South African National Roads Agency SOC Limited

ENVIRONMENTAL AUTHORISATION FOR THE N2 KOKSTAD INTERSECTION UPGRADE

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP)

DRAFT 2 FOR PUBLIC COMMENT

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PROPOSED UPGRADE OF THE N2 KOKSTAD INTERSECTION
DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

CONTENTS

List of Figures

ANNEXURES

Annexure A: List of Important Contacts and Emergency Numbers
Annexure B: Inspection Sheet and Report Templates
Annexure C: List of Incidents and Associated Penalty Values
Annexure D: List of Construction Activities that Required Method Statements

ACRONYMNS

BA	Basic Assessment
C	Contractor
DEA	Department of Environmental Affairs
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
MS	Method Statement
PE	Project Engineer
PM	Project Manager
SC	Sub-contractor

1 INTRODUCTION

The South African National Roads Agency SOC Limited (SANRAL) is proposing to upgrade the N2, Section 21 and Provincial Road 56 intersection in Kokstad. The intersection is known as the "N2 Kokstad Intersection", which is located approximately 3 km to the south of the Kokstad Town Central Business District (CBD) in the KwaZulu-Natal Province.

Jeffares and Green (Pty) Ltd, the project engineers for the project, have appointed GIBB (Pty) Ltd (GIBB), as the independent Environmental Assessment Practitioner (EAP) to undertake the Basic Assessment (BA) for the proposed intersection upgrade.

GIBB developed this draft Environmental Management Programme (EMP) as part of the BA process. The draft EMP follows on from the Basic Assessment Report (BAR) in as much as all the measures for mitigation of impacts that were identified during the BA are incorporated in the EMP. The EMP covers the pre-construction planning and design, construction, operational and decommissioning phases of the Project.

The draft EMP is published in conjunction with the draft BAR for public comment. Once public comment has been considered, the draft BAR and draft EMP will be amended as required and thereafter submitted to the Department of Environmental Affairs (DEA) for decision making. On DEA's approval of the BAR and draft EMP, Environmental Authorisation may be granted which details the environmental conditions to be adhered to during the various developmental phases for the Kokstad N2 intersection upgrade. It is important to note that the EMP must be amended to incorporate any additional specifications required in terms of the Environmental Authorisation and any additional requirements the proponent may find necessary.

The final EMP must be considered during pre-construction planning and design; incorporated in all the contractor documents; and fully implemented prior to commencement of any construction activities. The EMP may also require further amendments as the project unfolds. Any significant amendments require DEA approval before being implemented.

1.1 Structure of Environmental Management Programme and Alignment to NEMA (2010), Section 33

This EMP is structured as follows:

Chapter 1	Provides the introduction and details of the proponent, EAP that undertook the BA and the authorities that dealt with the application for Environmental Authorisation
Chapter 2	Provides the objectives and scope of the EMP
Chapter 3	Presents the Glossary of Terms

Chapter 4 Provides a brief project overview, including the project motivation and description, the study area and environmental impact assessment

Chapter 5 Provides the legislative and policy context of the project

Chapter 6 Provides details on the roles and responsibilities; compliance monitoring and reporting; and penalties with regard to planning and implementation of the EMP

Chapter 7 Provides details on requirements, procedures and content of specific method statements and standard operating procedures to be developed for the project.

Chapter 8 Defines the environmental specifications to be adhered to during the pre-construction, construction, operational and decommissioning phases of the project

Chapter 9 Concludes the EMP.

Regulations 22 (l) requires that the draft EMP comply with Regulations 33, as detailed in **Table 1-1**.

Table 1-1: Alignment to NEMA 2010 EIA Regulation 33

Sub Section Content	Reference in the EMP
(a) details of – i. the person who prepared the environmental management programme; and ii. the expertise of that person to prepare an environmental management programme;	**Section 1.4.2**
b) information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of— i. planning and design; ii. pre-construction and construction activities; iii. operation or undertaking of the activity; iv. rehabilitation of the environment; and v. closure, where relevant.	**Section 8** – Library of Environmental Specifications to Address the Specific Aspects and Impacts.
c) a detailed description of the aspects of the activity that are covered by the draft environmental management programme;	**Section 4** – Brief Project Overview.
d) an identification of the persons who will be responsible for the implementation of the measures contemplated in paragraph (b);	**Section 6** – Organi-sation, Roles and Responsibilities.
e) proposed mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon;	**Section 6.5** – Independent Environmental Control Officer; **Section 6.7** – Compliance Monitoring and Reporting; **Section 8** – Various

	monitoring related mitigation measures incorporated
f) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development, including, where appropriate, concurrent or progressive rehabilitation measures;	**Section 8.4.4** – Site Remediation, Rehabilitation and Re-vegetation
g) a description of the manner in which it intends to— i. modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; ii. remedy the cause of pollution or degradation and migration of pollutants; iii. comply with any prescribed environmental management standards or practices; iv. comply with any applicable provisions of the Act regarding closure, where applicable; v. comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	**Section 8** – Library of Environmental Specifications to Address the Specific Aspects and Impacts
h) time periods within which the measures contemplated in the environmental management programme must be implemented;	Applicable time periods are indicated in **Section 8** in **[brackets]**
i) the process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity;	*Inter alia*: **Section 8.1**; **Section 8.4.7**; **Section 8.4.8**; **Section 8.4.9**; **Section 8.4.10**
j) an environmental awareness plan describing the manner in which— i. the applicant intends to inform his or her employees of any environmental risk which may result from their work; and ii. risks must be dealt with in order to avoid pollution or the degradation of the environment;	**Section 8.4.1**
k) where appropriate, closure plans, including closure objectives.	**Section 8.4.4** – Site Remediation, Rehabilitation and Re-vegetation ***Note****: Due to the close proximity of the site to the Richards Bay CBD, it is unlikely that the site would be returned to a green-field site. It would likely be redeveloped for industrial use in the foreseeable future.*

The legislation hereby ensures that effective environmental management is implemented throughout the life cycle of the project via the translation of BA management actions into the FEMP and ultimately into an EMP.

1.2 Alignment with Conditions of Authorisation

To be completed once authorisation is issued

1.3 Revisions

Revisions and updates to the EMP must be recorded. **Table 1-2** provides a list of revisions to the EMP to date and must be updated accordingly. All EMP revisions with substantial changes must be submitted to DEA for approval prior to implementation. Note that Annexures may require more frequent updating and it is therefore assumed that these revisions do not need to be sent to DEA for approval.

Table 1-2: EMP Revision Record

Document name and version	Date	Author / reviser	Contact
Draft EMP for Public Review (Original)	August 2013	Alecia Barnard Katherine de Jong	albarnard@gibb.co.za +27 012 348 5880 kdejong@gibb.co.za +27 31 267 8560
Draft EMP for Public Review (Draft 1)	August 2013	Elisabeth Nortje	enortje@gibb.co.za +27 012 348 5880
Draft EMP for Public Review (Draft 1)	September 2013	Client review	N/A
Draft EMP for Public Review (Draft 2)	June 2014	Elisabeth Nortje Katherine de Jong	enortje@gibb.co.za +27 012 348 5880 kdejong@gibb.co.za +27 31 267 8560

1.4 Details of the Planning Team

This section provides details on the planning team that was involved in the development of the draft EMP. The team includes the proponent organisation and EAP. Details of the contact person are also provided.

1.4.1 The Proponent: SANRAL

The South African National Roads Agency SOC Limited, generally known as SANRAL, is an independent, statutory company registered in terms of the Companies Act. The South African government, represented by the Minister of Transport, is the sole shareholder and owner of SANRAL. Their mandate is to finance, improve, manage and maintain the national road network (the "economic arteries" of South Africa).

Jeffares & Green (Pty) Ltd contact person are provided below.

Name of Applicant:	Jeffares & Green (on behalf of SANRAL)
Contact Person:	Mr Menzi Yengwa / Mr Colin Scott
Address:	John Jeffares House 6 Pin Oak Avenue Hilton 3201
Postal Address:	PO Box 794 Hilton, Pietermaritzburg 3245
Tel:	+27 33 343 6700
Fax:	+27 33 343 6701
E-mail:	YengwaM@jgi.co.za

1.4.2 The Environmental Assessment Practitioner: GIBB (Pty) Ltd

GIBB is a multi-disciplinary engineering and environmental consultancy organisation. GIBB's Environmental Division has a proven track record in the planning, co-ordination, management and execution of a wide range of environmental projects, including BAs, EIAs and EMPs.

Details of EAP's that prepared the draft EMP are as follows:

Name	Ms Katherine de Jong
Address:	54 Norfolk Terrace 2nd Floor, IBM Building Westville 3630
Postal Address:	PO BOX 1365 Westville 3630
Tel:	+27 31 267 8560
Fax:	+27 31 266 3310
E-mail:	kdejong@gibb.co.za

Expertise	BSc (Hons) (Geography and Environment Management) - An environmental scientist specialising in environmental processes such as Environmental Auditing, Environmental Basic Assessments, Integrated Waste Management Plans and Integrated Water Use Licences.

1.4.3 The Environmental Authority: Department of Environmental Affairs (DEA)

The DEA is the designated authority responsible for authorising the BA and this EMP. DEA has overall responsibility for ensuring that the applicant (SANRAL) complies with the conditions of its Environmental Authorisation as well as this EMP.

The following DEA case officer was involved in handling the BA application and EMP review:

Name:	Vincent Chauke
Title:	Case Officer
Postal Address:	Private Bag X 447, Pretoria, 0001
Tel:	012 310 3859
Fax:	012 320 7539
E-mail:	vchauke@environment.gov.za

1.4.4 Assumptions and Limitations

Assumptions and limitations are listed below:

- The development of the EMP follows from those captured in the Basic Assessment Report and assumes that GIBB has been provided with all relevant project information known to SANRAL at the time it was provided and that it was correct at such time;
- There will be no significant changes to the Proposed Project and associated infrastructure between the submission of this EMP; and
- Implementation of the Proposed Project that could substantially influence the conclusions and recommendations are given in this report.

2 OBJECTIVES AND SCOPE

2.1 Objective of the Environmental Management Programme

In accordance with the National Environmental Management Act 107 of 1998 and associated EIA Regulations, an Environmental Management Programme (EMP) must be compiled and approved by the Department of Environmental Affairs (DEA) (the Competent Authority), prior to the commencement of construction activities for the proposed project. The legislation states that an EMP is to be implemented by the appointed proponent, contractor and operator of the project which will ensure that environmental impacts associated with the proposed project are mitigated as required.

It is imperative that the remedial and mitigation requirements identified during the Basic Assessment process and by appointed specialists are effectively realised during pre-construction site investigations, construction, operation, through to the final decommissioning of the project. Accordingly, the EMP plays a key role in the implementation of consistent and continued environmental management for the duration of the project life cycle. **Figure 2-1** contextualises EMPs within the broader environmental assessment and management processes for the project. It also illustrates the links between the various activity life cycles, processes and mechanisms specific to the upgrade of N2 Kokstad intersection.

Therefore the EMP provides environmental management guidelines, in design, construction, operational and decommissioning activities, with which the respective parties of the SANRAL project must comply.

The Environmental Control Officer (ECO), acting on behalf of both SANRAL and environmental authorities, will monitor the implementation of the EMP during construction. The EMP will form part of the contractual agreement between SANRAL and the appointed construction contractor. Compliance with the EMP must therefore form part of all the construction contactor's working tender documentation and be endorsed contractually. The recommendations and constraints, as set out in this document are thus enforceable under the General Conditions of Contract.

As previously stated, this EMP is currently in draft form and will be finalised once DEA issues the environmental authorisation. The conditions of approval that are recorded in the environmental authorisation will thereafter be incorporated into the document when finalising the EMP. As such, the EMP structure captures the requirements of the Environmental Authorisation through incorporating environmental specifications applicable to the project, against which the effectiveness of management of each impact will be measured.

The aims of an EMP should therefore include to (Hill, 2000):

- Ensure compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international from the start of the project;
- Ensure that there is sufficient allocation of resources on the project budget so that the scale of EMP-related activities is consistent with the significance of project impacts;

- Verify environmental performance through information on impacts as they occur;
- Respond to changes in project implementation not considered in the BA;
- Respond to unforeseen events; and
- Provide feedback for continual improvement in environmental performance.

2.2 Scope of the Environmental Management Programme

In order to achieve the above aims, the generic scope of an EMP should include the following (Hill, 2000):

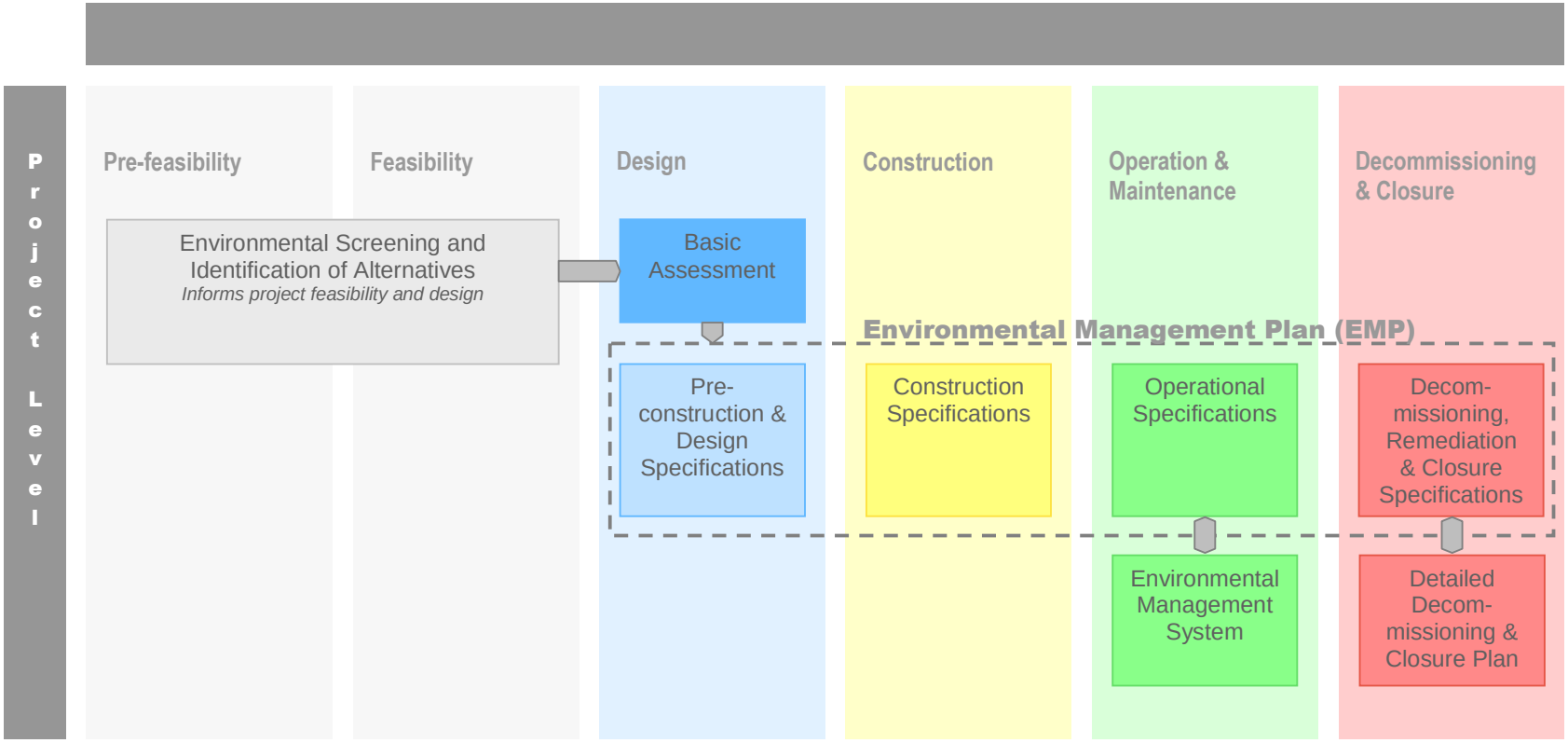
- Definition of the environmental management objectives to be realised during the life of a project (i.e. pre-construction, construction, operation and/or decommissioning phases) in order to enhance benefits and minimise adverse environmental impacts;
- Description of the detailed actions needed to achieve these objectives, including how they will be achieved, by whom, by when, with what resources, with what monitoring/verification, and to what target or performance level. Mechanisms must also be provided to address changes in the project implementation, emergencies or unexpected events, and the associated approval processes;
- Clarification of institutional structures, roles, communication and reporting processes required as part of the implementation of the EMP;
- Description of the link between the EMP and associated legislated requirements; and
- Description of requirements for record keeping, reporting, review, auditing and updating of the EMP.

Specifically, this EMP aims to:

- Draw attention to all the key environmental management requirements applicable to the project
- Organise environmental; management requirements for the various life-cycle phases, as were determined through the Basic Assessment process, in a meaningful and structured way;
- Provide extracts for input into construction tender and contract documents, commissioning procedures, operational Environmental Management System (EMS), and decommissioning and final site remediation procedures;
- Provide information extracts to be included as part of the vendor tender pack if required by the client, with the understanding that the selected vendor(s) will provide for compliance to the EMP in his/her/their tender submission(s);
- Define and outline the functions, roles and responsibility of accountable persons for effective environmental management;
- State key standards and guidelines, which are required to be achieved in terms of environmental legislation;

- Outline mitigation measures and environmental specifications which are required to be implemented during pre-construction, construction, operation, decommissioning and closure phases of the project, in order to minimise the extent of environmental impacts and to manage environmental impacts associated with the project through effective control;
- Identifies the requirements for detailed Method Statements (construction phase) and Safe Operating Procedures (operational and decommissioning phases) for certain aspects or activities;
- Prevent long-term or permanent environmental degradation;
- Define requirements and procedures for monitoring; and
- Outline procedures for environmental management and control, in the event of pollution or similar incidents.

Figure 2-1: Environmental Management Plan context in environmental planning and management processes



Source: Adapted from Lochner, 2005

3 DEFINITIONS OF TERMS

Table 3-1: Glossary of Terms

Audit	A verification process that is used to obtain information regarding the implementation of the EMP. It is an objective tool used to make improvements at the workplace
Avi-fauna	All birdlife and their nests.
Berm	A barrier that is designed to divert surface water flow. Berms will primarily be used along roads/tracks to prevent to concentrated flow of water over particular areas, thereby reducing erosion of roads.
Bunding	An impervious containment system for potential spillages from tanks / containers stored on site. The bunded area shall have a capacity greater than 110% of the total tankage contained. The bunding shall be constructed of a material impermeable and resistant to the stored material.
Client	For the proposed N2 Kokstad Interchange upgrade, SANRAL is the client.
Construction activities	Any action undertaken by the contractor, suppliers, sub-contractors or employees during the construction process.
Contractor	Construction companies as well as their sub-consultants and suppliers appointed to undertake the construction activities on behalf of the client.
Construction camp	The area allocated for the establishment of equipment, repair area, ablution facilities, lay down and rest areas, etc. It also serves as the central point for the storage of fuel and construction material.
Environment	The surroundings within which humans exist and include biophysical, social and economic aspects. Examples include water, air, soil, plants and animals.
Environmental Control Officer (ECO)	Individual appointed by the Project Manager/Engineer who is responsible for the monitoring, review and verification of the implementation of the EMP, liaison between SANRAL, Contractor, landowners and monitoring, reviewing and verifying compliance with the EMP by the Contractor.
Environmental Officer (EO)	Individual appointed by the Contractor to assist with the effective implementation of the EMP and to render environmental control of site actions, re-mediation and rehabilitation work on a day-o-day. The EO focuses exclusively on matters related to environmental management, compliance and enhancement.
Environmental specification	A component of the contractor's construction activity that is likely to interact with and potentially impact on the environment.
Environmental impact	A positive or negative change to the environment that results from the effect of a construction activity. The impact may be a direct or indirect consequence of a construction activity.

Environmental Management Programme (EMP)	An EMP is to be implemented by the appointed contactor, to ensure that environmental impacts that may occur due to construction activities are mitigated on site. An EMP provides environmental management specifications, which must be complied with by the Contractor in constructing the road. The undertaking of an EMP is in accordance with the requirements of the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations.
Fauna	All animals identified within or outside of the construction area. Animals may not be harmed in any way.
Flora	All plant and tree species identified within or outside of the construction area.
General solid waste	Domestic, commercial, non-hazardous waste and builders rubble e.g. paper, plastics, food, tins, etc.
Hazardous substance	Any substance that is of risk to health and safety, property or the environment. Hazardous substances have been classified under the SANS 10228: 'The Identification and Classification of Dangerous Goods and Substances'.
Hazardous waste	Any inorganic or organic element or compound that because of its toxicological, physical, chemical or persisting properties, may exercise detrimental acute or chronic impacts on human health or development. Hazardous wastes are classified in accordance with the 'Minimum Requirement for the Handling, Classification and Disposal of Hazardous Waste' published by the Department of Water Affairs and Forestry (DWAF) (1998).
Hazardous waste landfill site	A waste disposal site that is designed and managed to accommodate the disposal of hazardous waste substances, and is accordingly permitted/licensed
Heritage site	A site that contains either archaeological artefacts, graves, buildings older than 60 years, meteorological or geological fossils etc.
Land owner	The individual or company that owns the land adjacent to the construction site.
Method Statement (MS)	Method Statements indicate how compliance with the Environmental Specification will be achieved. The Contractor shall submit a written Method Statement to the ECO for approval, covering those activities, which are identified (in this document and/or by the ECO), as being potentially harmful to the environment.
Material Safety Data Sheets (MSDS)	MSDS are intended to provide workers and emergency personnel with procedures for handling or working with specific substances in a safe manner, and includes information such as physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures. In South Africa the Occupational Health and Safety Act 85 of 1993 (as amended) specifies the requirements for MSDSs.

