with a list of all hazardous substances on site, together with storage procedures for these materials.

The Contractor shall ensure that information on all hazardous substances is available to all personnel on site. The Contractor shall furthermore be responsible for training and education of all personnel on site who will be handling the material about its proper use, handling and disposal.

(i).1.1.32 EP4.14.6 Transport of materials outside the site

The Contractor shall comply with all the applicable local, regional and national by-laws with regard to road safety and the transport of materials, especially hazardous and/or toxic materials. Any claims against the Contractor shall be for his account.

The Responsible Person shall provide the EM with a schedule of proposed transportation of significant quantities of hazardous material onto the site, before commencing work on site. The EM may request further details or notifications of specific material movements if considered necessary.

(i).1.1.33 EP4.15 Emergency procedures

The Contractor shall submit his Emergency Procedure Method Statement to the EM prior to commencing activities on site.
(i).1.34  **EP4.15.1  General**

The Contractor shall ensure that emergency procedures are set up prior to commencing work. Emergency procedures shall include, but are not limited to, fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, etc. Emergency procedures, including responsible personnel, contact details of emergency services, etc. shall be made available to all the relevant personnel and shall be clearly demarcated at the relevant locations around the site.

The Responsible Person shall advise the EM of any emergencies on site, together with a record of action taken.

(i).1.35  **EP4.15.2  Fire**

The Contractor shall take all the necessary precautions to ensure that fires are not started as a result of his activities on site, and shall also comply with the requirements of the Occupational Health and Safety Act 85 of 1993.

No open fires shall be permitted on or off site. Closed fires or stoves shall only be permitted at designated safe sites in the construction camps. Fires shall also not be permitted near any potential sources of combustion, such as fuel stores, stockpiles of plant material etc.

The Contractor is advised that sparks generated during welding, cutting of metal or gas cutting can cause fires. Every possible precaution shall therefore be taken when working with this equipment near potential sources of combustion. Such precautions include having an approved fire extinguisher immediately available at the site of any such activities.

The Contractor shall be liable for any expenses incurred by any organisations called to assist with fighting fires, and for any costs relating to the rehabilitation of burnt areas.

(i).1.36  **EP4.16  Social issues**

(i).1.37  **EP4.16.1  Third party or public complaints**

The EM shall be responsible for responding to queries and/or complaints and may request assistance from the Responsible Person.

The EM shall notify the Responsible Person of any complaints lodged by a third party, and request appropriate information and measures to address such complaints. The EM shall be responsible for maintaining a complaints register in which all complaints are recorded, as well as action taken. This register shall be available to the Responsible Person and the Contractor on request.
(i).1.38  EP4.16.2  Use of local labour

All recruitment of personnel must be undertaken via the recruitment centres which have been set up to provide a fair service to job seekers. No personnel are to be recruited on site. The recruitment centres will provide the contact details, skills and training of a pool of local labour. The EM will provide further information as required.

(i).1.39  EP4.16.3  Information sharing

The Responsible Person and/or the Contractor may need to make staff available for formal consultation with affected parties for the purpose of explaining the construction process and answering queries if necessary.

(i).1.40  EP5  SITE CLEARANCE

EP5.1  Removal of endemic or endangered species

The Contractor shall contact Eastern Cape Nature Conservation (CNC) Scientific Research Department (Telephone 041 338891) at least three weeks before site clearance to provide the CNC with the opportunity to visit the site. CNC shall advise the Contractor within one week if it is necessary to provide the opportunity for a specialist to remove endemic or rare plant species prior to site clearance. If no response is received from CNC within one week the Contractor may proceed with the clearance of the site.

If necessary, CNC would contact the specialist(s). The service provided by the specialist would be at no cost to the Contractor.

EP5.2  Removal of topsoil

Following removal of vegetation from the site, all top soil shall be removed (up to a maximum of 30cm depth) and stockpiled for re-use in subsequent rehabilitation and landscaping activities. The stockpiles shall not be higher than 2 m in order to minimise composting. The stockpiles of topsoil shall be located in an area agreed with the EM.

(i).1.41  EP5.3  Stabilisation of steep slopes

The disturbance of steep slopes, for example by the removal of vegetation, may result in slope instability and erosion by rain and surface run off. The Contractor shall ensure that slopes that are disturbed during construction are stabilised to prevent erosion occurring. Where revegetation of slopes is undertaken, this shall be in accordance with the specification provided in EP6.

Slopes that are susceptible to accidental damage during construction shall be protected to reduce the risk of disturbance.

Any erosion that does occur must be reinstated at the Contractor’s cost.
(i).1.1.42  EP5.4  Removal of alien vegetation

The Contractor shall clear all alien vegetation from areas within the demarcated site that are to be landscaped or which fall within the open space or buffer zones. Open space and buffer zones are indicated in Figure 2.