Servitude	Servitude is a right to access which allows a local authority access to a property for inspection or installation of roads, pipes, sewerage lines, electricity cables and so on. It is registered against the title deed.
Site Diary	A logbook kept on site during construction to record the day to day construction activities.
Spoil	Uncontaminated soil removed during excavations, culverts and roads.
Topsoil	The layer of soil covering the ground that allows for the successful germination of seeds, water penetration and is a source of micro-organisms and plant nutrients.
Watercourse	A natural channel in which water flows regularly or intermittently.
Wetland	Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil. (National Water Act 36 of 1998)
Workforce	All people involved in the construction activities, including people employed by the client or contractor, either permanent or casual staff.

4 BRIEF PROJECT OVERVIEW

4.1 Project Motivation

In summary the motivation for the proposed Project is to:

- To reduce extreme traffic congestion at the N2 Kokstad intersection during weekends and at month ends;
- To meet SANRAL's requirements in terms of functioning National Roads (Class 1 and Class 2 Roads). The main function of a Class 1 road is to provide high speed mobility to long distance traffic;
- To improve mobility on the roads and cater effectively for through traffic from all directions;
- To increase road safety for road users turning at the existing access to the Mount Currie Engen Stop on the R56 near the N2 Kokstad Intersection;
- To cater for rezoning applications seeking individual access to the R56;
- To provide for connections to collector roads for proposed developments in and around the;
- To Kokstad area in line with the Kokstad Spatial Development Framework (SDF);
- To provide long term planning for a more direct coastal route to the east of Mthatha; and
- To control truck loads to/from the Mthatha direction or entering Kokstad by using the proposed new overload facility.

4.2 Project Description

The South African National Roads Agency SOC Limited (SANRAL) is proposing to upgrade the N2, Section 21 and Provincial Road 56 intersection in Kokstad in the KwaZulu-Natal Province. The intersection is known as the "N2 Kokstad Intersection" and is located approximately 3 km to the south of the Kokstad town Central Business District (CBD). During weekends, particularly on Friday afternoons and at month ends, severe congestion occurs at this intersection. Therefore in order to meet SANRALs requirements for a functioning National Route, possible improvements are needed including a long term need for a full grade separated interchange at the N2 Kokstad Intersection.

The N2 Kokstad Intersection is a T- junction with the following three legs;

- The N2 towards Mthatha forms the southern leg
- The R56 towards Kokstad forms the opposite northern leg
- The N2 eastern leg towards Port Shepstone forms the leg of the T

The Mthata N2 southern leg and the Kokstad northern leg of the intersection form a continuous route with no stoppages. There is however a stop control on the Port Shepstone leg of the intersection. Extreme congestion is currently experienced at this intersection, where vehicles often form a queue of approximately 800m during peak traffic. The current intersection therefore needs to be upgraded to improve operation, safety and to reduce congestion.

The proposed preferred road alternative upgrade comprises (but is not limited to) the following:

- Construction of the interchange and road works for capacity upgrades, including the following:
    - Construction of a new bridge structure over N2. A new road over the road interchange bridge will be constructed over the N2. The new bridge will have 2 lanes of 3.5m width, a 3m wide painted island and a 2m pedestrian sidewalk.
    - Construction of N2 on and off ramps. The N2 on and off ramps are to have 8m wide carriageway with Type A drain and/or 0.8m gravel shoulder where required.
    - Realignment of existing R56 between the Engen Garage and the proposed interchange.
    - Widening of the road where required. The existing slip lane for traffic from Port Shepstone to uMthata will be widened to match the new N2 carriageway width with traffic in both directions.
    - Strengthening of existing carriageways
    - Pavement improvement on R56
    - Capacity upgrade by construction of a new carriageway. The N2 is to have 2 lanes of 3.7m wide carriageway and 1.5m surfaced shoulder with kerb and channel for drainage and 2m wide pedestrian walk
    - Provision of additional climbing lanes where required. There will be no climbing lanes within the construction limits Km5+500 and Km 7+200.
    - Upgrading of existing and installation of new stormwater culverts
    - Protection of utility services affected by the rehabilitation of existing carriageway and the new carriageway
    - Geometric safety improvements at intersection
- Improvements (widening) and rehabilitation on three (3) culverts/bridges (Tributaries of Mzintlava River and Koppies Kraal River Bridge). The existing uMzintlava river bridge under the N2 will be widened to accommodate the new N2 carriageway width and the on and off ramps
- Construction of new culverts. The existing 3m box culvert on the N2 will be lengthened to accommodate the new N2 carriageway width, new 3m box culverts will be constructed under the on and off ramps, new 1.8 m box culverts with 4 cells will be constructed on the R56
- The construction of a traffic control centre for trucks, including the following;
    - Bulk earthworks and layerworks for the construction of the facility
    - Operational buildings and offices, including weigh bridges and lighting

- Access roads, vehicle processing station and stacking area for overload vehicles
- Underpass structures for grade separated access from the R56
- Stormwater drainage pipes and culverts
- Fencing and security for the facility.

The Traffic Control Centre will house the KZN Road Traffic Inspectorate (currently housed in Kokstad) and will have an 8m wide roadway, a double storey office building, a 3.5m wide mass bridge with inspection pit and a 9000m^2 impound yard for overloaded trucks. Access to the facility will be though one security gate as per KZN DOT's input influenced by current operations in other facilities. The facility will be paraplegic friendly in that wheelchair ramps will be provided at building access points and all offices are downstairs with upstairs being mostly boardrooms. The building is not a green building but complies with SANS XA regulations. Energy efficiency measures to be implemented include the use of solar geysers, dual purpose air conditioners and window louvers for shading.

4.3 Project Activities

The following project activities were identified during the planning process and were as such considered during the BA and EMP development. It should be noted that the list of activities may need to be expanded or amended as the project unfolds. The EMP may then also need to be updated to address any additional environmental impacts and associated mitigation measures related to any revised or additional activities.

4.3.1 Construction Phase

The following facilities may be required and established in the site camp:

- Equipment yard and lay down area
- Waste material skips, stockpile and storage
- Site offices and ablution facility
- Concrete mixing / batching facility (provisional)
- Diesel, hydrocarbon and other substances storage/dispensing facility.

The possible construction activities that could potentially have an impact on the environment have been identified as the following:

- Use of available roads and tracks for transportation of equipment (some of which would be very large and bulky) and materials and for construction site access
- Use of transportation and construction vehicles, plant and equipment
- Setting up of a construction camp site at and/or close to the proposed site
- Noisy construction activities, such as heavy vehicles, jack hammers, hoists, cranes etc.
- Refuelling and maintenance of construction vehicles and plants
- Drilling and soil sampling for geotechnical investigations
- Earth work for platform preparation
- Concrete batching and/or mixing
- Asphalt laying for the road
- Resourcing, introduction, storage and use of construction material such as water, concrete, brick, fuel, oils, steel structures, equipment, construction wastes and litter
- Use of hazardous substances such as fuels, oils, paints, solvents, etc.;
- Possible use of portaloos;
- Disposal of construction waste and rubble.

4.3.2 Operation and Maintenance Phase

Once construction has been completed, activities for the proposed development will be restricted to the following:

- Vehicle usage of the road
- Pedestrian usage
- Bicycle and motorcycle usage.

4.4 Environmental Impact Assessment (Basic Assessment Process)

4.4.1 Brief Process Summary

The proposed upgrade required that an application for Environmental Authorisation application be submitted to the Competent Authority (The DEA) and a Basic Assessment Process be undertaken. The BA process followed was in accordance with the National Environmental Management Act 107 of 1998 (NEMA) (as amended) and the revised NEMA Environmental Impact Assessment (EIA) Regulations published as Government Notice No. Regulation 543, 544, 545 and 546 of 2010. These regulations regulate and control activities which may have a detrimental effect on the environment. Accordingly, certain "listed activities" require environmental authorisation by way of a BA or full EIA process.

The proposed development constitutes the following listed activities in terms of the EIA Regulations GN R 544, GN R 545 and GN R 546 (Listing Notice 1, 2 and 3):

Listed activity as described in GN R.544, 545 and 546	**Description of project activity**
GN R.544 Item 11*: The construction of:* *(i) Canals (ii) channels* *(iii) bridges (vi) bulk storm water outlet structures;* *(x) buildings exceeding 50 square metres in size;* *(xi) infrastructure exceeding 50 square metres or more* *Where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.*	*The proposed N2 Kokstad Intersection Upgrade will include the construction of;* • *A new bridge structure over the N2 ("bridges") and* • *Construction of N2 On and Off Ramps ("infrastructure exceeding 50 square metres or more")* • *Overload control facility for trucks ("infrastructure exceeding 50 square metres or more").* *This will occur within 32 metres of a watercourse (Tributaries of Mzintlava River and Koppies Kraal River).*

***GN R.544 Item 18**: The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from;* *(i) a watercourse*	*The proposed N2 Kokstad Intersection Upgrade will also involve improvements (widening) and rehabilitation on three (3) culverts/bridges which will involve "the removal or moving of soil, sand, pebbles or rock from a watercourse" (Tributaries of Mzintlava River and Koppies Kraal River Bridge).*
***GN R.544 Item 22**: The construction of a road, outside urban areas,* *(i) with a reserve wider than 13.5 metres or,* *(ii) where no reserve exists where the road is wider than 8 metres, or* *(iii) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.*	*The construction upgrade of a road interchange (National Route) and road works for capacity upgrades, outside urban areas,* *"(i) with a reserve wider than 13.5 metres"*
***GN R.544 Item 39**: The expansion of* *(i) Canals (ii) channels;* *(iii) Bridges (iv) weirs;* *(v) bulk storm water outlet structures;* *(vi) marinas;* *Within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, where such expansion will result in an increased development footprint but excluding where such expansion will occur behind the development setback line.*	*The expansion and upgrading of;* • *culverts/bridges ("bridges")* • *existing and installing new stormwater culverts ("bulk storm water outlet structures");* *"Within 32 metres of a watercourse" (Tributaries of Mzintlava River and Koppies Kraal River Bridge), measured from the edge of a watercourse, where such expansion will result in an increased development footprint.*

***GN R.544 Item 47**: The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre-* *(i) where the existing reserve is wider than 13.5 metres; or* *(ii) where no reserve exists, where the existing road is wider than 8 metres-* *excluding widening or lengthening occurring inside urban areas.*	*The proposed N2 Kokstad Intersection Upgrade occurs just outside an urban area and will involve;* • *Widening of the road where required ("by more than 6 metres, or the lengthening of a road by more than 1 kilometre")* • *Realignment of existing R56 between Engen Garage and the proposed interchange* • *Strengthening of existing carriageways* • *Pavement improvement on the R56* • *Capacity upgrade by construction of a new carriageway* • *Provision of additional climbing lanes where required* *"(i) where the existing reserve is wider than 13.5 metres"*

4.4.2 Identified Impacts

The following potential categories of environmental impacts were identified through the BA:

- Soil erosion and sedimentation Impact
- Soil and Resource Contamination Impact
- Impact on Hydrology, Drainage and Wetlands
- Impact on Flora
- Impact on Fauna
- Impact on Water use
- Impact on Public Health and Safety
- Economic Impact on Businesses
- Impact on Air Quality
- Impact on Visual and Aesthetics
- Impact on increased Noise Generation
- Impact on Community Relationship - Influx of Temporary Construction Workers;
- Impact on Heritage
- Public Service Use and Infrastructure Impact
- Traffic Impact and Use of and Impact on Public Roads.

The recommendations for mitigation of the above impacts that were made during the Basic Assessment process by specialists and Interested and Affected parties, which are considered pertinent to the EMP, have been incorporated into the relevant sections of the EMP and in some places have been expanded on.

Refer to the draft BAR for further information on the identified impacts.

5 LEGISLATIVE AND POLICY CONTEXT

5.1 National, Regional and Local Legislation

All legislation applicable to the development must be strictly enforced both during the construction and operational phases, irrespective of whether they are covered in the Environmental Specification Section **(Section 8)** or not. The proponent, contractor, subcontractor and operator of the Intersection upgrade on the N2 near Kokstad project must be acquainted with the relevant environmental legislation, including provincial and local government regulations, which are in place to ensure the protection of the environment. The environmental legislation applicable to the project includes, but is not limited to, the following:

- Constitution of the Republic of South Africa, 1996
- National Environmental Management Act 107 of 1998 (NEMA)
- Environment Conservation Act 73 of 1989
- National Water Act 36 of 1998
- National Environmental Management: Air Quality Act 39 of 2004
- National Environmental Management: Waste Act 59 of 2008
- National Environmental Management: Biodiversity Act 10 of 2004
- National Heritage Resources Act 25 of 1999
- Occupational Health and Safety Act 85 of 1993
- Hazardous Substances Act 15 of 1973
- National Road Traffic Act 93 of 1996
- The White paper on integrated pollution and waste management of South Africa
- All relevant Provincial regulations and Municipal bylaws.

6 ORGANISATION, ROLES AND RESPONSIBILITIES

6.1 Organisational Requirements

In order to ensure sound development and effective implementation of the EMP, it is necessary to identify and define the responsibilities and authority of the various persons and organisations that will be involved in the project.

During construction, all instructions and official communications regarding environmental matters shall follow the generic organogram shown in **Figure 6-1.** The organisational structure identifies and defines the authority structure, and the communication structure for the various parties involved in the proposed upgrade of the N2 Kokstad intersection. The structure may require revision as the project unfolds.

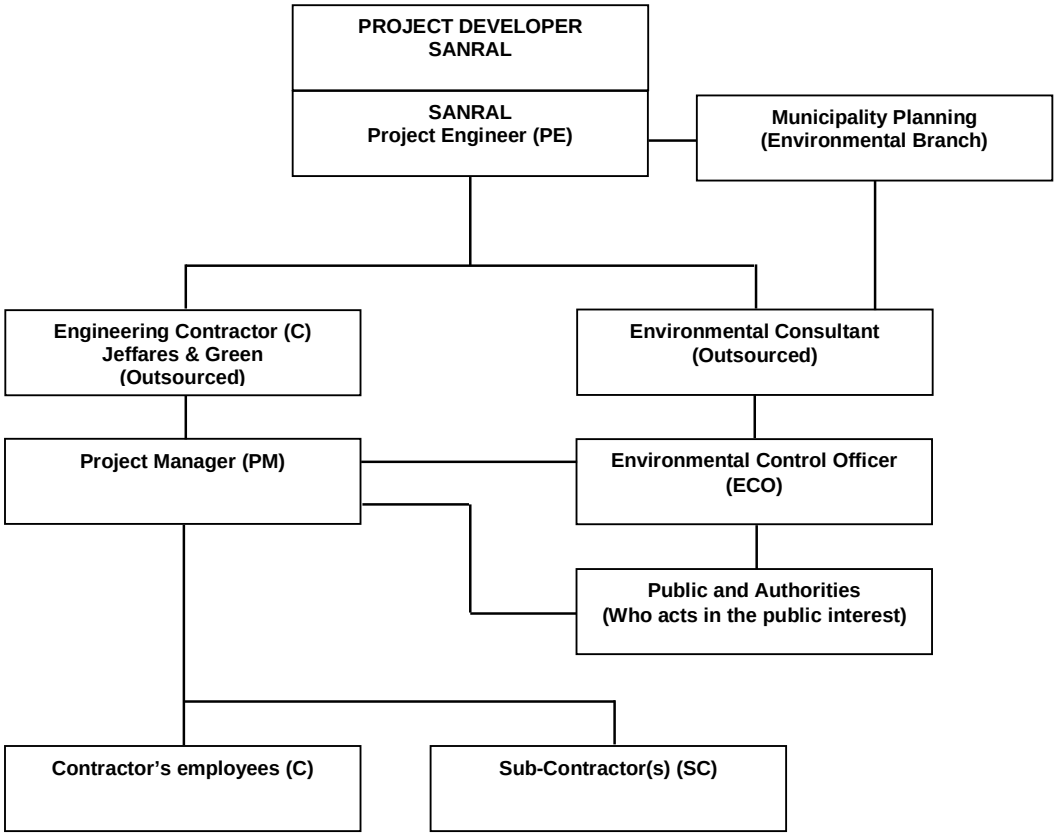


Figure 6-1: Organisational / Reporting Structure for implementation of the EMP

SANRAL will appoint a SANRAL Project Engineer (PE) who will represent SANRAL for the proposed development. SANRAL would appoint an Engineering Consultant / Contractor, Jeffares & Green (hereafter 'Contractor' or 'C') to implement the project. Two separate appointments will be made; for the civil and electrical construction phases respectively. SANRAL shall require each Contractor to appoint a Project Manager (PM) to direct and monitor all contractor activities during the construction of the development.

SANRAL shall appoint an Environmental Consultancy to fulfil the role of Environmental Control Officer (ECO) to oversee the implementation of the construction component of the EMP on site. It will be the responsibility of the ECO to consult with the PE and/or PM regarding instructions pertaining to contravention, corrective actions, and penalties or working methods. Except in an emergency situation, where instructions may be given directly to the Contractor's employees and sub-contractors, all instructions given by the ECO shall go through the PM.

The EMP will be an item of the monthly site meetings, and the ECO may attend these meetings in order to provide input with respect to compliance with the EMP. Copies of the minutes will be sent to SANRAL.

Key roles and responsibilities of each party are outlined in more detail in **Section 6.2**. It is important to note that, while parties are assigned various environmental roles and responsibilities, parties are severally and jointly responsible to ensure compliance with all environmental legislation and best practice.

6.2 Roles and Responsibilities

Table 4 outlines the roles and responsibilities in terms of the EMP for the following parties:

- Provincial Authorities
- SANRAL (PE)
- SANRAL Environmental Manager
- Jeffares & Green Engineering Contractor (C)
- Jeffares & Green Project Manager (PM)
- Environmental Consultant and Environmental Control Officer (ECO);
- Sub-contractor (SC)
- Public, which include authorities who act on behalf of the public.

Contact details for all key role-players are provided in **Annexure A**. These must be updated as necessary throughout out the project phases.

Table 2: Organisational Roles and Responsibilities

Role	Responsibility
6.2.1 Provincial Environmental Authorities (Competent Authority)	
The Department of Environmental Affairs (DEA) is the authority responsible for compliance with all environmental legislation.	Convey legal requirement for the EMP. Give directives in terms of specific requirements for EMP specifications. Review draft, final and revision EMPs. Undertake spot inspections of the site at its own discretion. Review ECO Audit Reports. Request and view Environmental Incident Report. Request and view the Complaints Register. Issue directives, notices and/or fines for significant transgressions with the EMP or environmental legislation. While the DEA is ultimately the authority responsible for ensuring compliance with the EMP, various other authorities play a critically important role in directing and advising on matters relating to environmental compliance. These include inter alia the following: The South African Heritage Resource Agency (SAHRA) and/or Amafa / Heritage KwaZulu Natal (Amafa) has legal competence over the management of heritage resources. In spite of the DEA's authorisation (assuming it is granted, SAHRA or Amafa may issue authorisations for the excavation and duration of heritage features and in general for the mitigation of heritage impacts. The Department of Water Affairs (DWA) has legal competence with respect to water-related issues and compliance with Water Use Licenses in terms of the National Water Act. It will also need to license any potential water uses or water crossings and monitor compliance with the conditions of approval during its operation. The local authority (Greater Kokstad Municipality) has competence with respect to zoning and land use, as well as health–related issues, noise and other nuisance bylaws. The Department of Labour has competence over labour conditions and occupational health and safety, and may conduct inspections of investigations in the event of disabling injuries. Although this is not strictly environmentally-related, there are a number of overlaps between environmental and occupational health issues where the Department may have an input. Ezemvelo KwaZulu-Natal Wildlife has competence with respect to any biodiversity or wetlands. They are entrusted with the long-term conservation of the regions rich biodiversity.

6.2.2 SANRAL Project Engineer	
The PE assumes overall responsibility for the environmental aspects and management of the SANRAL upgrade of the N2 Kokstad intersection. This includes compliance to all environmental regulatory and good management practice requirements for the duration of the project, in order to ensure effective minimisation of all environmental impacts. The PE is also responsible for the overall management and implementation, administration and enforcement of the EMP.	Ensure that all designs appropriately incorporate the required environmental provisions as discussed in the Basic Assessment (BAR) and EMP. Ensure that the EMP is finalised and adequately describes the minimum environmental regulatory requirements at the time construction commences. Ensure that the final EMP is approved by all relevant authorities. Ensure that the EMP specifications are included in all tender documents issued to prospective engineering consultants/contractors for the development works and activities on site. Review and where necessary, revise the 'incident and associated penalty values list' and include the list in the tender document. Ensure that the prospective Tenderers/Contractors adequately provide for the provisions of the EMP in their submissions. Appoint the Engineering Contractor(s) and Environmental Consultants, and through them a PM and ECO respectively, for the duration of the construction period and ensure that their scope of work sufficiently covers responsibilities that will ensure implementation and compliance with the EMP and good environmental management throughout the project. Ensure that the EMP is fully implemented and remains so, and when necessary is revised and updated. Give instructions regarding the development and implementation of Method Statements. Ensure that the Contractor develops and provides all required Method Statements. Review the Method Statements, with the assistance from the Environmental Consultant/ECO, to confirm their conformance with EMP requirements as well as with reasonable practicality and financial feasibility and provide relevant feedback to the Contractor. Approve acceptable Method Statements and inform the Environmental Consultant/ECO of such approval. Keep record of all Method Statements and the associated review and approval status. Review and approve drawings produced by the Contractor in connection with, e.g. construction site layout, road designs, construction stormwater management plan, etc. Be liable / accountable, to the relevant authority, DEA, for any contravention/non-compliance by any Contractor under their supervision. Liaise with the environmental authorities and SANRAL Senior Management as and when necessary. Establish and maintain regular and proactive communications with the Consultant/PM, Contractor and Environmental Consultant/ECO. Assist the Contractor in finding environmentally responsible solutions to problems with input from the ECO. Undertake periodic audits, site visits and inspections to ensure that the environmental requirements are implemented. Review and comment on environmental compliance assessments and/or reports. Review the Complaints Register. Give instructions on any procedures and corrective actions. Report any significant environmental incidents or impacts to the relevant environmental authorities.

	Deal with policing, fining, penalties and discrepancies. Instruct the Contractor on the requirements and procedures in terms of environmental non-compliance 'near misses', incidents and public complaints recording, investigation and reporting. Order the removal of, or issue spot fines for, person(s) and/or equipment not complying with the specifications. Issue fines, penalties or 'work suspend' orders for contravention of the EMP and give instructions regarding corrective action to the Contractor/PM.
6.2.3 Municipal Environmental Manager	
The Municipal Environmental Branch, which falls under the Development Planning and Management Unit, is responsible for sound environmental management of any projects or activities undertaken within the Municipal Area. As such they advise all municipal departments on environmental requirements for their projects and activities and will therefore support SANRAL on this project with advice and instruction on any environmental issue or requirement related to the project.	Review the EMP and any revision thereof and ensure that it fully aligns with the BA and associated Environmental Authorisation. Review Method Statements that are prepared for the project. Comment, advise and provide instructions for any additional environmental requirements for the project or any project activity. Advise on specific environmental requirements for protected areas Liaise with other environmental authorities) as and when required. Report any serious environmental issues to the relevant environmental authorities (DEA, Department of Water Affairs, etc.).
6.2.4 Engineering Contractor (Civil & Electrical Phase)	
The Engineering Contractor's role to implement and comply with recommendations and conditions of the EMP at all times. As such he needs to incorporate and cover all the relevant EMP requirements in the budget plans, detail designs, planning, sub-contractor appointments and all project implementation activities. The Contractor also needs to appoint an individual for the role of Project	Study the EMP and all its specifications carefully and gain a full understanding of its implications. Provide for full compliance with the EMP and all its relevant specifications in the submitted Tender; and/or provide motivation and/or alternative specifications through Method Statement(s) for any deviation from or 'tailor making' of the EMP for SANRAL to consider. Include all relevant EMP specifications in the tender documents and subcontractor appointments. Avail him / her, as well as any employee he may identify, for induction training on the EMP by the ECO. Notify the PE and ECO of the anticipated programme of works and fully disclose all details of activities involved (includes off-site activities associated with the project). Prepare all the required / agreed Method Statements for submission to the PE and Environmental Consultant / ECO. Sign off on approved Method Statements. Provide appropriate training on the latest version of the EMP and all approved Method Statements to all employee and sub-

Manager.	contractors and keep record of such training (e.g. keep record of the date of training, version of the EMP the training was for, the employee/sub-contractor trained and their ID numbers and have the trainee sign off on the training received). Appoint a competent, experienced and responsible individual as PM to administer and implement EMP with regard to engineering and construction. Ensure that the EMP environmental specifications (of this document including any revisions, additions or amendments) and all approved Method Statements are effectively implemented. Implement on-site steps to mitigate environmental impacts. Ensure that all employees and sub-contractors employed comply with the requirements and provisions of the EMP at all times. Report any serious environmental incidents or impacts to the SANRAL Project Engineer and ECO (or if not available to the Municipal Environmental Manager).
6.2.5 Project Manager	
The Project Manager (PM) oversees the construction programme and all construction activities performed by the contractor and as such also any EMP implementation, EMP compliance and environmental related activities, issues and impacts.	Gain an in-depth understanding of the EMP. Ensure implementation of all aspects and specifications of the EMP and approved Method Statements. Oversee all site works. Discuss implementation of and compliance with this document with Contractor employees and Sub-contractors at routine site meetings. Be responsible for all Contractor employees and sub-contractors. Enforce, oversee, monitor and verify the Contractor's and Sub-contractor(s)'s compliance with environmental legislation, the EMP and specifications and the approved Method Statements. Inspect the site and surrounding areas on a daily basis with regard to compliance with the EMP Monitor and verify that environmental impacts are kept to a minimum at all times. Inform the PE and ECO of problems arising when implementing the EMP and recommend ways of improving it. Assist the Sub-contractor(s) in finding environmentally responsible solutions to problems with input from the ECO. Take action to address all EMP, Method Statement and/or environmental legislation non-compliances. Notify the PE and ECO of any accidents and transgressions on site with respect to environmental management and non-compliance with the latest EMP version and approved Method Statements and seek advice from the ECO for required corrective actions and/or site remediation. Instruct the Sub-contractor(s) on the requirements and procedures in terms of environmental non-compliance 'near misses', incidents and public complaints recording, investigation and reporting. Report all 'near miss' incidents and actual incidents of environmental legislation and/or EMP non-compliances immediately to the PE. Record all 'near miss' incidents and actual incidents and consequent corrective actions/remedial action taken in Near Miss Reports and Incident Reports and submit these within one week of the occurrence to the PM and ECO for signing off. Report and record all accidents, incidents resulting in injury or death or significant environmental liability immediately to the PE and ECO. Record all public complaints received and immediately inform the

	PE and ECO thereof. Ensure that suitable records are kept of all compliance status/feedback reports, incident reports and complaints register and that these documents are available for auditing by the PM or ECO at all times. Keep records of all activities, 'near misses' and incidents concerning the environment, EMP compliance status and issues in the site diary and distribute associated reports to the PE and ECO. Report progress towards implementation of and non-conformances with the latest EMP version and approved Method Statements at site meetings with the PE and ECO. Prepare two weekly compliance status/feedback reports and submit these to the PE and ECO and keep copies thereof on record for the duration of the contract and at least three years after the contract expired. Communicate to the Contractor employees and Sub-contractors, verbally and in writing, the advice of the ECO and the content of the ECO reports. Designate and manage the working areas as per approved construction site layout, including sensitive environments. Keep a register of all public complaints in the Site Office (to be situated in proximity to where the works are taking place) and deal with any community comments or issues. Issue penalties for contravention of the EMP to Contractor Staff and Sub-contractor (as deemed necessary).
6.2.6 Environmental Consultant / Environmental Control Officer	
Fulfil an advisory consultancy, monitoring and reporting role with regard to overseeing the effective implementation and updating of the EMP. Making recommendations for addressing EMP and/or environmental legal non-compliances. Liaising with the relevant Environmental Authorities on any environmental issues to confirm their requirements, as and when required and communicating such requirement to the SANRAL Project Engineer and/or PM. (Note that the Environmental Authorisation may specify that the ECO needs to be independent in which case SANRAL needs to	Revise and update the EMP as and when necessary and submit such updates to the PE for review. Submit copies of revised EMP to all relevant stakeholders for their information and review. Advise the PE on necessary environmental authorisations and permits that would be required. Prepare EMP introduction and environmental awareness training course material/manual and present this course to the PE, Contractor, PM and possibly sub-contractors, including any employee member they deem necessary, prior to them starting any work on site. Keep record of everyone who attended the EMP introduction training course. Review and comment on all Method Statements relevant to environmental management and make recommendations to the PE on whether or not to accept the Method Statement and/or any amendments or revisions required. Make recommendations on any additional Method Statements that may be required as the construction process progresses. Develop a strategy and system (e.g. checklist) for site inspections and EMP compliance monitoring and audits. Undertake regular site inspections and liaison with the PE and/or Contractor (meetings) to monitor, audit and verify that all works comply with environmental legislation and the EMP compliance; that environmental impacts are kept to a minimum; and ascertain the level of such compliance and impact minimisation. Keep record of EMP implementation, monitoring and audits. Prepare regular monitoring/audit reports which reflect the EMP compliance status, findings, issues and recommended actions for addressing non-compliances and submit these to the project team

outsource this function.)	and relevant Environmental Authorities (DEA). Review 'near miss' reports, incident reports and complaints register and recommend corrective actions. Report any serious environmental incidents or environmental impacts immediately to the PM, PE and the Municipal Environmental Manager. Assist the project team in finding environmentally responsible solutions to problems. Keep records of all activities/incidents concerning the environment on site. Maintain a photographic record of the site before, during and after construction. Advise the PM on the removal of person(s) and/or equipment not complying with the specifications. Make recommendations to the PE and PM on the issuing of fines for transgressions of site rules and penalties for contravention.
6.2.7 Sub-contractor	
It is the Sub-contractor's role to implement and comply with recommendations and conditions of the EMP at all times.	Study all relevant EMP sections, specifications and approved Method Statements carefully and gain a full understanding of the implications thereof. Prepare and provide Method Statement(s) as per the PM's instructions. Implement and comply with all relevant EMP sections, specifications and approved Method Statements. Notify the PM of the anticipated programme of works and fully disclose all details of activities involved. Avail him / her, as well as any employee he may identify, for induction training on the environmental requirements as per PM's instructions. Implement on-site steps to mitigate environmental impacts. Be responsible for its employee. Report progress towards implementation of and non-conformances with the relevant sections of the latest EMP version and approved Method Statements to the PM. Inform the PM and ECO of problems arising when implementing the EMP and recommend ways of improving it. Notify the PM of any and all 'near misses', incidents, accidents and transgressions on site with respect to environmental management and non-compliance with the latest EMP version and approved Method Statements and seek advice from the PM for required corrective actions and/or site remediation. Record all incidents and the corrective actions/remedial action taken in incident report and submit these to the PM for signing off. Report and record all accidents and incidents resulting in injury or death immediately to the PM. Record all complaints received and immediately inform the PM thereof.
6.2.8 Public and Authorities Acting on Their Behalf	
The public, as well as the authorities responsible of acting on behalf of the public, watches over the project and 'blows the whistle'	Monitor EMP compliance. Register complaints on any EMP or MS non-conformances.

on any non-compliances with the Environmental Authorisation and EMP. Note: While Interested and Affected Parties (I&APs) were given ample opportunity to participate during the BA process, I&APs will be encouraged to continue participating as 'watch-dogs'	

6.3 Compliance Monitoring and Reporting

As mentioned, EMP compliance is the responsibility of all the parties that make up the project team shown in **Figure 6-1.** Similarly all these parties have a role to play in EMP compliance monitoring and reporting in accordance with the authority structure. For example Sub-contractors must monitor their own compliance and report any discrepancies, non-compliances or incidents to the PM, while the PM shall monitor the Contractor's and Sub-contractors EMP compliance on a day-to-day basis. The ECO has the role to undertake regular site inspections and audits and prepare audit reports, which shall be submitted to the PM, PE and environmental authorities for their information and review.

The following inspection sheet and report templates are recommended for the construction phase and included in **Annexure B** respectively.

- Project Start Up Inspection Sheet
- Routine Site Inspection Sheet
- Construction Site Decommissioning Inspection Sheet
- Site Inspection Report Structure.

6.4 Non-compliances and Penalties

The Contractor shall effectively address and/or remedy all EMP non-compliances.

The PE, in consultation or on the advice of the ECO, shall issue penalties ('spot fines') if the Contractor infringes environmental specifications set out in this EMP. The decision on when to impose a penalty will be at the discretion of the PE or ECO and will be final. The Contractor shall be advised in writing of the nature of the infringement and the amount of the spot fine. The Contractor shall be liable for the fine and it is his responsibility to recover the fine from the relevant employee or sub-contractor. The Contractor shall also take the necessary steps (e.g. training) to prevent a recurrence of the infringement.

The Contractor is also advised that the imposition of spot fines does not replace any legal proceedings the authorities, landowners and/or members of the public may institute against the Contractor. 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.

Spot fines shall be between R100.00 and R20, 000.00, depending upon the severity of the infringement. For each subsequent similar offence, the penalty may, at the discretion of the PE be doubled in value to the maximum value to be determined by the PE.

A list of typical EMP non-compliance incidents for which penalties may incur and associated fine value is included in **Annexure C**. This list may be amended provided that the amended list is formally issued to the Contractor prior to an incident for which a penalty is imposed.

Examples of infringements for which spot fines will be imposed on the contractor are as follows:

- Using any areas outside the working areas without permission particularly within the wetland buffers
- Clearing and/or levelling areas outside of the working areas without permission
- Spillage of fuels and other hazardous materials onto the ground or water bodies (wetlands)
- Picking/damaging plant material
- Injuring/killing or poaching animals/birds
- Untidiness and litter at the construction site
- Poor waste management on site
- Making fires on site
- Discharging effluent and/or contaminated stormwater onto the ground or into surface water
- Repeated contravention of the specifications or failure to comply with instructions
- Damage to public or private property or any identified heritage sites
- The PE and PM shall retain records of all spot fines issued
- Money for the spot fines will be deducted from the Contractors monthly certificate.

6.5 'Suspended Work' Orders

The PE at his own discretion, or on recommendation from the ECO, may also order the Contractor to place on-hold or suspend part or all the works if the Contractor repeatedly causes damage to the environment by not adhering to the EMP (i.e. more than 3 cases of infringements). The suspension will be enforced until such time as the offending actions, procedure or equipment is corrected. No extension of time will be granted for such delays and all costs will be borne by the Contractor.

Work may also be placed on hold if a heritage artefact or feature or grave is uncovered. The Heritage authorities (Amafa) will need to be notified immediately.

Work may also be placed on hold to prevent a potential significant incident from occurring or spreading.

7 METHOD STATEMENTS AND STANDARD OPERATING PROCEDURES

Method Statements and Standard Operating Procedures (SOPs) for the proposed project must meet the SANRAL standards and where applicable reasonably align and/or complement the existing SANRAL Code of Practices (COPs) and SOPs.

7.1 Method Statements

Method Statements indicate in detail how the Contractor will achieve compliance with environmental legislation, good management practice and the Environmental Specifications described in **Section 8** during the construction phase and at the end of the project during demolition(if applicable) and site remediation. Method Statements may be required for any identified specific or group of activities for which it is considered necessary to implement a detailed method to mitigate potential environmental impacts. In addition to the Method Statements identified in this EMP, the Contractor, PE and/or ECO may require additional Method Statements for effective environmental management as the project unfolds.

Method Statements must meet the SANRAL standards and reasonably align and/or compliment the Code of Practice (COP) and Standard Operating Procedures.

7.1.1 Procedures and Content

The Contractor shall submit written Method Statements to the PE for approval, and shall only implement a Method Statement once he has received the PE's approval in writing. On receipt of a Method Statement the PE shall forward a copy thereof to the ECO. The PE and ECO shall review the Method Statement and come to an agreement as to whether the Method Statement is acceptable or requires amendments.

The Method Statement shall state clearly:

- Timing of activities
- Materials to be used
- Equipment and staffing requirements
- Proposed construction procedure designed to implement the relevant environmental specifications
- The system to be implemented to ensure compliance with the above
- Other information deemed necessary by the Contractor, PE and/or ECO.

The Method Statement shall be submitted at least 14 working days prior to the projected commencement of work on an activity, to allow the PE and ECO time to study and approve the Method Statement. The PE shall strive to review and approve the Method Statement within 7 working days of receipt thereof.

Once a Method Statement is approved it binds the Contractor. The Contractor must therefore ensure that all activities to which the approved Method Statement applies is carried out accordingly.

Due to changing circumstances, it may be necessary to modify Method Statements. In such cases, the proposed modifications must be reviewed by the PE and ECO. The Contractor may only implement a revised Method Statement once he receives formal written approval from the PE to do so. The Contractor must also obtain approval from the PE and ECO for any deviation from a Method Statement.

The ECO and PE must retain records of any amendments to any Method Statement and ensure that the most current version of all Method Statements is being used.

7.1.2 Required Method Statements

Method Statements that are identified and required from the Contractor in terms of this EMP are listed in **Annexure E**. These cover, for example, the following activities:

- Location, layout and preparation of the construction camp(s) and materials storage areas;
- Location, layout and preparation of cement/concrete batching facilities and/or cement plant/trucks/equipment wash bays, including the methods employed for the mixing of concrete and the management of runoff water from such areas (if applicable);
- Stormwater management plan;
- Contaminated water management plan, including the containment of runoff and polluted water;
- Incidence Response Method Statements (including details of methods for fuel spills and clean-up operations);
- Solid waste management and removal of waste from site; and
- Site remediation.

Note that specific activities and/or environmental impact mitigation for which Method Statements are required are tagged with **{Method Statement}** in **Section 8**.

As mentioned, additional Method Statements may be identified and required by the Contractor, PE and/or ECO as the project unfolds.

7.2 Standard Operating Procedures

Similar to Method Statements, Standard Operating Procedures (SOPs) provide detail on 'how' specific environmental requirements will be developed, implemented, maintained and/or adhered to, but this during the operating, maintenance and decommissioning phases of the project.

SOPs must be incorporated into and then form part of the SANRAL Environmental Management System for their complex, once approved. As such they bind SANRAL and its employees in terms of their commitment to sound environmental management.

Note that specific activities and/or environmental impact mitigation for which Standard Operating Procedures are required are tagged with **{Standard Operating Procedure}** in **Section 8**.

8 LIBRARY OF ENVIRONMENTAL SPECIFICATIONS TO ADDRESS THE SPECIFIC ASPECTS AND IMPACTS

This section covers the requirements for managing and controlling various specific aspects and environmental impacts of project related activities associated with the proposed upgrade of the N2 Kokstad intersection, to ensure that impacts on the environment are appropriately mitigated. The specifications are based on the mitigation measures identified through the Basic Assessment process and as identified in the specialist reports listed below:

- Wetland Specialist - Specialist Wetland Assessment and Assessment of Aquatic Impacts conducted by EcoPulse Consulting;
- Heritage Specialist - Phase 1 Heritage Impact Assessment Report conducted by eThembeni Cultural Heritage Specialists; and
- Economic Impact Specialist – Economic Impact Study conducted by Imani Development

The specifications are worded in the form of instructions, which indicate that such a specification **'must'/ 'shall'** be followed or adhered to. This is unless the wording clearly indicates a specification to be conditional or a recommended option.

For ease of reference, colour coded bars have been added on the left side of each specification to indicate the relevant primary responsible party or parties:

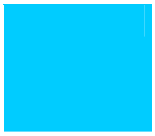
Applicant:	SANRAL Project Engineer and Project Manager, as the case may be.	
Contractor:	All contractors and/or subcontractors working on the site to implement the upgrade of the N2 Interchange near Kokstad project, with the lead contractor(s) fully responsible for compliance.	
ECO or Auditor:	Environmental Control Officer or Independent Environmental Auditor (individual or company).	
Specialist:	A variety of specialists that may be consulted or appointed during the roll-out of the project.	

Ultimately the applicant remains accountable for effective and complete implementation of the Environmental Management Programme (EMP) throughout the project life cycle. However, the Applicant may award lead responsibilities to a contractor or specialist by way of contractual arrangements in combination with this EMP. For ease of reference, the following coding forms part of the specifications:

"#":	Indicates, where applicable, the party with the lead responsibility; with any other indicated parties either having an advisory, supporting and/or monitoring role, or in the case of the applicant a 'directory' and/or approval role.
More than one "#":	Indicates both the contractor and applicant as lead parties but for different phases of the project; namely the contractor 'must' / 'shall' take the lead responsibility for the specification during the construction phase while the applicant is responsible for

	the operational phase and/or the decommissioning phase.
No "#"	Indicates full responsibility for all indicated parties to consider, implement and/or adhere to the specification in all the work / tasks they do on the Project.
"&"	Indicates where ECO or specialist consultation is compulsory.

To provide for consistency and continuity in EMP compliance throughout the project life-cycle and to minimise duplication of specifications, colour coded bars in the right margin indicate for which phase or phases of the development a specification applies:

Planning & Design:	Spans the pre-construction phase; including master planning, contractor tendering and appointment, detail site/road surveys / investigations.	
Construction:	Spans the period from site demarcation for construction purposes up to the handover of the site to the applicant/municipality for main commissioning.	
Operation:	Spans the phase from the start of the main commissioning phase until operation of the facility finally ceases before full decommissioning.	
Decommissioning:	Spans decommissioning, dismantling, demolition and clearing of the road, structures and infrastructure; as well as the final site remediation.	

For purposes of this EMP, the main commissioning of the N2 Kokstad intersection is considered forming part of the Operational Phase. However, certain commissioning activities, e.g. commissioning of ancillary facilities, may for practical reasons form part of the Construction Phase.