(i).1.1.43  EP6  SITE REHABILITATION

EP6.1  Scope

The Contractor shall be responsible for rehabilitating any areas cleared or disturbed for construction purposes that are to be incorporated into the open space or buffer zones (e.g. pipeline routes, road fringes, haul road). The Contractor shall revegetate such areas in accordance with the specification provided below. The EM will provide details of the appropriate buffer zones.

The Contractor shall stabilise, by straw rotovation or other means (see Project Specification for stabilisation), any areas that are cleared or disturbed for construction purposes which are not going to be incorporated into open space or buffer zones (i.e. areas that will be subsequently developed by another party).

All construction equipment and excess aggregate, gravel, stone, concrete, bricks, temporary fencing and the like shall be removed from the site upon completion of the work. No discarded materials of whatsoever nature shall be buried on the site or on any other land not owned by Coega.

EP6.2  Landscaping and preparation for revegetation

Areas that require reshaping shall be cut, filled and compacted so as to follow the contours of the surrounding landscape. Topsoil removed from the area initially shall be replaced. Care must be taken not to mix the topsoil with the subsoil during shaping operations. Should a crust form on the soil before revegetation is commenced, the Contractor shall, at his own cost, loosen the crust by scarifying to a depth of 150 mm.

EP6.3  Seeding

A commercial annual and perennial grass seed mix shall be used which has an annual to perennial ratio of greater than 1.5:1. *Eragrostis tef* is a suitable annual species, while perennial species should be comparable to those in the natural grassveld. Grass sown at high rates can prevent the establishment of natural species, therefore suitable sowing rates should be chosen.

Irrigation will enhance the rehabilitation and should be considered if unusually dry conditions prevail.

If valley thicket or bushclump sections need to be rehabilitated then aloes and nurse species could be planted to facilitate the recovery process.

The use of anti erosion compounds should be considered on steep slopes where there is a risk of erosion.
Control of the spread of alien species, especially *A. Cyclops*, should be managed by regular monitoring of the area and removal of these seedlings. Regular monitoring of the area will also allow for modifications to the rehabilitation programme, for example the need to irrigate, sow more seed or fertilise. The rehabilitation programme should be flexible allowing for these modifications.

**EP7 MANAGEMENT AND MONITORING**

This section focuses on the systems and procedures required to ensure that the environmental specifications are effectively implemented. The emphasis is on monitoring, training and penalties/incentives aimed at ensuring compliance with this document. Suitable documentation and external checks are crucial to ensure compliance and methods to achieve this are also presented in this section.

**EP7.1 General inspection monitoring and reporting**

The Responsible Person shall:

- Inspect the site on a daily basis to ensure that the environmental specifications are adhered to.

- Provide the EM with a monthly written report, detailing both compliance with this document as well as environmental performance. This Environmental Performance and Compliance Report will be made available to the NEC should they wish to see it.

- Maintain a record of major incidents (spills, impacts, complaints, legal transgressions etc) as well as corrective and preventive actions taken, for submission to the EM at the scheduled monthly report back meetings.

- Conduct regular internal audits to ensure that the system for implementation of the EMP is operating effectively. The audit shall check that a procedure is in place to ensure that:
  - the method statements and EMP being used are the up to date versions;
  - variations to the EMP/Method Statements and non-compliances and corrective action are documented;
  - appropriate environmental training of personnel is undertaken; and
  - emergency procedures are in place and effectively communicated to personnel.

- Provide information to the EM as required during external audits that shall be conducted by the EM as part of the EMS auditing procedure. The information required will include the reports of internal audits conducted by the Responsible Person.
EP7.2 Scientific monitoring

EP7.2.1 Groundwater monitoring

The Contractor is advised that an independent groundwater monitoring system has been established. Further information is available from the EM. The Contractor shall be required to alter his construction procedures should there be any evidence of groundwater pollution emanating from the site activities. Such alterations shall be identified through discussions between the Contractor, Responsible Person and the EM.

EP7.2.2 Monitoring of the Coega River

The Contractor is advised that an independent water quality monitoring system for the Coega River has been established. Further information is available from the EM. Any deterioration in the quality of the water in the Coega River as a result of the Contractor’s activities on site shall be cause for the EM to order the suspension of such activities. The Contractor and EM shall agree on measures to ensure that suitable new measures are devised prior to recommencing activities. Any costs incurred in order to remove any pollutants from the lake and/or re-stabilise the banks resulting from the non-compliance of the controls detailed above will be for the Contractor’s account.

The Contractor and his employees shall not use the Coega River for any purpose.

EP7.2.3 Monitoring of sewerage and stormwater systems

The Contractor is advised that an independent sewerage and stormwater monitoring system has been established. Further information is available from the EM. The EM will advise the Responsible Person of the appropriate discharge standards. Violation of these standards shall be cause for the EM to order the suspension of all effluent and stormwater discharges until such time as a suitable solution has been implemented by the Contractor. Any costs incurred to remediate polluted areas as a result of a violation of standards, as well as costs of finding a solution to discharge exceedances, shall be for the Contractor’s account.