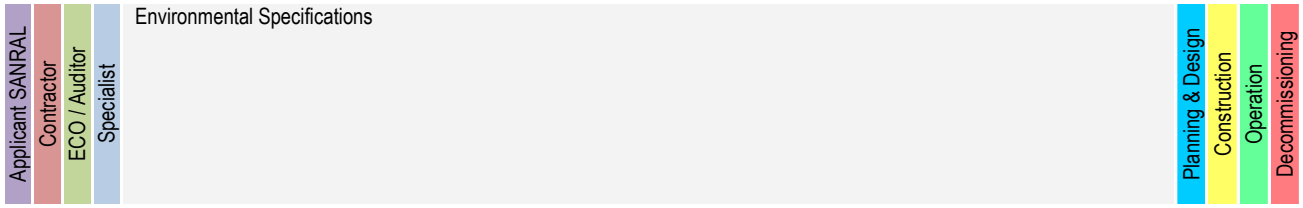
Furthermore:

[ ]:	While specifications should <u>generally be considered an 'on-going' responsibility</u>; where applicable and appropriate, specific time or frequency requirements are flagged or shown in block brackets.
{Method Statement}:	Indicates specifications that require an appropriate Method Statement to be developed, submitted for approval to the applicant (and accepted by the ECO) and thereafter implemented for effective implementation of the specification.
{SOP}:	Indicates specifications that require a Standard Operating Procedure (SOP) to be developed, endorsed by the Project Manager (PM) and ECO, incorporated and implemented as part of the site's Operational and/or Decommissioning EMP.

For ease of reference, specifications have been organised and grouped in the following subsections:

- Protection of Biophysical Environments;
- Protection of Socio-economic Environments;
- Protection of Heritage;
- Overall Site Management; and
- Specific Construction Activities.

8.1 Protection of Biophysical Environments



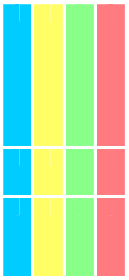
8.1.1 Soil Erosion and Sedimentation Impact

During the construction phase of a development, earth grading for site preparation, removal of vegetation cover and keeping of soil stockpiles can leave surfaces uncovered and unprotected which may facilitate erosion and sedimentation of the wetland system. During the operation phase of the N2 Kokstad Intersection Upgrade, the potential for soil erosion will increase during high rainfall events particularly at storm water discharge points and other potential point sources.

The sourcing and use of construction materials is a direct impact to the site particularly since there is a riverine system which occurs in close proximity of the proposed development. As noted by the wetland specialist, erosion and channel incision is a problem for the wetland identified as exacerbated erosion resulting from this development is considered to be significant.

Should decommissioning activities include demolition and site clearing, erosion and sedimentation impacts resulting from such activities will be similar to those associated with construction activities.

1. Minimise the area to be cleared and keep as much of the area surrounding the road and associated infrastructure vegetated (preferably retain indigenous vegetation). Most importantly maximise the buffer/'no-go' area surrounding the wetlands.
2. Demarcate the no-go areas.
3. Sediment traps should be put into place at certain locations (in close proximity to wetlands) and should be serviced regularly and kept clean



				and functioning optimally.				
#	#			4. Implement erosion control measures when removing vegetation.				
				5. Locate the construction camp within the infrastructure footprint, where reasonably feasible, thus thereby avoiding direct impact outside this footprint.				
				6. Locate the construction camp (and laydown areas) outside the 32m buffer of the wetlands.				
#	#			7. Develop, implement and maintain a *Stormwater Management Plan* and associated stormwater management system (refer to **Section 8.4.10** for further details). **{Method Statement}** / **{SOP}**.				
				8. The stormwater networks must be designed and constructed in such a manner that storm water of a suitable quality will drain into the surrounding system.				
				9. Implement energy dissipating measures in the storm water drainage channels that lead to the wetland (in accordance with the recommendations provided by the wetland specialist – see below)				
				10. Implement erosion control measures in areas sensitive to erosion such as near water supply points, on any small inclines, etc. - measures could include the use of sand bags, hessian sheets, retention or replacement of vegetation				
				11. Protect areas susceptible to erosion by installing temporary and/or permanent drainage works				
				12. Keep soil and sand stockpiles outside the 1 in 100 year flood lines				
				13. Minimise erosion by reducing the flow velocity of storm water				
#	#			14. Stabilise and manage cleared areas to prevent and control erosion by applying a suitable method of stabilisation. **{Method Statement}** / **{SOP}**				
				15. After construction any disturbed areas should be graded and revegetated to promote the infiltration of runoff and reduce the amount of sediment reaching the streams and wetlands				
				16. Drainage must be controlled to ensure that runoff from the site will not culminate in off-site pollution or cause water damage to properties and the wetland systems further down from the site				
				17. Ensure that firstly no mixing of ‘clean’ and ‘dirty’ runoff may occur and certainly no ‘dirty’ runoff may enter any natural system				
#			&	18. The Storm water Management Plan should ensure that the ultimate flow from the development does not result in any negative impacts on downstream properties or wetlands/watercourses and must therefore ensure that storm water is managed within the overall site as effectively as possible.				

19. Capture storm water effectively and direct well away from all structures.
20. Prevent ponding of surface water adjacent to foundations both during and after construction
21. Over land flows and point releases should be avoided or at least minimised
22. Install small erosion control measures on construction vehicle roads to eliminate the potential for scour and erosion in the vehicle tracks
23. Opportunities for infiltration across the site should be made rather than to direct all runoff to large discharge points. Run off therefore needs to be attenuated and managed on the site itself
24. Ensure storm water controls are implemented into the design of the road

Specific Mitigation measures provided by the wetland specialist include the following:

1. Construction should proceed mainly during the dry, winter months in order to minimize the risk of soil erosion and impacts to downstream areas.
2. Excavated and imported material should be stored away from stream lines / areas of concentrated flow to limit the risk of sediment wash to downstream areas.
3. Pipes / diversion structures should be used to deflect water away from active works areas where feasible.
   - If sandbags are used to temporarily divert water then these bags should be in good condition.
4. Exposed soils should be rehabilitated as soon as practically possible to limit the risk of erosion.
5. Erosion control measures should be employed where required.
6. Wetland soils that have been compacted must be loosened to an appropriate depth to allow natural seed germination to occur. This will need to include all temporary access routes that will need to be ripped and rehabilitated once construction is complete.
7. Excavated material/sediments/spoil from the construction zone (including any foreign materials) should not be placed or stockpiled within the channel or riparian zone in order to reduce the possibility of material being washed downstream.
8. For activities taking place within channelled sections of the wetland it is suggested that coffer dams are built around the works area to trap any possible pollutants or sediments.

Applicant SANRAL	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
				9. Measures must be implemented to distribute storm water as evenly as possible to avoid point sources of erosion.				
				10. Any erosion points created during construction should be filled and stabilized immediately.				
				11. Install sediment barriers (eg. silt fences, sandbags, hay bales, filter berms, retaining walls and check dams) immediately downstream of any disturbed areas (e.g. Where vegetation stripping is taking place) to trap any sediment generated during construction.				
				12. Sediment barriers should be regularly maintained and cleared so as to ensure effective drainage.				
				13. Measures must be implemented to distribute storm water as evenly as possible to avoid point sources of erosion.				
				14. Necessary erosion protection works for unstable banks and erosion gullies (e.g.: coarse rock pack, riprap and gabions) need to be constructed.				
				15. Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden.				
				16. Erosion control measures should be employed where required.				
				17. Construction should proceed mainly during the dry, winter months in order to minimize soil erosion linked to high runoff rates.				
				18. All disturbed construction areas should be suitably top soiled and vegetated as soon as practically possible after construction, so as to stabilize erosion-prone areas.				
				19. Access routes should be designed to limit their potential impact on the environment.				
				20. Weather forecasts from the South African Weather Bureau should be monitored to avoid exposing soil or building works or materials during a storm event and appropriate action must be taken in advance to protect construction works should a storm event be forecasted.				
				21. Water quality should be monitored for level of suspended solids at a point upstream and immediately downstream of the construction area, during construction and for a period after construction taking seasonality of rainfall into account.				
				22. Excavated sediments from the construction zone (including any foreign materials) should not be placed within wetland areas or associated buffer zones in order to reduce the possibility.				

8.1.2 Soil and Resource Contamination Impact

A potential for contamination of soils and ground and surface water resources during the construction, operational and decommissioning phase of the Kokstad Intersection Upgrade Project may occur as a result of poor or improper management of, use, storage or disposal of hazardous substances.

In the context of the Kokstad Intersection Upgrade Project, cases of accidental spills may increase during the construction phase due to materials being used and stored on the site.

Hazardous Substances Management

#	#	1. Include a requirement in the tender contract for the contractor(s) to provide a method statement(s) for hazardous substances management during site remediation and construction and ensure that the method statement(s) be approved by the appointed ECO, and if required the Emergency Services Department and Environmental Department, prior to commencement of remediation and construction.
		2. Solicit expert advice and or services for appropriate safe handling of any potentially toxic or hazardous substances (e.g. unidentified substances or items that could potentially be hazardous).
		3. Adhere to all relevant national, regional and local legislation regarding the transportation, storing, keeping, handling, use and disposal of hazardous substances and/or waste at all times.
		4. Obtain all necessary approvals from the Emergency Services Department with respect to fuel storage and dispensing.
		5. Obtain and ensure on-site availability of a Material Safety Data Sheet (MSDS) for every hazardous substance used for construction purposes.
#	#	6. Ensure that all staff handling hazardous substances are adequately informed about the specific hazards (e.g. information from MSDSs or hazard specialists), equipped with appropriate Personal Protective Equipment (PPE) and suitably trained in the handling of the specific substances and hazards.
#	#	7. Implement appropriate health and safety precautions to avoid employee and/or public exposure to any contaminant or hazardous substance, which in addition to hazardous substances for construction purposes may potentially include certain historically dumped wastes, spilled substances and leachate.
		8. Minimise quantities of fuel, paints and other hazardous material kept at the construction site and ensure that they are stored in correctly bunded and covered areas.
		9. Safeguard hazardous substances from being stolen, vandalised, catching fire or spilling on open ground.
		10. Introduce and implement effective spill prevention, minimisation, containment, emergency and clean up measures and procedures, which include the following:

- Locate all hazardous substances storage areas and portaloos outside the 1:100 year floodline;
- Keep a complete emergency spill kit available on site at all times and ensure that the Contractor trains all the relevant staff members in the effective use thereof for dealing with spills of hazardous substances (oils, diesel or petrol);
- Carry out routine vehicle maintenance and washing necessary during construction at a maintenance workshop instead of at the construction site or camps to avoid on-site spills and leakages;
- Keep all mechanical equipment used in construction activities clean and free of oil, petrol, and diesel leaks;
- Avail and deploy adequately sized drip trays for all vehicles/equipment that pose a risk of leaking oil or fuel;
- Provide and keep/store all fuel, oil, paint, bitumen and other hazardous liquids in suitably designed impermeable bunded areas with a containment capacity of at least 110% of the volume of substance stored therein;
- Keep abovementioned containment bunds clean by 'mopping' up any spillages of any hazardous substances immediately and, either prevent rainwater from accumulating in the bund (e.g. provide a roof over the bund) or remove any rainwater to ensure the capacity of the bund is maintained;
- Store incompatible hazardous substances separately (in separate bunded areas;
- Utilise drip trays to prevent oil or fuel spills in case of on-site emergency maintenance;
- Conduct concrete batching or place ready mix on provided impermeable sheet material;
- Seal and store all empty and externally dirty containers that had contained hazardous substances in a bunded area or an area where the ground has been protected by an impermeable surface;
- Implement and adhere to appropriate and safe latrine hygiene and sewage disposal procedures; and
- Compile and implement an emergency procedure to deal with accidents and incidents (e.g. spills) arising from hazardous substances (particularly for road accidents during the operational phase) which should include at least the following:
  - Stop the source of the spill as soon as possible;
  - Contain the spill immediately and as effectively as possible;
  - Report any significant spills immediately to the Emergency Services Department, ECO, DWA, Environmental Department and

Applicant SANRAL	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
				other relevant authorities; o Follow any instructions that the abovementioned parties may give; o Determine if there is any soil, groundwater or other environmental impact and, if so take appropriate, remedial action to the satisfaction of the ECO on the construction site and/or the Environmental Department; and o Document all spill incidents, response procedures and corrective actions on an incident register.				
				11. Ensure that maintenance, oil restocking and waste oil removal activities are undertaken in such a manner that no spillage of hazardous substances occur.				
				12. Consider making use of ready-mix concrete supply instead of installing an on-site concrete batch plant. However, should an on-site concrete batch plant be necessary, special precautions in terms of bunding; waste water capturing and treatment; and precautions against wind-blown cement would need to be implemented.				
				13. Prohibit vehicles from being washed and maintained on the construction site. Introduce appropriate waste collection and disposal procedures and facilities.				
				14. Adhere to all requirements of the Occupational Health and Safety Act and associated Regulations and any amendments thereto that are relevant for management of hazardous substances.				
				15. Implement the EMP which covers the abovementioned mitigation measures appropriately.				
				Waste Management				
#	#			1. Introduce and implement/install appropriate waste and sewage collection and disposal procedures and facilities during construction and operation.				
#	#			2. Dispose of all contaminated soil, excavated waste and solid waste material generated or uncovered at a permitted landfill site that is authorised to accept the particular waste				
#	#			3. Obtain safe waste disposal certificates for all wastes disposed and retain and keep these certificates on record for proof of appropriate disposal for at least 3 years (or alternatively in accordance with any other Municipal requirements).				
				4. Recycle used oil, e.g. to a suitably qualified external recycler or appropriately permitted on-site used oil refinery.				
#	#			5. Remove and/or treat any contaminated soil immediately and dispose therefore appropriately and in accordance with legal requirements.				

8.1.3 Impact on Hydrology, Drainage and Wetlands

There will be anticipated wetland losses associated with the proposed N2/R56 interchange development. This will have a negative impact on wetland biota both in the affected area and in the broader area due to disruption of natural movement zones.

Roads act as artificial barriers to water flow, especially from hillslope seepage inputs. Water abstractions from the wetland are relatively low and used mainly for irrigation of cultivated lands within wetlands. When considered together with changes to water inputs, the current hydrological integrity of the wetland is regarded as being seriously modified.

1. See **Section 8.1.1** for detailed storm water mitigation measures
2. Prohibit abstraction of groundwater.
3. Provide for the wetlands to be formally delineated in accordance with the Department of Water Affairs requirements; and for the required setbacks defined.
4. Include a 1:10 000 scale map on the *Site Layout Plan* (refer to **Section 8.4.2**) which clearly shows the proximity of site footprint and construction activities in relation to wetlands and streams and associated buffer zones.
5. Establish and maintain a no-go buffer area around sensitive wetlands and streams by a minimum of 32 m; and provide for such to be incorporated and considered in site layout, utilisation and stormwater management planning (refer to **Section 8.4.2** for further details). This is with the exclusion of the crossings of the wetland where direct impact on the wetland is unavoidable.
6. Take all necessary precautions to ensure that activities do not alter natural ground and surface water flows in areas identified as sensitive.
7. Clean up any spills close to the wetlands and streams immediately (refer to **Section 8.5.7**)
8. Develop, implement and maintain special protective measures during the construction of the roads and associated culverts in close proximity of wetlands / streams to prevent / minimise the impact on these resources. **{Method Statement}**
9. Prohibit vehicular traffic in or close to any of the wetlands and its associated buffer zone with the exclusion of the crossings of the wetland where direct impact on the wetland is unavoidable.
10. Prohibit use of wetlands as sources of water.
11. Implement and adhere to all conditions of any relevant Water Use Licence (WUL) and the relevant water use, stormwater, wastewater

Applicant SANRAL	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
				specifications and plans referred to in this EMP.				
				12. See **Section 8.1.2** for detail of soil and water resource contamination mitigation.				
#			&	13. Develop and implement a comprehensive wetland monitoring programme which includes evaluation of the efficacy of mitigation measures.				
				14. Report on the wetland monitoring results to the ECO and Department of Environmental Affairs.				
#	#			15. Develop a storm water management plan for the construction and operational phase of the project and submit this plan for approval to the Municipality Water Services Department and DWA.				
				16. Locate the construction camps away from surface water bodies and wetlands.				
				17. Limit activities to 32 m from the edge of the wetlands except for road culverts.				
				18. Prohibit activities such as temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment or any other use of the buffer zone (32m).				
#	#			19. Address wetland impact issues that are identified during the abovementioned wetland monitoring.				
				20. Plan construction to minimise impact on the natural drainage of the site and wetland functionality.				
		&		21. Undertake a site assessment, once contamination has been detected (predominantly based on a deterioration of groundwater quality), as follows: • Identify the source of contamination and the scale of the problem; • Investigate the extent of contamination by auguring a series of shallow, temporary exploration holes and collecting samples for analysis.				
#	#			22. Treat and/or dispose of all contaminated soil and groundwater according to environmentally acceptable procedures or in accordance with any applicable authorisation (e.g. Waste Management Licence, Water Use Licence), with full cooperation from the relevant authorities and full documentation on the quantities and methods of treatment and/or disposal. **{Method Statement}** / **{SOP}**				

8.1.4 Impact on Flora

There will be the complete removal or partial destruction/disturbance of existing indigenous wetland vegetation during construction (particularly associated with road construction), impacting directly on the ecological condition and habitat availability within the wetland.

Invasion by weeds and IAPs (Invasive Alien Plants) poses a risk to indigenous wetland plant species and would be facilitated by disturbance of natural vegetation during construction. If a control plan is put into place as soon as construction starts, it would have the effect of controlling any future invasions due to construction as well as removing current infestations.

Potential localised impacts on the composition and function of the natural vegetation and flora would probably occur at a medium intensity and over a long term period and possibly also impact on hydrological processes within the wetland.

1. Areas that are not to be developed must be clearly demarcated and must be specified in all contractual documentation as “no-go” areas for any construction related activities.
2. Identify and manage all declared aliens in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) and eradicate alien invasive vegetation systematically and fully. **[On-going]**, **{Method Statement}** / **{SOP}**
3. Areas that are not to be developed must be clearly demarcated and must be specified in all contractual documentation as “no-go” areas for any construction related activities.
4. Make every effort to minimise the impact where flora/ habitat stands to be lost.
5. Minimise areas to be cleared as much as reasonable, whether off-site or on-site; and rehabilitate affected areas, where possible and appropriate, as soon as reasonably possible after it had been impacted; for ‘normal’ indigenous (local) ecological function to be retained / restored.
6. Prohibit collection of fire wood by staff; unless it is wood from controlled alien vegetation and site clearance.
7. It is advised that an ECO with a good understanding of the local flora be appoint during the construction phase.
8. The construction zone should be clearly demarcated prior to the commencement of construction activities to ensure that construction vehicles do not unduly disturb the wetland areas. Site supervisors must ensure that impacts are confined to the construction zone.
9. Access routes should be designed to limit potential impact on the

environment, bearing in mind steep banks and areas that are already showing reduced groundcover and erosion.

10. Provide for and implement the appropriate and effective removal, stockpiling and safekeeping of top soil in accordance with **Section 8.5.2**.
11. Existing access roads/tracks to be used where possible.
12. Wherever possible, blading new tracks with a grader must be avoided, and a new vehicle track is to be created by simply driving over the grass cover without removing grass cover/topsoil. The same track is to be used to access areas and widening and creating alternative or parallel tracks must not be allowed. Likewise, the same vehicle turning areas are to be used.
13. Keep the clearing of vegetation in wetland areas to a minimum and attempt to ensure that clearing occurs in parallel with the construction progress where practically possible.
14. Apply effective dust control measures to prevent excessive or harmful dust accumulation on habitats (refer to **Section 8.4.12**).
15. Road crossings must be designed to limit the area of wetland impacted and should cross the wetland in degraded/cultivated sections of the wetland where possible.
16. Road crossings must be designed to minimize disruption of flows through the wetland and must ensure that the base level of the wetland is not affected as this could stimulate headward erosion.
17. Exotic trees and plants encountered should be removed from the site and properly disposed of.
18. Where any works (e.g. erosion & storm water control measures) near a river is required, specific attention should be paid to the immediate re-vegetation of cleared areas to limit the potential for erosion and sedimentation.
19. No open fires to be permitted on construction sites. Fires may only be made within the construction camp and only in areas and for purposes approved by the ECO.
20. Smoking must not be permitted in areas considered to be a fire hazard.
21. Ensure adequate fire fighting equipment is available and train workers on how to use it.
22. Ensure that all workers on site know the proper procedure in case of a fire occurring on site.
23. Ensure that no refuse wastes are burnt on the site or on surrounding premises.
24. Rehabilitate disturbed areas as soon as practically possible. A suitable replanting and revegetation programme is needed to rehabilitate

disturbed areas post-construction as follows:

- Once the soil and topography of the disturbed terrestrial surface has been returned to its pre-construction state, and waste products removed, vegetation is to be reinstated as soon as weather conditions are deemed suitable;
- This should comprise a mix of rapidly germinating indigenous grasses, shrubs and trees suited to the eco-region and adapted to stabilizing areas. Locally occurring, indigenous runner grasses should be used. Where runners cannot be locally sourced from natural areas within a 50 km radius, then a sterile variety of Couch Grass (*Cynodon dactylon*) can be commercially sourced and planted for disturbed terrestrial areas;
- Re-instate disturbed wetland areas with suitable indigenous wetland vegetation such as reeds (*Phragmites australis*) and sedges. Mono-specific planting should be avoided, as diversity is the key to robustness, which will assist in retaining sediment and preventing erosion;
- It would be advisable to plant at the onset of the wet season (early spring – August to October) so that watering requirements are minimal;
- Do not use fertilizer, lime, or mulch unless required;
- Alien species (such as *Pennisetum clandestinum, Kikuyu grass*), must not be used in re-vegetation, particularly those with invasive potential (Category 3 and above – Conservation of Agricultural Resources Act/CARA); and
- When sourcing plants from nurseries, it is important to consider the genetic origin of the plants. It is best to use small regional nurseries instead of large commercial nurseries that obtain stock from large regional suppliers.

8.1.5 Impact on Fauna

Due to the impacts that will impose on the wetlands in the area during the construction, operational and decommissioning phases of the proposed development, a potential loss of habitat and accidental death of smaller animal species may occur. Most species are however likely to move away from the construction site into the surrounding wetland habitats once the activities and noise associated with constructions becomes evident. Thus it is unlikely that they would suffer any long-term effect. Indigenous vegetation will be protected as far as possible so that animal habitats and breeding species are not disturbed.

1. Prohibit / control access to portions of the property that is to remain undeveloped; and ensure that it is used for conservation purposes only.

Applicant SANRAL	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
				2. No wild animal may under any circumstance be hunted, snared, captured, injured, killed, harmed in any way or removed from the site. This includes animals perceived to be vermin.				
				3. Prohibit the exploitation of wildlife resources strictly, e.g. prohibit snaring, trapping, hunting and fishing; and inspect the site and surrounding area regular for any evidence of such activities.				
				4. Where possible, cut vegetation to ground-level rather than removing it completely, leaving root systems intact to ensure rapid re-colonization. No birds or any other animals may be trapped, hunted or handled in any way.				
				5. Ensure that waste bins are kept tidy and that waste is removed weekly to reduce any rodent infestation.				
				6. Remove any faunal species that may shelter or nest at the site or that may stray onto site in a humane manner.				
				7. Prohibit feeding of wild animals; unless it forms part of a formal conservation programme.				
#			&	8. Where rare fauna (vertebrate and invertebrate) stands to be lost, every effort should be made to minimise the impact, bearing in mind that rescue and relocation of invertebrate species is generally not recommended as an option due to uncertainties and low success rate.				
#			&	9. Consider the requirement to allow movement of organisms along natural corridors and their access to resources (e.g. wetlands) by incorporating such in the design layout and features (e.g. road, culvert bridge, pipeline); including but not limited as follows: • Define these protected habitat corridors on the Site Layout Plan; • Minimise the number of access roads and tracks, and limit use of roads to as few as practically possible; • Use appropriate curb and roadside gutter designs with low, sloping profiles without any vertical surfaces, to facilitate the movements of small animals (e.g. frogs, lizards, mice); and • Place pipelines and cables underground to prevent surface barriers, wherever reasonably possible, and fill in trenches and rehabilitate the affected area as soon as reasonably possible.				
				10. Maintain the habitat corridors effectively in accordance with the Site Layout Plan, e.g. by refraining from 'blocking' such corridors, incorporation in buffer zones and other "No-go" areas, demarcation, awareness raising through induction training (see Section 8.4.1), signage, etc.				
			#	11. Facilitate search-and-rescue operations before and during site clearance, by rescuing at least but not limited to individuals of threatened species and re-locating these in neighbouring protected /				

Applicant SANRAL	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
				conservation areas.				
	#			12. Clear the site in a logical sequence and manner that allows mobile species to escape.				
				13. Prohibit pets on site, since these interact negatively with wildlife and must not be allowed close to conservation areas.				
				14. Avoid attracting pests and unwanted animals as follows: 15. Keep attractive resources such as food, water and edible refuse completely out of reach of wild animals (e.g. monkeys and other vermin) by implementing effective and where necessary inventive and extreme measures to achieve this 16. Exercise rigorous control of edible refuse, by providing for such refuse to be completely removed from site at frequent and regular intervals.				
	#			17. Ensure that all openings in structures are closed off during the construction phase to prevent birds (especially owls) from nesting in the structures.				

8.1.6 Impact on Water Use

During the construction, it is the responsibility of the contractor to source their own water (not from rivers or wetlands on site). During the operation of the proposed Kokstad Intersection Upgrade, there will need to be tie in's for the municipal water servitude for water use namely for the ablutions and use by the staff at the proposed overload control facility.

During construction and decommissioning, should contractors require temporary abstraction of water in excess of quantities then they would need to obtain the permission from DWA to do so. Due to the fact that there are wetlands in close proximity to the site, abstraction may potentially lead to contamination of water sources. During the construction phase water use will be the responsibility of the contractors.

				1. Optimise water usage in order to minimise water and pollution of water resources.				
				2. Develop and implement storm water management plans for the construction and operational phases to ensure that all storm water collected on site is managed such that it does not get contaminated.				

8.2 Protection of Socio-Economic Environments

Applicant (SANRAL) | Contractor | ECO / Auditor | Specialist

Environmental Specifications

Planning & Design | Construction | Operation | Decommissioning

With the proposed site being located close to existing businesses and pedestrian activity, public health and safety will be of utmost importance and should be carefully guarded and considered during all project activities.

8.2.1 Impact on Public Health and Safety

1. Take appropriate and effective precautions and all reasonable measures to ensure the safety of people in the surrounding area.
2. Develop, implement and maintain a Public Health and Safety Plan for each of the project phases.
3. Take all necessary precautions to effectively address any potential health and safety hazards.
4. Adhere to all requirements of applicable legislation, e.g. the Occupational Health and Safety Act, the National Road Safety Act, relevant Municipal Bylaws, as well as any instructions the Kokstad Emergency Services Department and/or Department of Health may give
5. Minimise the construction footprint and where possible, confine construction activities to the site
6. Provide the construction site with an appropriate security fence to reasonably contain construction activities within the site and restrict public access.
7. Provide a 7-day-24-hour security service at the site to reasonably secure the site from unauthorised access for the duration of the construction phase.
8. Develop an emergency response plan, submit this plan to the Emergency Services Department for comment and approval and ensure that the plan is available and displayed at the site at all times.
9. Provide appropriate fire fighting equipment and any relevant emergency response kit which has been approved by the Kokstad Emergency Services Department (Chief Fire Officer).
10. Prohibit any staff, other than security staff, from lodging at the construction site, outside normal working hours
11. Provide sufficient amenities for use of construction workers.
12. Display appropriate hazard warning signs conspicuously at all potential hazards that may affect public members, e.g. signs to prohibit public access to the site, hazard warning for trespassing on the site, warning sign for construction trafficking at access to construction sites, signs to warn motorists of road obstructions and traffic signals for laying underground cable in public roads, etc.

Applicant (SANRAL)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
				13. Minimise air pollution.				
				14. Control access to the site and prohibit unsupervised public access to the site.				
				15. Use all public roads responsibly (refer to **Section 8.2.4** for further details).				
#	#			16. Deal with transgressions by staff with regard to public health and safety severely (fines and dismissals).				
#	#			17. Minimise air pollution by implementing the air quality management measures provided in this EMP (refer to **Section 8.4.12**); to minimise impact on public health.				

8.2.2 Impact on Businesses

Concern was also raised at the potential economic impact on businesses along the R56 – Refer to **Appendix D3**. The economic specialist noted that "Although there was majority support for an interchange, there was no consensus as to a preference between the upgrading with or without a feeder road."

- An interchange is clearly the best technical solution to the traffic problems at the triangle. There was majority support for this and a widespread view that it reflected progress. Thus, the no-go option was rejected.
- However, there was no consensus as to which of the other two options – with or without the service road – would be preferable.
- Of these two, the feeder road option, despite being the better technical option for traffic flows, was clearly the most controversial with perceptions of a potential serious loss of investment and employment creation if the proposed shopping centre/mall development were to be dropped by the investors. Most interviewees thought that the feeder road would not be the problem the objectors perceive it to be. The opinion of the Economic Specialist is that a feeder road would be perceived by motorists as a safer option provided there was sufficient signage to guide them to the business complexes.
- An upgraded R56 without a feeder road would not be controversial, but would require careful planning (e.g., traffic lights) to provide access to enterprises and control traffic. However, this does not seem to be the best option to handle traffic growth especially once development occurs on both sides of the R56".

The specialist study concluded with a number of recommendations with regard to the feeder road option, to mitigate perceived negative effects on establishments:

- Ensure that there is ample and clear signage along both the N2 and R56 before the interchange and new traffic circle, clearly stating the names of the businesses along the service road. In the case of the filling station at the Engen/Wimpy complex, there should be a separate sign indicating that it is the last convenience stop for a specified distance. Examples of signage complying with the latest South African Road Traffic Signs Manual are given in Annex 3 of Appendix D3 of the Economic Report; in three of the examples the names of enterprises are mentioned.
- The owner of the Engen/Wimpy convenience businesses should be compensated for costs, should revamping be required to the entrance of the Engen/Wimpy Facility.
- The motor scrapyard business should be provided with a service road immediately parallel to the R56, and this should include a turning area to accommodate heavy vehicle combinations owned by the business.
- SANRAL should meet Tintswalo Property Group and other establishments along the R56 prior to construction to provide a detailed explanation of the proposed service road and to clarify the road diagram.
- There should be improved and regular communications with interested and affected parties along the R56, keeping them informed about plans and timeframes as well as compensation arrangements.

8.2.3 Public Service Use and Infrastructure Impact

A project of this magnitude will place a demand on local social services, and would thus also impact on such services. Appropriate planning well in advance of such demands or impact is essential.

1. Negotiate with local authorities, well before construction, to determine what the needs are for use of municipal services (water, electricity, sewage wastewater disposal) during all project phases.
2. Liaise with the Greater Kokstad Municipality and the relevant departments to identify all underground service infrastructure at the site
3. Liaise closely with the relevant servitude/land owners / operators on access to, use of or impact on servitudes owned / used by other parties (e.g. the portions of land owned by Mondi and SAPPI).
4. Keep the disruption of essential services as short as possible to

minimise public inconvenience for both planned and unforeseen events.

5. Ensure that all affected communities and stakeholders are kept well informed of the process and of all significant dates attached to the development process. **[On-going]**
6. Protect all public and private service infrastructures (e.g. pipelines, cables) by clearly marking these or incorporating the relevant servitudes into “No-go” areas, where applicable.
7. Ensure that all essential services are in place prior to the development and all other facilities to be used are appropriately upgraded and equipped.
8. Ensure that the implementation process is carefully monitored and that any disruptions are immediately identified and appropriately managed.
9. Minimise use of scarce resources reasonably and effectively.

8.2.4 Traffic Impact and Use of and Impact on Public Roads

The proposed project is being undertaken by Jeffares & Green on behalf of SANRAL in order to reduce extreme traffic congestion at the N2 Kokstad intersection during weekends and at month ends. It will also meet SANRALs requirements in terms of functioning National Roads (Class 1 and Class 2 Roads). The main function of a Class 1 road is to provide high speed mobility to long distance traffic. By improving mobility, the proposed project will cater effectively for through traffic from all directions.

1. Liaise with the relevant traffic and transportation authorities, e.g. Greater Kokstad Municipality and DOT on envisaged traffic impacts, e.g. on transportation of bulky equipment.
2. Ensure that adequate signage be provided during the construction phase to notify drivers of the increase in heavy vehicles entering as a result of construction.
3. Implement any road and traffic interventions strictly in accordance with plans that have been sanctioned by the Local Traffic Authority
4. Ensure that construction and maintenance vehicles keep to the speed limits on public roads (construction and operational phase).
5. Train staff to show respect to other road users and give public vehicles the right of way.
6. Minimise construction activities in roads during peak hours.
7. Minimise congestion and traffic obstruction e.g. by keeping lanes open and introducing traffic control measures.
8. Maintain all construction / operational vehicles using public roads in a roadworthy condition and refrain from using non-roadworthy vehicles on

public roads.

9. Notify affected road users in advance of any road closures or transport of abnormal/ heavy loads. [Two weeks in advance].
10. Keep any required disruption of public roads as short as possible to minimise public inconvenience for both planned and unforeseen events.
11. Secure all loads for transport effectively and cover vehicles transporting materials such as sand, rock, scrap metal and pipes effectively, to prevent their contents falling or blowing off, causing traffic hazards.
12. Enlist the services of the Local Traffic Department to plan routes for the transportation of unusual loads and to escort such transports to the site.

8.2.5 Creation and Securing of Employment Opportunities

1. Meet the requirements of the SANRAL policies for procurement and employment, to take care of and avoid potential conflict between people in the immediate surroundings seeking employment and those from elsewhere.

8.2.6 Impact on Visual and Aesthetics

During the construction phase the introduction of construction camps and associated activities may be unsightly and become aesthetically unpleasing.

During the operation phase there is also the potential for litter and blocked stormwater drains, associated with poor management and maintenance of the road. Waste management will also need to be effectively implemented at the overload control facility to reduce any windblown litter etc.

Planning:

1. Provide for a good aesthetically pleasing building and site design that adheres to the relevant architectural and urban design codes of the Greater Kokstad Municipality.

Construction:

1. Ensure that the contractor plans the construction site layout appropriately, including materials stocking, waste management and temporary latrine areas, by providing a layout plan which the ECO must approve prior to the contractor occupying the site.
2. Store construction equipment and material in an orderly manner on a designated site.
3. Ensure that rubble and waste material are removed regularly from the

site.

4. Arrange additional and appropriate construction lay down areas outside the site, if lay down areas on the site is inadequate.
5. Adhere to good housekeeping during the construction phase to ensure that construction camps and sites are well organised, material is neatly stacked and waste is regularly removed.
6. Ensure that soil stockpiles are neatly kept to avoid soil dispersing.
7. Apply effective dust suppression.
8. Implement effective litter control measures to prevent construction litter.
9. Implement appropriate waste and rubble management and disposal procedures.
10. Include as much of the natural vegetation around the site to reduce any significant visual impacts during the operation phase.
11. Rehabilitate disturbed areas effectively and as soon as reasonably possible.
12. Soften the visual impact through neatly constructed screens and planting of suitable indigenous shrubs or trees, if and where safe and practical (e.g. around perimeter).
13. Include the requirement for providing the construction camp with screens (e.g. shade cloth) as a visual barrier (screens) to shield unsightly areas from view of public roads/residential areas in tender documentation (for pricing by the relevant contractor).
14. Prohibit the defacing of property outside the site footprint and on-site landscape elements and/or structures without permission from the PE/PM; including but not limited to:
    - Draw up a code of practice and construction site layout for site work by surveyors, contractors and their staff with specific reference to environmental aspects related to their work which must be approved by an ECO; and
    - Incorporate this prohibition as a training topic in environmental induction and refresher training.
15. Minimise the visual impact caused by the visual clutter presented by machinery, equipment and material at construction / demolition sites, camps and lay-down areas which are visible to the public from roads, as follows:
    - Include as much of the natural vegetation around the site to reduce any significant visual impacts;
    - Adhere to and practice good housekeeping to ensure that construction camps and sites are well organised, material is neatly stacked and waste is regularly removed;

- Provide and maintain stable and neat screens along boundaries of construction footprints and sections of the site perimeter fence where construction activities and material stored within the site will be visually exposed to the public roads; e.g. by attaching dark green or black shade cloth to 2 m high fences (perimeter or screening fence);
- Minimise the visual impact of spoil dumps on land in accordance with **Section 8.5.8**.

16. Implement appropriate waste and rubble management and disposal procedures.
17. Implement effective litter control measures.
18. Apply effective dust suppression techniques (refer to **Section 8.4.12**) to suppress dust generated during earth moving and vehicles travelling on dirt roads to and from exposed areas, bearing in mind that airborne dust is often visible from far, and is visible at night as it diffuses light and coats vegetation with an unsightly layer of settled dust.
19. Rehabilitate disturbed natural areas effectively and as soon as reasonably possible to retain as much natural environment as reasonably possible **Section 8.4.4** and maintain such rehabilitation effectively.
20. Notify affected road users in advance of any road closures or transport of abnormal/ heavy loads. [Two weeks in advance]
21. Keep any required disruption of public roads as short as possible to minimise public inconvenience for both planned and unforeseen events.
22. Secure all loads for transport effectively and cover vehicles transporting materials such as sand, rock, scrap metal and pipes effectively, to prevent their contents falling or blowing off, causing traffic hazards.

8.2.7 Impact on Community Relationship – Influx of Temporary Construction Workers

Management and control of community relationship and influx of job seekers is important to avoid social problems such as public unrest.

1. Make use of local labour and local suppliers of material for the construction as far as reasonably possible.
2. Train construction workers to respect the property and needs of the adjacent landowners and to minimise any unnecessary disturbance
3. Ensure that adequate lines of communication are established between SANRAL, the contractors and the neighbouring landowners to deal with any public grievances.
4. Ensure that the contractors' camp is fully fenced and that access is

Applicant (SANRAL)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
				controlled				
#	#			5. Formulate a rapid response plan to deal with security matters.				
#	#			6. Engage proactively with local authorities/ SAPS/ Community Policing Forums to ensure that job seekers do not settle in the vicinity of the construction site. **[When necessary]**				
				7. Deal with transgressions by construction staff severely (fines and dismissals).				

8.3 Protection of Heritage Resources

Cultural artefacts that are of heritage importance such as graves, tools, painting etc. can be damaged or destroyed through construction activities. It is however not foreseen that any heritage resources will be found, as the site, as a whole, is generally disturbed (farming etc.). The EMP has however considered and provided mitigation measures should potential heritage artefacts be discovered. GIBB has also contacted Amafa in this regard who have requested that a need and desirability form be completed and submitted.

Applicant (SANRAL)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning

8.3.1 Overall Management of Protected Heritage Resources

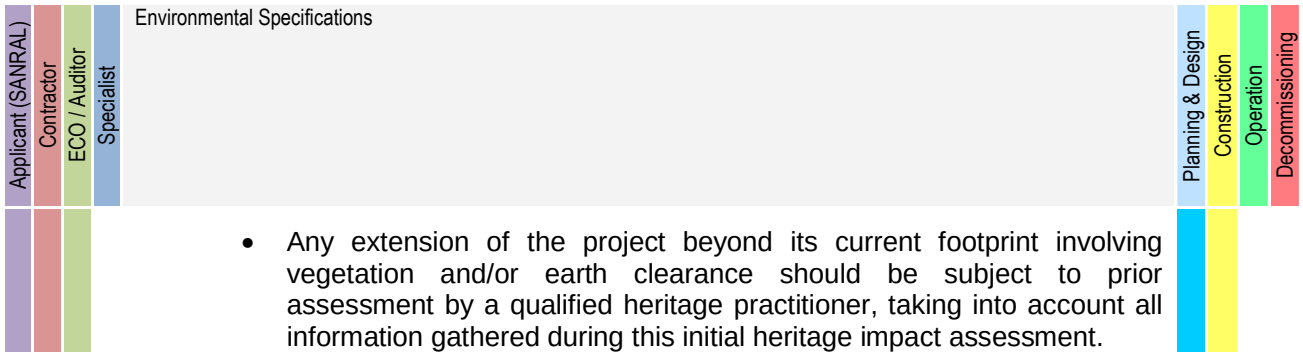
	#			1. Monitor excavations to establish any heritage finds.				
				2. Do not demolish, alter or extend any building older than 60 years old until Amafa has been contacted				
	#		&	3. Place any excavations/construction on hold, should any heritage features or artefacts, or skeletons or bones that could potentially be from human origin, be uncovered. Contact Amafa heritage authorities immediately. Report the finding to the local police station.				
				4. If a heritage practitioner has been appointed to monitor the project, s/he should be contacted and a site inspection arranged as soon as possible.				
				5. If no heritage practitioner has been appointed to monitor the project, the head of archaeology at Amafas Pietermaritzburg office should be contacted; telephone 033 3946 543).				

6. Maintained records of heritage findings found buried in sediments.
7. Report heritage finds to the ECO and Project Manager.
8. Report heritage finds to the heritage authorities.
9. Report any potential heritage features uncovered during the construction activities to the ECO and Amafa / Heritage KwaZulu Natali (Amafa) and follow any instructions they may give.
10. Report all confirmed heritage finds to the Department of Agriculture and Environmental Affairs.