EP7.2.4 Monitoring of dust in the atmosphere

The Contractor is advised that an air quality monitoring system has been established for the Coega Development Zone. Further information is available from the EM. Any deterioration in the air quality as a result of the Contractor’s activities on site shall be cause for the EM to order the suspension of such activities. The Contractor and EM shall agree on measures to ensure that suitable new measures are devised prior to recommencing activities. Any costs incurred will be for the Contractor’s account.
(i).1.1.44 EP7.3  Environmental awareness training

EP7.3.1  Environmental awareness training prior to commencing work

An initial environmental awareness training workshop shall be held prior to any work commencing on each Concessionaire/Tenant’s site. The Responsible Person shall organise (deliver) the workshop and will record the names of those attending. It is recommended that the Contractor allow one hour for this workshop. The workshop shall be attended by all site staff, including sub-contractor’s staff.

The Contractor is responsible for ensuring that personnel commencing work on site after the start of the contract (who therefore miss the initial workshop) are also made aware of the environmental procedures before commencing work.

The emphasis should be on any (potential) environmental impacts relating to the construction activities to be undertaken on site and the related environmental precautions which need to be taken to avoid or mitigate these impacts. The contractual obligation to comply with the specifications in the EMP must also be emphasised (some training material will be specific to certain sites or tenders).

A general environmental awareness programme aimed at all employees of the Contractor, sub-contractors and suppliers is available from the EM.

EP7.3.2  Additional environmental awareness sessions

If there are persistent breaches of the specifications contained in this document and/or if new environmental issues arise during the course of construction, the EM may require additional environmental training sessions. Attendance at these sessions will be determined by the EM, in consultation with the Responsible Person. The Contractor shall make provision for one hour a month for attendance (of construction staff) at these meetings.

EP7.4  Documentation

The Responsible Person shall ensure that all records of spills, pollution incidents, spot fines, training details etc. are copied to the EM for his records. All documents shall be open for inspection by the NEC.

The EM shall ensure that a register of public complaints and action taken thereon, plus the relevant documentation from the Contractors, is maintained.

EP7.5  Incentives and penalties

EP7.5.1  Incentives

The EM may identify a Contractor that is best implementing this Environmental Specification and may make a (monthly) award to, or acknowledge, that Contractor.

EP7.5.2  Penalties
Spot fines shall be imposed by the EM on Contractors who are found to be infringing these specifications. The Contractor shall be advised in writing of the nature of the infringement and the amount of the spot fine. The Contractor shall determine how to recover the fine from the relevant employee and/or sub-contractor. The Contractor shall also take the necessary steps (e.g. training) to prevent a recurrence of the infringement and shall advise the EM accordingly.

The Contractor is also advised that the imposition of spot fines does not replace any legal proceedings the Council, authorities, land owners and/or members of the public may institute against the Contractor.

Spot fines shall be between R20 and R2000, depending upon the severity of the infringement. The decision on how much to impose will be made by the EM, and will be final. In addition to the spot fine, the Contractor shall be required to make good any damage caused as a result of the infringement at his own expense.

A preliminary list of infringements for which spot fines will be imposed is as follows:

- Moving outside the demarcated site boundaries;
- Using the river for any purposes other than those specified;
- Littering of the site and surrounds;
- Burying waste on site and surrounds;
- Smoking in the vicinity of fuel storage and filling areas and in any other areas where flammable materials are stored/used;
- Making fires outside designated areas;
- Defacement of natural features;
- Using the veld for ablution purposes;
- Spillage onto the ground of oil, diesel, etc;
- Picking/damaging plant material;
- Damaging/killing wild animals;
- Additional fines as determined by the EM and added to this list.

Receipts for fines paid shall be issued, and the appropriate documentation retained, by the EM. Money “raised” through fines may be used to fund EMP incentive schemes and/or other environmental/social schemes of collective benefit to the Coega DZ.

**EP7.6 External audit**

Regular scheduled audit of the Coega Development Zone EMS will be conducted. However, this is not a dedicated audit of the implementation of this document (which is one of many components of the EMS). Nevertheless, it is anticipated that implementation of the terms and specifications contained in this document will be periodically audited as part of the EMS audit.

All documentation held by the EM shall be available for the EMS audit at all times. Contractors shall also be required to provide any information required by the EMS auditors.
(i).1.1.45  EP8  MEASUREMENT AND PAYMENT

The following items have cost implications that have not been defined elsewhere. The Contractor shall include a sum for all the following items in the Schedule of Quantities Section 1: Preliminary and General Item: Compliance with EMP.

The Contractor shall include a lump sum for general compliance with the EMP (items not specified below). Failure to provide any item or comply with any instruction of the Responsible Person will be cause for non payment of the Whole Lump Sum and for ordering the cessation of works.

| EP8.1   | Provision of temporary fencing for Environmentally Sensitive Areas |
| EP8.2   | Time for Environmental Training                                  |
| EP8.3   | General compliance with EMP                                       |