8.3.2 Procedures on Discovery of Potential Heritage Artefacts and or Features

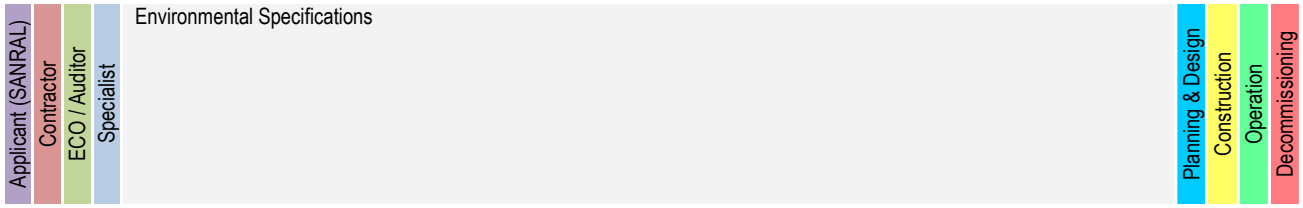
1. Follow the following procedures on discovery of any potential heritage/ archaeological sites/ objects (including artefacts, fossils, bones, etc.):

- Cease all construction within a radius of at least 20m of the indicator. This distance should be increased at the discretion of supervisory staff if heavy machinery or explosives could cause further disturbance to the suspected heritage resource;
- Clearly mark the sites/ objects using clearly visible means, such as barrier tape, and all personnel should be informed that it is a no-go area;
- Notify the site supervisor/manager (PE/PM) and ECO immediately **[without any delay]**;
- Appoint a guard to enforce this no-go area if there is any possibility that it could be violated, whether intentionally or inadvertently, by construction staff or members of the public;
- No measures should be taken to cover up the suspected heritage resource with soil, or to collect any remains such as bone or stone;
- Contact the heritage practitioner or the head of archaeology at Amafa's Pietermaritzburg office; telephone 033 3946 543) and a site inspection should be arranged as soon as possible;
- The South African Police Services should be notified by an Amafa staff member or an independent heritage practitioner if human remains are identified. No SAPS official may disturb or exhume such remains, whether of recent origin or not;
- All parties concerned should respect the potentially sensitive and confidential nature of the heritage resources, particularly human remains, and refrain from making public statements until a mutually agreed time; and



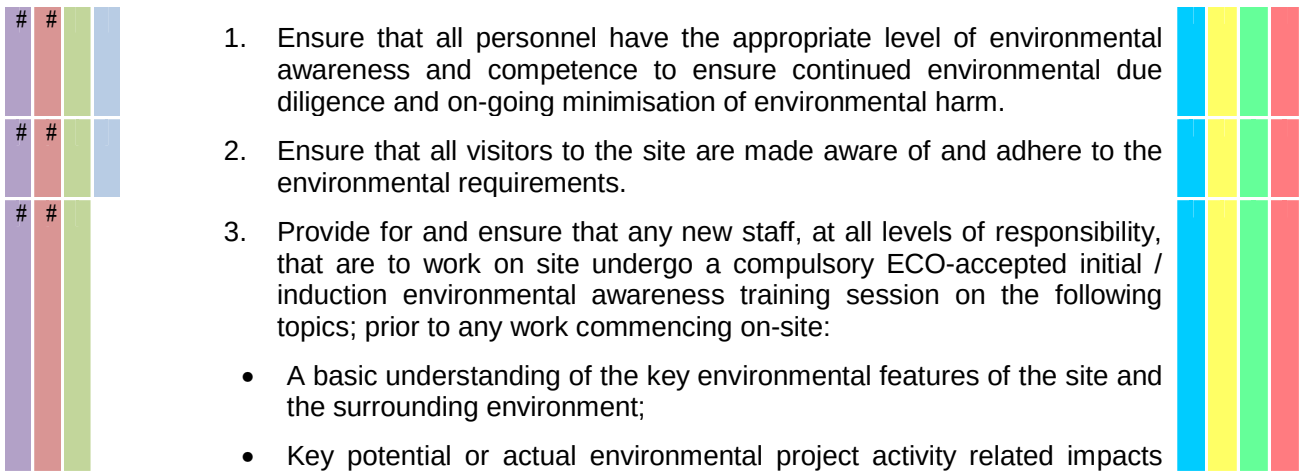
- Any extension of the project beyond its current footprint involving vegetation and/or earth clearance should be subject to prior assessment by a qualified heritage practitioner, taking into account all information gathered during this initial heritage impact assessment.

8.4 Overall Site Management



8.4.1 General Preparedness and Administration

To achieve effective environmental management and ensure continued environmental due diligence and on-going minimisation of environmental harm, it is necessary to ensure that all personnel have the appropriate level of environmental awareness and competence. SANRAL and its contractors / service providers therefore need to ensure that suitably qualified and trained staff is appointed to understand and deal with the environmental sensitivities and requirements. SANRAL employees, service providers, Contractors and Sub-contractors and visitors therefore need to be aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMP and the specification and procedures they must adhere to.



1. Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm.
2. Ensure that all visitors to the site are made aware of and adhere to the environmental requirements.
3. Provide for and ensure that any new staff, at all levels of responsibility, that are to work on site undergo a compulsory ECO-accepted initial / induction environmental awareness training session on the following topics; prior to any work commencing on-site:
   - A basic understanding of the key environmental features of the site and the surrounding environment;
   - Key potential or actual environmental project activity related impacts

Applicant (SANRAL)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
				and related environmental precautions, which need to be taken to avoid, minimise or mitigate these impacts; • The requirements of the EMP and associated environmental specifications as they apply to the SANRAL N2 Kokstad Interchange upgrade project; • The requirements in terms of procedures and conduct when dealing with the public and/or using or impacting public or private places, services or infrastructure; • The high conservation status of the wetlands, fauna and flora around the site; • Conservation-related "No-go" areas, issues and programmes that need to be considered and/or implemented; • The identification of rare and endangered flora and fauna that may be encountered on the site and the procedures to be followed to protect these; • Heritage issues and procedures, e.g. the identification of archaeological artefacts that may be encountered on the site; • Waste management and litter control; • Outline of all monitoring programmes; • Key mitigation measures to be implemented during project activities; • Emergency responses to issues; • Responsibilities towards the public; • Linkages between environmental and occupational health and safety protection and management (taken that a separate Occupational Health and Safety Programme will be introduced); • Roles and responsibilities of all staff on the project site; • The benefits of achieving conformance with, and consequences of transgressions of environmental specifications or requirements of the EMP; and • Awareness of any other environmental matters, which the PM/PE and/or ECO deemed to be necessary.				
#	#			4. Ensure that all site staff remain appropriately trained, aware of and understand the contents and conditions of the EMP, the key environmental issues and the consequences of non-compliance that are relevant to the activities in which they are or will be involved, including but not limited to the following: • Inspect work regularly to ensure that environmental requirements are appropriately implemented, maintained and adhered to and address staff to encourage good and discourage poor environmental				

management practices;

- Maintain 'environmental compliance' as a standing topic on routine site management meetings;
- Hold regular 'tool-box' talks to train and raise environmental awareness amongst staff; and
- Discipline staff for serious and/or repeat offences.

[On-going], {Method Statement} / {SOP}

5. Ensure that records are kept of all staff members that attend training sign an attendance register or form; and retain the associated attendance records for at least five years. (A training certificate may also be issued).
6. Undertake all work in an environmentally sensitive manner and strictly prohibit any impact on any declared "No-go" areas.
7. Enforce all legislation, policies and procedures applicable to the development strictly.
8. Adhere to this EMP and all approved Method Statements / SOPs strictly, and where this is not possible / feasible follow the relevant procedures to apply for approval of an appropriate update or amendment thereto.
9. Develop, implement and maintain a Quality Management Programme (in line with the ISO 9001 principles) to ensure effective site monitoring, auditing and reporting in order to maintain confidence in meeting the SANRAL, site and plant safety requirements and performance objectives.
10. Ensure that the latest version of this EMP (or any applicable parts thereof) form part of any contractual agreements with Contractors and Sub-contractors for any appointments related to the execution of the project (e.g. site inspections, site probes, site surveys, site clearing, construction, commissioning, services, maintenance, upgrade, decommissioning, demolition, remediation, rehabilitation, etc.).
11. Ensure that the latest version of this EMP forms part of an Environmental Management System (EMS) for the construction, operational and decommissioning phases of the project (in line with ISO14001).
12. Adopt a precautionary approach whereby any work that would deviate from the Environmental Authorisation, EMP specifications, approved Method Statements and/or Safe Operating Procedures be approved by both the PM/PE and accepted by the ECO.
13. Keep the following records on site in accordance with the standard SANRAL site documentation and ensure that such documents are signed by all the relevant parties:

- Physical access plan;

- Complaints register;
- Site daily diary;
- Records of all remediation/ rehabilitation activities;
- Copies of reports to the ECO;
- Copy of the Construction Method Statements / Safe Operating Procedures;
- Fire Protection Association Plan;
- Environmental Incident Register;
- ECO inspection audit reports;
- The Environmental Authorisation issued for the project; and
- An appropriate fines system for non-compliance will be developed and implemented.

14. Introduce a monitoring system in accordance with the monitoring requirements indicated in various sections of this report; as well as any monitoring requirements imposed by authorities, authorisations and licenses.
15. Avail all records relating to monitoring and auditing in respect of the Kokstad N2 intersection upgrade project for inspection to any relevant authority, ECO or SANRALs Environmental Audit Team. **[As necessary].**

8.4.2 Site Elevation and Footprint Development, Layout Planning and Establishment

1. Ensure that the footprint of the construction of the Kokstad N2 Interchange upgrade Project, associated infrastructure and access road take all the environmental characteristics of the site into account as indicated in **Section 8.1**.
2. Take all the relevant biophysical environment protection specification into consideration when planning and designing the site and construction areas footprints and layout as well as the access route (in accordance with **Section 8.1**).
3. Plan the layout of the proposed Kokstad N2 Interchange site, so as to maximise the potential conservancy / nature reserve and to minimise the area removed from the potential conservation.
4. Proclaim the undeveloped portions of the SANRAL-owned sites as protected areas.

5. Restrict the footprint of the development to the smallest area possible, taking into consideration that while the actual footprints of the road may be fixed, other areas are likely to be more flexible in their extent, e.g. areas for lay down, storage of topsoil, parking, etc.
6. Clear areas mentioned in point 5 only as and when necessary to avoid having large portions of land void of vegetation for long periods of time in order to mitigate against water and wind erosion, dust, etc.
7. Avoid creating laydown and storage areas for overburden in areas of high quality habitat; and, where possible, restrict such laydown and storage areas in previously disturbed areas.
8. Minimise the impact outside of the site security fence.
9. Refrain, where reasonably feasible, from cutting across natural features, such as wetlands as this would make rehabilitation of the areas that remain more difficult and less effective.
10. Develop and provide a Site Layout Plan for the construction phase, which takes the above listed environmental specifications into consideration, by showing the overall site layout, including but not limited to:
    - Site boundaries;
    - Contractor yard site allocations;
    - On-site “No-go” areas, that are to remain undisturbed;
    - Footprint proposed interchange upgrade and associated service infrastructure and facilities;
    - The access road, large vehicle turning areas;
    - Security access points / gates;
    - Material (e.g. construction material, diesel/ petrol) and equipment storage and lay-down areas;
    - On-site main road servitudes;
    - On-site main stormwater management system and sedimentation traps; and
    - Areas earmarked for central construction service facilities, e.g. water system and facilities, waste handling facilities, construction offices, ablutions, canteens, vehicle wash bays and service station, fuel storage and station, topsoil and spoil stockpile, concrete batching facilities, excess concrete storage, etc.

    {Method Statement}

8.4.3 Site Demarcation, Signage, Fencing and “No-go” Control

Applicant (SANRAL)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
#				1. Survey and demarcate the site and construction areas accurately and in accordance with the Site Layout Plan to establish the permitted footprint.				
				2. Control access to areas of the Kokstad N2 Interchange Project site that are not involved in construction or operation of the plant.				
				3. Mark off the area to be affected effectively, to demarcate the limits of allowable disturbance of natural areas; e.g. provide stakes and hazard tape to demarcate the footprint area within which all construction is to take place prior to site clearance and fence in such areas after initial site clearance.				
				4. Fence the main development footprint and any satellite construction / operation sites off to allow site access control, prevent unauthorised access and prevent larger mammals from entering (refer to fencing specification as provided in **Section 8.4.3**). {Method Statement}				
				5. Prohibit domestic animals or livestock from being brought on or entering the site.				
				6. Institute and consider all areas on the applicant's owned property outside the formerly demarcated and fenced in development areas strictly as "No-go" areas, unless the Project Manager provided specific written permission for these area to be accessed.				
				7. Prohibit / refrain from commencing with any construction activities (other than for access roads and fencing) prior to the site being fenced off and working areas secured.				
	#			8. Dedicate and demarcate suitable on-site areas for material, equipment, waste, topsoil and spoil stockpile areas in accordance with Site Layout Plan prior to commencing with construction activities.				
	#			9. Erect and maintain appropriate safety and environmental risk precaution signs prior to commencing with construction activities.				
	#			10. Dedicate and demarcate on-site "No-go" areas and off-site "No-go" areas that are at risk by suitable fences where reasonably practical; and if not with danger tape and/or "No-go" sign boards.				

8.4.4 Site Remediation, Rehabilitation and Re-vegetation

Although site remediation and rehabilitation are particularly important at the end of construction and for final preparation of change in use at the end of the project life cycle, it is important to consider, plan for and implement site remediation and rehabilitation systematically and continually through the life cycle of the project.

All areas impacted outside the footprint of the SANRAL N2 Kokstad Interchange upgrade Project and its associated infrastructure, whether off-site or on site must be suitably and effectively remediated and rehabilitated

as soon as reasonably possible. Considering the duration of the construction phase, intermediate remediation may be necessary in certain areas which may again be disturbed later on, to minimise soil erosion.

1. Refrain from and strictly prohibit deposition of fill in the wetlands located within the development footprint.
2. Provide for adequate budget planning and funding specific for site remediation, rehabilitation and re-vegetation (include insurances, fund securing / retention, etc.).
3. Develop a Rehabilitation Plan that provides for effective, systematic and continual remediation and rehabilitation of the site and impacted areas outside the site to a high standard in accordance with all the relevant requirements of this EMP and the Basic Assessment specialist studies; including but not limited to the following:
   - Landscape exposed and/or destabilised areas to blend in with the surrounding natural areas;
   - Provide for and arrange for the safe removal and legal disposal of any and all hazardous substances from the area to be rehabilitated;
   - Provide for all areas disturbed during the development of the proposed facility; including areas outside the site footprint (e.g. access tracks) and the natural areas inside the site boundaries, to be effectively rehabilitated with locally occurring indigenous species;
   - Provide for ultimate remediation of the development footprint to be remediated effectively to allow for the relevant change in land use; and in doing so, follow all relevant planning requirements that would be applicable at the time; and
   - Undertake rehabilitation out to a high standard so that stabilisation, aesthetic form and ecological sustainability are able to rapidly improve with time.
4. Develop and implement a Detailed Rehabilitation Plan. {**Method Statement} / {SOP}**
5. Remove all 'waste' spoil regularly from the site to appropriately authorised / approved off-site disposal; or deposit it in a controlled manner and in accordance with **Section 8.5.8** at the spoil dump.
6. Provide for and implement the appropriate and effective stockpiling and safekeeping of top soil in accordance with **Section 8.5.2**.
7. Rehabilitate areas effectively where excavation and filling is completed as well as exposed areas where construction has been completed, including but not limited as follows:
   - Landscape where necessary in accordance with the relevant rehabilitation plan;

- Loosen compacted soil;
- Apply topsoil from the relevant stockpile as a top layer at exposed areas;
- Mulch, fertilise and water the re-vegetated areas as necessary and in a manner that would prevent erosion or pollution;
- Stabilise exposed slopes as follows;
- Re-vegetate slopes less steep than 1:3 with an indigenous grass mix that blends in with the surrounding vegetation (as the primary stabilisation);
- Provide additional and adequate soil conservation measures (e.g. bio mats) to slopes steeper than 1:3 and other areas susceptible to erosion due to their position in the landscape, before re-vegetation;
- Rehabilitate exposed areas (and areas stabilised by grass mix) with the surrounding indigenous vegetation;
- Control exotic weeds and invaders that might establish on the re-vegetated areas, to allow the indigenous vegetation to properly establish;
- Monitor re-vegetated areas until the vegetation is stabilised; and
- Repair any damage to re-vegetated areas promptly.

{Method Statement} / {SOP}

8.4.5 Access Road Development, Maintenance and Use

1. Plan access roads /tracks to ensure minimised environmental impact.
2. Design, implement and maintain the access road such that runoff is dissipated in side drains/ swales, rather than concentrated in lined channels.
3. Define and demarcate limited access tracks, where travelling / transportation through sensitive environments cannot be avoided.
4. Refrain from using off-road vehicles outside designated and demarcated roads or tracks, when travelling / transporting outside the construction / operations footprint.
5. Declare and display / indicate appropriate speed limits that would effectively mitigate potential environmental impacts; e.g. dust, noise, spills, accidents, etc.
6. Use public roads in accordance with specifications in accordance with **Section 8.2.4**.

8.4.6 Staff Facilities Development, Operation and Maintenance

1. Develop an overall Site Facility and Service Plan for effective provision and phasing in / out of staff facilities and services, based on best estimates of such requirements by all the resident staff, contractors and their sub-contractors on site; and include such a plan in the contractor tendering and agreement process / operational EMS.
2. Design, implement and maintain sanitation facilities and associated systems for containment, treatment and/or disposal of raw sewage and sewage sludges such that potential leakage or spillage is effectively prevented and that any 'clean' wastewater is discharged in accordance with all legal requirements (e.g. Water Use License). **{Method Statement} / {SOP}**
3. Provide adequate temporary chemical toilets on site, during periods where more permanent ablution facilities have not yet been provided, are insufficient and/or located far away from an area of work, as follows:
   - Provide for a suitable ratio of toilets per number of employees (usually at least 1 toilet per 15 employees);
   - Provide for toilets to have hand wash facility either within the toilet cubicle or adjacent thereto;
   - Locate toilets (portaloos) outside the 1:100 year floodline and preferably away and/or hidden from public roads, residential areas and other public places;
   - Secure toilets (portaloos) firmly to prevent them from toppling over due to wind or any other cause;
   - Appoint a service provider to remove sewage from the chemical toilets and/or sewage sludge from package plants on a regular basis; and provide and ensure for this sewage / sewage sludge to be disposed of at a municipal sewage treatment plant or alternatively on an appropriately designed on-site sewerage treatment plant;
   - Clean the sewage system out regularly and immediately before long weekends, builder's holidays and work breaks; and disposed the sewage to the municipal sewage system;
   - Ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents is properly stored and removed from site; and
   - Keep toilets locked after working hours.

   {Method Statement} / {SOP}
4. Prevent any sewage from on-site sanitation facilities to leak, seep or spill onto the ground or into the surface or groundwater; and conduct regular checks and if necessary repairs.

5. Connect permanent ablution facilities (where applicable) to the local municipal sewer system.
6. Prohibit staff from abluting anywhere other than in toilets.

8.4.7 Water Supply, Abstraction and Consumption

1. Assess all project activities and associated water use requirements (e.g. municipal water supply) well in advance in order to ensure the relevant water use is applied for and approved where required. **{Method Statement} / {SOP}.**
2. Install site services for water provision, as soon as possible before the main construction / operation activities commence but provided that the required approvals/licenses have been obtained, e.g.
   - Connect to a water reticulation system, preferably tapping into a municipal supply scheme; and
   - Provide for water to be brought in by tanker from an appropriately licensed local water supplier (temporary arrangement).

   {Method Statement} / {SOP}
3. Refrain from making use of and/or collect water from any source other than those pointed out in the approved Method Statement / SOP.
4. Ensure that no natural surface water sources (i.e. streams, rivers, wetlands) or groundwater sources are used; e.g. in situ to wash / clean plant or equipment, and/or for any water abstraction (other than for emergency fire fighting).
5. Minimise use of freshwater, prohibit water wastage, and train and encourage all staff to use water sparingly.

8.4.8 Materials Management

1. Include a requirement in the tender contract for the contractor(s) to provide a method statement(s) for hazardous substances management during construction, site remediation and/or demolition and ensure that the method statement(s) be approved by the appointed ECO, and if required the Emergency Services Department and Environmental Department, prior to commencement of remediation and construction. **{Method Statement} / {SOP}**
2. Solicit expert advice and or services for appropriate safe handling of any potentially toxic or hazardous substances (e.g. unidentified substances or items that could potentially be hazardous).
3. Prohibit pollutants such as cement, concrete, lime, paint, oil, chemicals

and diesel / petrol fuels from discharging into any water source and/or polluting open ground.

4. Follow the specification for cement and concrete management (refer to **Section 8.5.5**).
5. Adhere to all relevant national, regional and local legislation regarding the transport, use and disposal of hazardous waste at all times.
6. Provide and design sufficient materials handling facilities that provides for and meets all the relevant specifications of this EMP.
7. Avoid locating materials storage areas in close proximity to ecologically sensitive areas and inside the 1:100 year flood line of watercourses.
8. Obtain, keep on record, make use and avail Material Safety Data Sheets (MSDSs) for all hazardous substances brought / used on site.
9. Ensure that all staff handling hazardous substances are adequately informed about the specific hazards, equipped with appropriate Personal protective Equipment (PPE) and suitably trained in the handling of the specific substances and hazards.
10. Implement appropriate health and safety precautions to avoid employee and/or public exposure to any contaminant or hazardous substance, which in addition to hazardous substances for construction purposes may potentially include certain historically dumped wastes, spilled substances and leachate.
11. Develop and implement procedures for safe material transportation, storage and handling. **{Method Statement} / {SOP}**
12. Develop and implement emergency procedures / protocols to quickly and effectively repair any hazardous substance leakages and follow effective spill clean-up procedures (refer to **Section 8.5.7**). **{Method Statement} / {SOP}**
13. Maintain a register of spills, incidents and 'near-misses' involving hazardous materials; and compile and keep on record investigation reports for all such events involving significant quantities and/or very hazardous substances or where the Project Manager /or ECO requires such a report to be compiled.
14. Report any significant spills immediately to the Emergency Services Department, ECO, DWA, Environmental Department and other relevant authorities.
15. Clearly dedicate and demarcate areas for the storage of hazardous substances including hazardous waste and industrial effluent.
16. Train all staff handling hazardous substances and waste on the requirements in terms of the specific substance they handle, including requirements in accordance with the substance's MSDS and abovementioned procedures and protocols.

Applicant (SANRAL)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
#	#			17. Safeguard hazardous substances from being stolen, vandalised, catching fire or spilling on open ground.				
#	#			18. Obtain all necessary approvals with respect to storage of hazardous substances from the appropriate authorities; e.g. diesel/ petrol fuel storage and dispensing, keeping and using of explosives, keeping of pesticides, etc.				
#	#			19. Ensure that areas of fuels storage and other flammable materials comply with standard fire safety regulations and any conditions of approval of the local Fire Prevention Officer as well as the Major Hazardous Installation Regulations (OHS Act) if required. **{Method Statement} / {SOP}**				
#	#			20. Provide some appropriate form of secondary containment to all portable chemical containers.				
#	#			21. Design, construct and allocate bunded areas (i.e. concrete platforms with bund walls or inward slopes) to accommodate hazardous liquid substances (such as e.g. fuel, oil, paint, bitumen, herbicide and insecticides) to guard against infiltration of hazardous substances into the soil, groundwater or surface water, in accordance with the following design criteria: • Adhere to all relevant legislation; • Effective containment of the particular material stored by selecting an appropriate impermeable material for the construction of the bund; • Effective segregation for safe storage of incompatible material; • Bunded area to have a holding capacity of 110 % of the total volume of the hazardous substance to be contained (or apply SANS10089-1:2008 to bunding for multiple large tanks); • A roof over the bunded area, wherever reasonably practical, to minimise collection of rain water within the bunded area; • Means for safe access to the bund for regular inspections and maintenance; • Appropriate emergency and safety equipment, e.g. tank failure alarm, fire alarm, fire fighting system and equipment, etc.; • A system or for means to safely mop up or remove any spilled hazardous material without causing any environmental pollution; and • A system, e.g. valve or submersible pump, to effectively drain or remove any accumulated rainwater on a daily basis when it is raining.				
#	#			22. Refrain from storing any material in a bund, other than what the bund provides for in terms of the design criteria given above.				
#	#			23. Keep bunded areas spill free by removing and mopping up any spilled material immediately in accordance with the spill clean-up specifications				

referred to in **Section 8.5.7**; and remove or drain any accumulated uncontaminated water on a daily basis.

24. Provide for storage, handling and disposal of fuels, oils, lubricants and other potentially harmful chemicals (and their containers) to be done under proper supervision in accordance with the manufacturer's instructions (e.g. Material Safety Data Sheets (MSDS)).
25. Follow the vehicle and plant refuelling and maintenance procedures as specified in **Section 8.5.6**.
26. Follow the spill clean-up procedures as specified in **Section 8.5.7**.
27. Ensure that any delivery drivers are informed of all procedures and restrictions (including "No-go" areas) required to comply with the EMP, and to ensure that these delivery drivers are supervised during the off-loading by someone with an adequate understanding of the requirements.
28. Ensure that materials are appropriately secured and contained to ensure safe passage between destinations without any loss or spill of material along the way.
29. Prohibit smoking in the vicinity of hazardous substance storage areas and erect and maintain "No smoking" and "Danger" signs at such areas.
30. Consider and treat all empty and externally dirty containers (e.g. tanks and drums) that contained hazardous substances as hazardous materials, e.g. by ensuring safe storage in bunded areas or by providing other means to prevent any spillage from these; this is unless the containers have been appropriately and fully drained and cleaned to render them non-hazardous. **{Method Statement} / {SOP}**
31. Prohibit removal of empty containers that had contained hazardous substances for use (other than its intended use) or for taking off-site (other than for suitable disposal), e.g. by perforating used containers.
32. Ensure that adequate spill management equipment is available in the immediate vicinity where hazardous substances are used and/or stored. Where spill kits are used, they need to be properly stocked at all times.

8.4.9 Waste Management

1. Develop and implement a detailed on-site Waste Management Plan, prior to the relevant waste generating activities commencing, covering inter alia:
   - Identification, classification and keeping of a register of type of waste generated;
   - Planning for the construction / establishment / operation / decommissioning of a centralised waste management facility and/or

designated waste management areas;

- Procedures to be followed for waste separation at source as well as reduce, re-use, recycle, recover and treatment of waste prior to the disposal option; and
- Waste management procedures for waste disposal, e.g. storage, disposal, keeping of waste consignment certificates, etc.

{Method Statement} / {SOP}

2. Ensure that waste is placed in skips and stored in a designated, bunded storage/collection area prior to being safely disposed of this is to ensure that the waste will not cause any surface and groundwater pollution or pose any health hazards by being.
3. Minimise production of all solid, liquid, and gaseous radioactive waste, both in terms of volume and activity content.
4. Ensure that all conventional waste is properly disposed of and removed from the site to a permitted landfill site, or where applicable to an appropriately licensed waste recycling facility.
5. Dispose of all contaminated soil, excavated waste and solid waste material generated or uncovered, at a permitted landfill site that is authorised to accept the particular waste.
6. Obtain safe waste disposal certificates for all wastes disposed and retain and keep these certificates on record for proof of appropriate disposal for at least 3 years (or alternatively in accordance with any other Municipal requirements).
7. Dispose of sewage in a sustainable manner that will fully prevent any raw or treated sewage to contaminate surface water, wetlands or groundwater; entailing one of or a combination of the following:
   - Connect an on-site sewerage system to an existing off-site system; and
   - Provide for the collection by tanker and transportation and disposal to a local municipal sewage treatment work.
8. Provide for appropriate recycling of waste, e.g. disposal of waste oils to a suitably qualified external oil recycler.

8.4.10 Stormwater Management

Effective stormwater management is necessary at all phases of the project and is vital in terms of protecting the site from being flooded as well as ensuring that environmental degradation is prevented / mitigated.

In the case of a SANRAL N2 Kokstad Interchange upgrade Project the stormwater management system needs to be designed in accordance with the specifications agreed with the Wetland Specialist and Design Engineers.

Note: For the purposes of this EMP the following definitions apply:

"Dirty" water - means water that is directly or indirectly contaminated as a result of project activities to such an extent that it does not meet the applicable discharge standards; and where contaminants may include suspended or dissolved construction material, sewage, litter, eroded soil, etc.;

"Clean" water – means water that has either not been contaminated directly / indirectly as a result of project activities; or that has been treated to a quality that meets the applicable discharge standards.

1. Develop, design and maintain an overall site Stormwater Management Plan for the construction, operational and decommissioning phases, which includes appropriate, effective and legal management of stormwater; inter alia the following:
   - Ensure that the ultimate flow from the development does not result in any negative impacts on downstream properties or wetlands/watercourses and must therefore ensure that stormwater is managed within the overall site as effectively as possible; and
   - These networks must be designed and constructed in such a manner that stormwater of a suitable quality will drain into the surrounding system.
2. Include the Stormwater Management Plan in the contractor tendering and agreement process / operational EMS.
3. Design, implement and maintain all required stormwater control and mitigation measures so as to comply with applicable design standards thereby ensuring the safety of the SANRAL N2 Kokstad Interchange upgrade Project as well as conserving the surrounding environment.
4. Design and construct storm water control berms (e.g. trench and/or earth barriers) to divert rainwater around and away from the construction impacted areas, in a way that would retain such rainwater as uncontaminated. **{Method Statement} / {SOP}**
5. Design, implement and maintain a stormwater system during construction and thereafter in all areas outside the SANRAL N2 Kokstad Interchange upgrade Project site (temporary or permanent) as follows (or appropriate alternative measures):
   - Provide appropriate measures to reasonably protect the site from erosion by stormwater (these may need to be adjusted to ensure efficiency); e.g. provide for appropriate stormwater channelling and energy dissipation measures in the stormwater drainage channels that lead to the wetlands (in accordance with the recommendations provided by the wetland specialist);

Applicant (SANRAL)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
				• Define any areas where "dirty" stormwater run-off may arise and prevent such "dirty" stormwater from leaving the site without appropriate treatment to render it "clean" prior to discharge; • Minimise the inflow of "clean" (virgin) stormwater run-off into impacted areas where the stormwater could potentially be contaminated; • Provide for effective containment (e.g. sump) and treatment (e.g. sediment settling, oil traps/skimmers) of contaminated stormwater in order to render it" clean" for discharge purposes; • Adequate pollution prevention infrastructure to be installed where necessary to control pollutants entering storm water. This may take the form of oil/grease traps that filter contaminated storm water runoff before this enters the aquatic environment, or by using bio-filtering material laid out on the ground before water enters wetlands/rivers; and • Provide for containment of at least the 1:100 year run-off volume with an 800 mm freeboard from areas with a high contamination potential; in terms of Regulation 704 (June 1999) of the National Water Act, 1998 (Act No. 36 of 1998) [while this specification is fully applicable to the Operational Phase, it is also recommended for construction areas where risk of contamination with hazardous substances are high]. **{Method Statement} / {SOP}**				
#	#			6. Ensure that a temporary stormwater collection sump is installed during excavation activities to allow excess run-off to drain to a defined low area (collection system); where any transported sediment could be contained and clean stormwater pumped out, while, depending on the nature and content of the sediment this could be pumped to a temporary holding facility and then transported to a waste disposal site (or a suitable alternative measure to prevent erosion and sedimentation).				
#	#			7. Prohibit stormwater pollution; and implement appropriate measures to prevent stormwater pollution.				
#	#			8. Monitor the stormwater / seepage at the inlets of stormwater channels near any wetland, to determine the level of pollution; and keep a record of the monitoring results.				
#	#			9. Inspect and maintain all the storm water management system (drainage structures, silt / debris / oil traps, etc.) to retain it cleared of organic and inorganic debris in order to prevent storm water contamination. **[Regularly]**				
#	#			10. Dispose of any hazardous substances cleared from stormwater systems, e.g. oils/greases/chemicals from traps in accordance with the appropriate hazardous substances and waste management procedures.				

8.4.11 Wastewater Management

Applicant (SANRAL)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
#	#			1. Assess all project activities and associated water use requirements (e.g. watercourse crossings etc.) well in advance in order to ensure the relevant Water Use License (WUL) is applied for where required; and ensure that such a WUL is in place and all associated conditions complied with prior to such use commencing. **{Method Statement} / {SOP}**				
#	#			2. Design and construct a waste water management system and associated facilities for the safe and effective containment (including emergency containment), processing, treatment, re-use and disposal of all construction and industrial wastewater (including concrete wastewater and contaminated stormwater) from various activities and operations that complies fully with all relevant legal requirements.				
#	#			3. Remove (do not leave in-situ) all polluted water, including contaminated stormwater, immediately from an area or system where such polluted water could spill or wash into the surrounding water resources or onto open ground; and transfer it to an impermeable tanker, sump or container for safekeeping before transportation for treatment and/or disposal to an appropriate wastewater treatment facility or alternatively to an appropriately licensed landfill site.				

8.4.12 Impact on Air Quality

The N2 Kokstad Intersection Upgrade Project would probably have little effect on the overall emissions released. The proposed project is an upgrade of an existing intersection. The associated impacts (dust generation etc.) are therefore expected to be relatively low, however they should be mitigated wherever possible.

The main impact on air quality due to the construction phase will result from the generation of dust during site remediation and. Other sources of air pollution would be as a result of construction vehicles and equipment exhaust fumes, trafficking on unpaved roads (although this would be very limited), potential waste burning and potential runaway fires by construction labour.

#				1. Minimise the surface area of exposed soil and fine construction materials to wind erosion (construction phase).				
#	#			2. Develop, implement and maintain an Air Quality Management Plan, including but not limited to: • An 'on site' Air Quality Control Programme including for on-site dust suppression and fume emission control; • An 'off site' Air Quality Monitoring Programme for dust fallout; and • Appropriate air emission and air quality targets / criteria (e.g. for dust				

Applicant (SANRAL)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
				levels, exhaust fumes / gasses, etc.);				
#	#			3. Sprinkle water on dust on exposed areas or soil mounds (e.g. from cable trenching) as and when dust problems arise (construction phase).				
#	#		&	4. Develop, implement and maintain mitigation measures for fume and smoke emissions; including but not limited to the following: • Maintain vehicles and other driven machinery regularly to ensure that no smoke is emitted from exhausts; • Prevent any uncontrolled fires; and • Prohibit burning of wastes/refuse. **{Method Statement} / {SOP}**				
#	#		&	5. Develop, implement and apply mitigation measures to effectively suppress airborne dust at site and on all dirt roads used, e.g.: • Minimise the surface area of exposed soil and fine construction materials to wind erosion; • Pave or temporary stabilise surface of frequently used roads; • Damp / wet down trafficked areas with freshwater, and where appropriate, apply suitable additives to reduce the application frequency and use of fresh water; • Implement and enforce appropriate speed limits on dusty roads; • Make use of cloth or brush barrier fences (where appropriate); • Cover dumps with plastic sheeting (except for topsoil stockpiles); • Prohibit the use groundwater and water from wetlands for dust suppression; • Prohibit the use of seawater for dust suppression since seawater would pollute and degrade natural habitats, especially any natural water bodies; and • Undertake regular audits to monitor any significant dust emissions. **{Method Statement}**				
#			&	6. Develop, implement and maintain an Air Quality Monitoring Programme which includes measurements of levels in worker areas and on the site boundary, including *inter alia*: • Measure the background dust fallout prior to commencement of the proposed activity (e.g. through the bucket method); • Monitor the background dust fallout on an on-going basis (e.g. through the bucket method); and • Monitor atmospheric releases and ensure that such releases are maintained within legislated and Air Quality Management Plan target				

Applicant (SANRAL)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
				limits. **{SOP}**				
#	#			7. Maintain vehicles and other driven machinery regularly to ensure that no smoke is emitted from exhausts (construction and operational phase)				
#				8. Report on the air quality monitoring results to the ECO, Environmental Monitoring Committee and Department of Environmental Affairs. **[At a frequency of every 3 to 6 months]**				
#	#			9. Prevent any uncontrolled fires (construction and operational phase)				
#	#			10. Prohibit burning of wastes/refuse (construction and operational phase).				
#	#			11. Regular monitoring of the road, undertake regular audits to monitor any significant dust emissions.				
#	#			12. Address any air pollution issues that are identified during the abovementioned air quality monitoring.				

8.4.13 Noise

With regards to the Kokstad Intersection Upgrade Project, there are no residents or communities in close proximity to the proposed site. There are a few farm owners who may be impacted on by increased Noise Generation associated with the upgrade. However construction activities will be limited to the site, and will be restricted to working hours thus the impact on people in close proximity to the site will be unlikely.

#	#			1. Reduce / mitigate noise, where activities (e.g. use of the road) is to take place within approximately 500 m of residences and offices, for example: • Consider noise screens in the design of the road to limit the impact on nearby residents; • Restrict very noisy construction activities, e.g. breaking up concrete hard standing with pressure hammers to daytime, if feasible; and if not, obtain authorisation from the local authority for alternative arrangements; • Refrain from operations during the night as sound may travel to residential areas and communities; • Refrain from using routes for haulage through or close to residential areas during night time. Alternatively, provide residents with prior knowledge of scheduling for ultra-heavy-duty vehicles and advise on the frequency and day periods of exposure to such noise; • Ensure that all vehicles and where possible noisy equipment are fitted with silencers that are regularly and properly maintained; • Meet regulatory requirements in terms of site boundary noises; and				

- Provide affected parties with prior knowledge of scheduling for ultra-heavy-duty vehicles and advise on the frequency and day periods of exposure to such noise.

8.4.14 Site Access Control, Safety and Security

1. Confirm the availability of any required support for site control from the relevant police and emergency services.
1. Declare and retain the SANRAL N2 Kokstad Interchange upgrade project site and associated infrastructure and equipment off-limits to the public.
2. Inform all staff of the hazards on the site and provide suitable training on how to protect themselves, others and the environment from such hazards; how to react and what to do in an emergency.
3. Ensure adequate signage is provided along the major roads and at the entrance of the construction site.
4. Clearly communicate access policy for the properties to the staff and public, using notice boards on access gates and by directly communicating with the nearby communities (refer to **Section 8.2.1**).
5. Provide and declare the access gateway(s) and what use they are intended for; control access at all these gateways; prohibit access via any other places; and prohibit use of any deviation from approved access roads or transportation routes unless written approval has been received therefore from the Project Manager.
6. Raise awareness and clearly communicate any public safety risk to the public, using appropriate safety and precaution signage erected in applicable areas, radio broadcasts, and notice boards and/or by directly communicating with the nearby communities (meetings, flyers).
7. Ensure compliance with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), and specifically for the purposes of this EMP, such sections and regulations that have environmental relevance, e.g. handling of flammable liquids, asbestos management (if applicable), etc.
8. Ensure that the site and all associated operations are and remain in compliance with all National Health and Safety Standards and other relevant international, national, regional and local regulations.
9. Issue identity tags complete with a photograph to all individuals that are to be present on the SANRAL N2 Kokstad Interchange upgrade Project site for more than 3 consecutive calendar days.
10. Require visitors to sign a register at the security checkpoint; issue all visitors with a visitor's permit; and require an employee responsible for receiving / accompanying the visitor to endorse this permit before the visitor leaves the security area.
11. Maintain all vehicles used on site in a roadworthy and leak free condition and maintain all equipment in a safe working condition and such that any accidental emissions, spills, explosions, etc. are avoided.
12. Allow only qualified/ trained personnel to operate equipment and vehicles.

13. Prohibit anyone from driving or operating construction / operation / demolition vehicles, or any other vehicle, without being in possession of a valid driver's license; and without obeying the applicable speed limits and road safety regulations that apply on or off site.
14. Prohibit the transportation of persons on the back of vehicles.
15. Prohibit driving under the influence of alcohol or narcotic substances.
16. Provide ample and clear signage along both the N2 and R56 before the interchange and new traffic circle, clearly stating the names of the businesses along the service road.

8.4.15 Emergency Preparedness and Response

1. Develop and/or implement an Emergency Preparedness Plan consisting of appropriate emergency procedures and information prior to commencing with any work that may potentially result in an emergency; which includes but is not limited to fires, spills, and contamination of ground and surface water, accidents to employees and damage to services. (Applicable existing COPs and SOPs may be used.) **[On-going and where necessary]**, **{Method Statement} / {SOP}**
2. Include contact details of all relevant emergency services and response teams and neighbouring land owners/ users/ managers in the Emergency Preparedness Plan; keep and display such contact details in appropriate places; and ensure that these are regularly checked und updated if necessary.
3. Appoint an on-site emergency response team, train key staff in emergency response and make all staff aware of the emergency procedures. **[On-going]**
4. Work closely with the local emergency services departments in order to ensure that required services are sufficient in the area; particular due to increased population and traffic on roads; for providing support in case of site emergencies; and for assistance with evacuation procedures once the site is operational.
5. Maintain a register of and compile reports on all incidents, accidents, 'near miss', etc., which includes the action taken after the event has occurred; and inform at least the Project Manager as well as the ECO of the event.
6. Notify any relevant authority immediately and keep detailed record of such notifications, should any serious incident occur, including e.g.:
   - The local Emergency Services Department for all incidents that may affect the local community and road users;
   - The Department of Agriculture and Environmental Affairs for incidents which likely has a detrimental effect on the environment;
   - The Department of Labour for reportable incidents as defined in the Occupation Health and Safety Act (Act No 85 of 1993);
   - The relevant roads authority, for accidents on public roads; and

- The Department of Water Affairs for any emergencies that affect water resources.

8.4.16 Fire Prevention and Response

1. Responsible parties will be liable for any damage caused by fires resulting from their operation, negligence or lack of protection of the site from veld fires (e.g. the failure to maintain fire breaks).
2. Include a fire emergency preparedness plan for fighting accidental fires in the Emergency Preparedness Plan (Applicable existing COPs and SOPs may also be used) (refer to **Section 8.4.15**).
3. Define, implement and maintain a proper firebreaks around the entire site footprint (permanent), satellite facilities (permanent) and where appropriate on-site (temporary or permanent), to prevent accidental fires spreading to, from or across the site; and ensure that this is done in accordance with the requirements of Veld and Forest Fires Act.
4. Fire-fighting equipment for each construction / operational / demolition team and/or area must be readily available on site; bearing in mind that these should be approved by the local Fire Prevention Officer, ECO, Safety and/or Health Officer.
5. Avail and maintain appropriate fire-extinguishers on all vehicles carrying flammable materials.
6. Keep a register and inspection log of all fire fighting equipment; and inspect and check fire fighting equipment regularly and record such inspection on the inspection log that is retained on-site. **{Method Statement} / {SOP}**
7. Prevent accidental fires through proper sensitisation of staff towards the associated risks, dangers and damage of property.
8. Prohibit the use of open fires and random “braais” on-site, strictly, unless they are effectively contained and designated areas far away from vegetation.
9. Inform and/or involve neighbouring land owners/ users/ managers should there be a risk of a fire spreading to their land.

8.5 Specific Construction Activities

Applicant (SANRAL) | Contractor | ECO / Auditor | Specialist

Environmental Specifications

Planning & Design | Construction | Operation | Decommissioning

8.5.1 Site Clearance

Applicant (SANRAL)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
#	#			1. Restrict the area to be cleared to a minimum, and clear areas sequentially as needed; to benefit from the stormwater absorption, erosion protection and dust control properties of the vegetation cover. **{Method Statement}**				
#	#			2. Demarcate all areas to be cleared and those not to be cleared (e.g. "No-go" areas) clearly and effectively, prior to clearing.				
#	#			3. Designate stockpile areas for various materials (topsoil, subsoil, rock and building rubble/excess concrete that can be crushed and re-used as fill material) and communicate these to the contractors.				
#			&	4. Facilitate search-and-rescue operations before and during site clearance, as specified in **Section 8.1.4** and **Section 8.1.5**.				
				5. Clear the site in a logical sequence and manner that allows mobile species to escape, by starting clearance from an area of relatively high disturbance and progressing in an orderly manner in the direction of least disturbance and least physical obstruction; e.g. begin clearing from an existing fence and clear towards an area that is not yet fenced and is still covered by natural habitat.				
				6. Co-stockpile cleared vegetation with cleared topsoil and manage it in such a way that cleared vegetation is chipped and mulched and placed on top of stockpiled soil, and that the mixing of the materials is minimised as much as is reasonably practical.				
				7. Prohibit burning of cleared vegetation.				

8.5.2 Soil Stockpiling

				1. Restrict the removal of topsoil to areas where excavation or preparation for coverage by hardstanding are imminent, and there is a high risk of imminent topsoil contamination (e.g. areas of heavy traffic, areas in proximity of cement batching facilities, etc.).				
#	#			2. Remove the topsoil material (minimum 300 mm) from any areas to be excavated, covered by hardstanding or from which the topsoil needs to be stripped for topsoil protection.				
#	#			3. Store the topsoil separately (from general fill, rubble, etc.), effectively and securely for later use in rehabilitation in stockpiles in a manner that would limit erosion and dust. **{Method Statement}**				
#	#			4. Locate all soil stockpiles (topsoil and fill) as follows: • Sufficiently away from seepage zones, flood lines, water courses and other ecological sensitive area; • Preferably in areas that were already disturbed before the project activities commenced on site; and				

- In areas as indicated in the relevant approved and latest Site Layout Plan.

5. Plan for and adhere to a minimum of topsoil handling (preferably handle stockpile only during initial stockpiling and for eventual removal for rehabilitation purposes).
6. Secure and treat soil stockpiles to reduce dust generation and erosion effectively.
7. Reseed topsoil stockpiles that are to be kept for extended periods, to prevent excessive dust or erosion.
8. Remove all excess fill material from an area or the site, once construction therein has been completed.

8.5.3 Blasting

1. Undertake blasting (that may be required) according to all relevant statutes and regulations and under strict supervision of a registered specialist blaster; and strictly prohibit and refrain from undertaking any blasting without the required authorisations.
2. Notify and consult with the ECO to establish whether any species rescue operation, e.g. removal / chasing away of large animals and birds, would be required prior to any blasting event.

8.5.4 Sourcing of Borrow Material

1. Source / acquire any borrow pit material from legal sources, i.e. legally retrieved / mined.
2. Obtain relevant permits / licenses / authorisations that provide written proof that borrow pit material has been legally sourced and retain copies on record.

8.5.5 Concrete Mixing, Batching and Wash Areas

1. Avoid mixing concrete directly on the ground, in sensitive areas or near water resources.
2. Consider making use of ready-mix concrete supply instead of installing an on-site concrete batch plant, if at all feasible.
3. Clean up any concrete spilled on public roads immediately.
4. Provide a bunded and controlled cleaning and/or washing area

equipped with a wastewater catch pit to wash plant and equipment used for cement (including concrete shoots from ready mix trucks).

5. Carry out the cleaning and/or washing of concrete transporters and delivery trucks, concrete mixers and other concrete equipment in the cleaning facilities only; and refrain from undertaking any such cleaning elsewhere; with the cleaning zones/facilities designed to contain all concrete waste and wash water effectively. **{Method Statement}**
6. Locate concrete batching activity / facilities in an area of low environmental sensitivity and indicate such location on the Site Layout Plan, should an on-site concrete batch plant be necessary.
7. Implement special precautions in terms of bunding; waste water capturing and treatment; and precautions against wind-blown cement; should an on-site concrete batch plant be necessary. **{Method Statement}**
8. Treat all waste water resulting from batching of concrete and concrete equipment washing areas to a quality that meets the relevant specification of the applicable Water Use License and/or any municipal discharge requirements before re-use (e.g. road wetting) and/or discharge. **{Method Statement}**
9. Store bulk cement, bags of cement and empty cement bags in an area or a facility protected from the weather and in a way that minimises cement dust being wind blown into the environment.
10. Clean up any accidental concrete spills that occur outside the designated concrete batching area immediately.
11. Rehabilitate the ground of the batching plant area and any area where concrete has been spilled to render it uncontaminated, upon completion of works.

8.5.6 Refuelling, Servicing and Cleaning of Vehicles, Plant, Equipment and Machines

1. Refuel vehicle or machinery only at a purpose-designed and designated bunded refuelling area on site or off-site; unless in cases of an on-site emergency repairs or for refuelling stationary equipment (e.g. generator) in which case drip tray are to be used. **{Method Statement}**
2. Place drip-trays that are suitably and practically designed to effectively contain spills (i.e. sufficient capacity and freeboard), and where necessary filled with appropriate absorbent material, under all parked vehicles and machines that are or may leak oil or fuel, maintained daily and regularly disposed of in an appropriate manner; unless such a vehicle is parked in an area provided with hardstanding that drains towards an oil-water separator to handle the amount of water expected to fall within the hard standing area.

3. Carry out routine vehicle maintenance and washing necessary at a maintenance workshop instead of at the site or construction/demolition camps to avoid on-site spills and leakages.
4. Keep all mechanical equipment used in project activities clean and free of oil, petrol, and diesel leaks.
5. Prohibit washing of any mechanical plant or equipment on the site, unless in an area specifically equipped for such a purpose in a way that would prevent ground, stormwater and groundwater contamination.
6. Undertake all vehicle maintenance (unless where on-site emergency repairs are necessary) in a designated vehicle maintenance area/ workshop, which is provided with a roof, appropriate spill containment (bunding), waste water treatment facility, fire protection, etc. **{Method Statement}**
7. Undertake stationary plant and vehicle emergency repairs in-situ only if there is good reason why these are impractical to carry out in a workshop; and if doing so, implement and adhere to appropriate spill prevention and containment measures (e.g. drain fuel / oil into drums, make use of drip-trays, cover the ground for part and tool lay-down areas with tarpaulins, construct temporary containment berms etc.). **{Method Statement}**
8. Ensure skirts are places around static plant (e.g. generators) to prevent rainwater build-up that could result in overflow of contaminated water.

8.5.7 Spill Clean-up and Disposal

1. Make every effort to avoid spills of hazardous materials.
2. Develop and implement a Spill Clean-up Procedure that takes staff safety and environmental protection appropriately into consideration. In the event of a spill, the following steps must be taken:
   - Stop the source of the spill;
   - Contain the spill;
   - All significant spills must be reported to this Department and other relevant authorities;
   - Remove the spilled product for treatment or authorised disposal;
   - Determine if there is any soil, groundwater or other environmental impact;
   - If necessary, remedial action must be taken in consultation with this Department and other relevant authorities; and

- The incident must be documented.

{Method Statement} / {SOP}

3. Provide stock and maintain appropriate complete emergency spill kits at locations close to where hazardous substance are stored or used and ensure full availability at all times. **{Method Statement} / {SOP}**
4. Train all relevant staff members to use the emergency spill kit and on the procedures to deal with spills of hazardous substances such as e.g. oils, diesel, petrol, paints, pesticides, etc.
5. Contain and clean-up any spills as soon as possible after the incident and thereafter remediate the affected area effectively and to the satisfaction of the ECO; including spills on unbunded hard surfaces, stormwater drains, roads, laydown areas, etc..
6. Report spills of hazardous substances immediately to the ECO and maintain a register for spills and all incidents involving hazardous materials.
7. Dispose of spilled material recovered from bunded areas by either appropriate re-use, recycling or disposal to a suitably licensed disposal facility.
8. Remove contaminated soil or yard stone immediately (do not leave in-situ) and disposed of this soil at a suitably licensed waste disposal site; or alternatively treat contaminated soil on site but ex-situ through bioremediation on an impermeable bunded area, provided such a method proof to be effective and prevents further or on-going environmental contamination.

8.5.8 'Non-hazardous' Spoil Disposal and Dumps

Note: For the purposes of this EMP the following definition applies:

Soil – means excavated natural soil and crushed rock which is uncontaminated with any 'man-made' material such as concrete, cement, packaging, oils, fuel, etc.

1. Dispose of 'non-hazardous' spoil at a site approved for such disposal, e.g. infill area identified by the Municipality. **{Method Statement}**
2. Minimise the visual impact of temporary spoil dumps

- Provide for side slopes to ideally be 1:3 but not steeper than 1:2, taking the direction of the prevailing wind into consideration in order to reduce dust and fine sand from blowing into sensitive environmental features (e.g. wetlands) and work areas.

8.5.9 Demolition of Structures and Buildings

Applicant (SANRAL)	Contractor	ECO / Auditor	Specialist	Environmental Specifications	Planning & Design	Construction	Operation	Decommissioning
#	#			1. Obtain all relevant approvals and clearances prior to demolition (from SANRAL).				
#	#			2. Ensure that all hazardous substances –where applicable (e.g. oils, greases, asbestos, mercury containing light bulbs, etc.), are safely removed and disposed of in accordance with legislative requirements to an appropriate facility for safe storage, treatment and/or disposal.				
#	#			3. Remove any re-usable / recyclable material for re-use to an appropriately licensed recycler / recycling facility, where feasible.				
#	#			4. Dispose of any rubble to an appropriately licensed disposal facility (e.g. building rubble site, recycler).				

9 CONCLUSION

This Environmental Management Programme (EMP) for the proposed N2 Kokstad Intersection upgrade and processing site builds on the environmental processes that have preceded it, namely the Basic Assessment Report and Public Participation Process. The EMP defines roles and responsibilities; and provides procedures and specification relevant to minimisation and mitigation of environmental impacts, for the planning, design, construction, operation and decommissioning phases of the proposed project.

It is expected that the relevant SANRAL Project Manager 'takes ownership' of the EMP and facilitates the full implementation of and compliance with the EMP. It is recommended that the complete EMP be incorporated and form part of the construction tender documentation and process. This would allow all potential bidders to consider the cost for all the required specifications and mitigation measures that are applicable to the construction phase with reasonable accuracy. It would also ensure that the document receives the necessary buy-in that it requires right from the outset of any construction work.

The EMP is currently presented in a draft format, as it may require amendment subsequent to Environmental Authorisation of the proposed project.

DOCUMENT CONTROL SHEET
(FORM IP180/B)

CLIENT	:	South African National Roads Agency SOC Limited (SANRAL)
PROJECT NAME	:	SANRAL N2 Kokstad Intersection Upgrade Project Basic Assessment **PROJECT No. :** J31359
TITLE OF DOCUMENT	:	SANRAL N2 Kokstad Intersection Upgrade Project Environmental Management Programme
ELECTRONIC LOCATION	:	**P:\J31359 – SANRAL N2 Kokstad Interchange Upgrade EIA\REPORTS\EMP**

	Approved By	Reviewed By	Prepared By
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DATE **02 October 2013**	SIGNATURE	SIGNATURE	SIGNATURE

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DATE	SIGNATURE	SIGNATURE	SIGNATURE

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Annexure A

List of Important Contacts and Emergency Numbers

Department	Contact person	Contact No.	Email	Postal
Department of Environmental Affairs– (DEA)				
SANRAL Project Manager				
SANRAL Project Engineer				
Environmental Manager				
Transport Authority				
Department of Water Affairs				
Engineering Consultant				
Environmental Consultant / Environmental Control Officer				
Contractor				
Sub-contractor				
Public and Authorities Acting on Their Behalf				
Drizit - Environmental - Sales of absorbant products				
Drizit - 24-Hour Emergency Number for incidents				

Annexure B

Inspection Sheet and Report Templates

Project Start Up and Site Inspection Sheet

PROJECT START UP INSPECTION SHEET

Project: **Date**

Contract No.: **Completed by:**

Contractor:

ES	ENVIRONMENTAL ASPECT	YES NO N/A	COMMENTS	ACTION
PLANNING				
ESTABLISHMENT				
CLEARANCE				

Routine Site Inspection Sheet

ROUTINE SITE INSPECTION SHEET

Project: **Date**

Contract No.: **Completed by:**

Contractor:

ES	ENVIRONMENTAL ASPECT	YES NO N/A	COMMENTS	ACTION
HOUSEKEEPING				
CONSTRUCTION ACTIVITIES				
REINSTATEMENT AND REHABILITATION				

Site Decommissioning Inspection Sheet

Project: **Date**

Contract No.: **Completed by:**

Contractor:

ES	ENVIRONMENTAL ASPECT	YES NO N/A	COMMENTS	ACTION
DECOMMISSIONING OF THE SITE				

Site Inspection Report Structure

Purpose of the Site Inspection Report

The purpose of the Site Inspection Report is to describe the results of the site inspections undertaken by the Environmental Control Officer (ECO) or delegated responsible person so that the level of compliance with the Environmental Management Plan (EMP) can be monitored throughout the contract.

In particular, it will be expected to summarise the following:

- The key results;
- Trends observed;
- Key issues observed;
- Problems encountered;
- Actions required and response taken or to be taken; and
- Recommendations.

The Site Inspection Report should conclude with a commentary on the overall performance of the Contractor in terms of meeting the requirements of individual/groups of Environmental Specifications and/or EMP as a whole.

Preparation of the Site Inspection Reports

Site Inspection Reports are expected to be prepared regularly throughout a given construction contract, including (but not limited to) the following:

- Prior to the handover of the site to the Contractor
- At regular stages throughout the construction works, and particularly with the commencement of particularly significant activities
- At the decommissioning of the site and prior to the handover of the site to the Employer/Operator.

Recommended Structure for the Site Inspection Reports

The following report structure is suggested for the Site Inspection Report:

Introduction

By way of setting the context for the Site Inspection Report, this section should outline the following:

- The need for the Site Inspections, and reporting.
- Purpose of the Site Inspection Report.
- The scope of coverage of the Site Inspection Report.

Environmental Management Requirements	This section should summarise the environmental requirements for the contract and for the construction works, and against which environmental performance is assessed.
Methodology	This should describe the activities undertaken during the particular site inspection, such as: • A site walkabout with the Project Manager (PM). • A review of documents and records, such as complaints records and/or incidents reports maintained by the Contractor and/or ECO. • Consultations with pertinent parties on site.
Findings of the Site Inspection	This should contain reference to the following: • A commentary on the level of compliance with key aspects of the Environmental Specifications, as listed in the checklist(s). • Details of issues, infringements, problems and non-compliances encountered. • Recommendations on actions to be undertaken to address any issues, infringements and/or non-compliances.
Conclusions	This should include an overall statement on the level of compliance observed during the site inspection.
Annexures	Annexures should be used to store supporting information to the main document, such as: • Photographs. • A quick reference, summary table of issues of concern and the necessary corrective measures required to address these issues.

Annexure C

List of Incidents and Associated Penalties

TYPICAL INCIDENTS INCURRING PENALTIES	VALUE
Failure to submit Method Statements timeously.	R5,000.00
Failure to secure construction site from public access.	R5,000.00
Failure to demarcate working servitudes and/or maintain demarcation tape.	R1,000.00
Failure to stockpile topsoil correctly.	R500.00
Failure to stockpile materials in designated areas.	R500.00
Pollution of water bodies – including increased suspended solid loads.	R500.00
Discharging effluent and/or stormwater onto the ground or into surface water and wetlands	R 500.00
Failure to provide adequate sanitation, waste disposal facilities or services.	R1,000.00
Failure to demarcate construction area boundaries before commencing construction clearance and other activities	R1,000.00
Insufficient education of employees regarding environmental matters and site housekeeping practices	R500.00
Use of soil in an unspecified manner	R500.00
Stockpile of soils and materials outside demarcated areas	R1,000.00
Inappropriate mixing of cement/concrete and poor management of concrete slurry	R1,000.00
Untidiness and litter at camp.	R200.00
Unauthorised removal of indigenous trees, medicinal or other plants.	R1,000.00
Damaging/killing or poaching animals/birds.	R 1,500.00
Failure to erect temporary fences as required.	R1,000.00
Failure to reinstate disturbed areas within the specified timeframe.	R1,000.00
Fire – costs of runaway fires will be borne by the Contractor, should he/she be proven responsible for such fires.	R5,000.00
Failure to provide equipment for emergency situations	R1,000.00
Defacing, painting or damaging natural or heritage features (where applicable)	R1,000.00
Damaging cultural, historical and/or archaeological sites of importance	R5,000.00
Failure to maintain basic safety measures on site.	R1,000.00
Failure to obey site protection measures specified by the Project Manager.	R1,000.00
Failure to carry out required community liaison, damage to property etc., without prior negotiation and/or compensation and other social infringements.	R500.00
Persistent and un-repaired oil leaks from machinery. The use of inappropriate methods of refuelling.	R500.00
Failure to provide drip trays and/or empty them frequently.	R500.00
Inappropriate use of bins and poor waste management on site.	R200.00

TYPICAL INCIDENTS INCURRING PENALTIES	VALUE
Inappropriate off-site disposal of waste from site.	R1,000.00
Deliberate lighting of illegal fires on site.	R500.00
The eating of meals on site outside the defined eating area. Individual not making use of the site ablution facilities.	R100.00
Dust or excess noise on or emanating from the site.	R200.00
Inappropriate use of watercourses and water bodies – such as for unapproved water abstraction, washing of vehicles, wastewater disposal and use by employees for washing.	R500.00
Any person, vehicle, item of plant/equipment/machine, or anything related to the Contractor's operations causing a public nuisance.	R500.00
Improper use of plant or equipment.	R500.00
Construction vehicles not adhering to speed limits	R250.00
Failure to maintain a register of incidents on site.	R1,000.00
Failure to remove all temporary features and leftovers from the construction site and works areas upon completion of the works.	R20,000.00
Any contravention with a Method Statement.	R5,000.00
Repeated contravention of the specifications or failure to comply with instructions	R5,000.00

Annexure D

List of Construction Activities that Required Method Statements

Construction Activities that will require Method Statements

ACTIVITY	SPECIFICS
Access Routes and Roads	• Upgrading and construction of access routes; • Rehabilitation of temporary access routes; and • Location of proposed access routes.
Blasting	Details of all methods and logistics associated with blasting **if required**
Excavation	Method for all excavations, including minimisation of environmental impact such as siltation and sedimentation of Rivers and wetlands
Borrow Pit	Establishment and use of any new borrow pit where applicable.
Bunding	Method for the bunding of static plant
Cement/Concrete Batching	Location, layout and preparation of cement/ concrete batching facilities including the methods employed for the mixing of concrete including the management of runoff water from such areas
Contaminated Water	Contaminated water management plan, including the containment of runoff and polluted water
Drilling and Jack Hammering	• Method of drill coring with water or coolant lubricants; and • Methods to prevent pollution during drilling operations.
Dust	• Dust control plan (methods).
Earthwork, Erosion Control and Stormwater management	• Method for the control of erosion during bulk earthworks operations; • Method of erosion control of spoil materials; • Method of undertaking earthworks, including hand excavation and spoil management; • Construction site drainage design and management; • Construction site stormwater management plan to be approved by the Municipality Water Services; and • Construction of earth and stormwater control berms or drainage ditches around campsite to contain dirty water.
Emergency	• Emergency response plan approved by the Emergency Services Department; and • Emergency procedures must include but not be limited to electrical hazards, fires, spills, and contamination of ground and surface water, accidents to employees and damage to services.
Environmental	Ensure that all site employees are aware of, and

ACTIVITY	SPECIFICS
induction training	understand the contents and conditions of the EMP, the key environmental issues and the consequences of non-compliance
Fire, Hazardous and Poisonous substances Management	• Handling and storage of hazardous waste in impermeable bunded areas with separate storage of incompatible substances; • Construction and location of concrete platform / bund wall to accommodate hazardous substances; • Emergency spillages procedures and compounds to be used; • Emergency procedures for fire; • Emergency remediation / clean-up procedures for spills or leaks of hazardous substances; • Location of hazardous substance storage areas (outside 1:100 floodline); • Methods of the disposal of hazardous building materials, including asbestos, fibre claddings, refrigerants and coolants; • Methods of refuelling vehicles; • Details of methods for fuel spills and clean-up operations; • Refuelling of construction vehicles in high flow areas; • Hazardous substance management during site remediation prior to commencement of remediation and construction; and • Site remediation as part of site preparation for construction, to the satisfaction of the ECO and/or the Municipality Environmental Department.
Health and safety	• Compile a Construction Health and Safety Plan; • Take all necessary precautions to effectively address any potential health and safety hazards; and • Display appropriate hazard warning signs conspicuously at all potential hazards that may affect public members.
Rehabilitation	• Rehabilitation of disturbed areas and re-vegetation after construction is complete; • Retaining walls and gabions; and • Method for construction and installation of retaining walls/gabion baskets.
Services Commissioning and Decommissioning	Method of commissioning the various service infrastructure to ensure minimisation of environmental health and safety risk
Site Camp	• Layout and preparation of the construction camp;

ACTIVITY	SPECIFICS
Establishment	• Location, layout, preparation and operation of all wash areas, including vehicle wash, workshop washing and paint washing and clearing; • Construction camps, equipment storage sites and ablution facilities serving the construction phase should be sited a reasonable distance away from the wetlands, outside of the 1:100 floodline; • Location of storage areas for materials, equipment, plant and vehicles; • Method of vegetation clearing; and • Installation of ablution facilities with chemical toilets prior to construction commencing (minimum of one toilet to 15 people).
Sources of materials	Details of materials imported to the site (where applicable)
Traffic	Any traffic diversions must be undertaken with approval of the Municipality Transport Authority and in accordance with relevant legislation.
Waste Control and Management	• Types of wastes generated; • Classification of waste; • Location of designated waste areas; • On-site disposal facilities; • Collection arrangements; • Disposal procedures; • Disposal site verification; • Record keeping of waste consignment notes; • Solid waste and sewerage collection and disposal procedures; • Methods for the disposal of vegetation cuttings, tree trunks and/or building materials; and • Waste management plan to prevent spread of refuse within and beyond the site.
Wastewater management	• Supply wastewater management system in compliance with legal requirements; and • Remove or divert sewerage and wastewater from camp-sites to approved treatment works.
Water abstraction	Water abstraction from water resources