



ENVIRONMENTAL MANAGEMENT PROGRAMME

THE PROPOSED WIDENING OF BRIDGE 649 AND A SECTION OF ROAD P249, GAUTENG

Prepared for Gautrans

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GLOSSARY OF TERMS

The definitions given below are for explanatory purposes only and are applicable to this Environmental Management Programme.

Alien vegetation:

Alien vegetation is defined as undesirable plant growth which will include, but not be limited to Category 1 plants (declared weeds), Category 2 plant invaders (commercial value) and Category 3 plant invaders (ornamental value) as set out in the Amended Regulations of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA). Other vegetation deemed to be alien invasive will be those plant species that show the potential to occupy in number, any area within the defined construction area as per National Environmental Management Biodiversity Act.

Construction Activity:

Construction Activity is any action taken by the applicant, their contractors, suppliers or personnel during the construction process

Construction Area: (compare with “site”)

The Construction Area is defined as all areas reasonably required by the applicant for the contractor to undertake all construction related activities.

Construction Camp: (also called site camp)

Construction Camps (site camps) refer to all storage and stockpile sites, site offices, staff accommodation, container sites, workshops and testing facilities, and other areas required to undertake construction related activities.

EIA Regulations:

The Environment Impact Assessment (EIA) regulations, 2010 were promulgated on 18 June 2010 in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

The Engineer:

The principle agent appointed by the applicant to design, implement and oversee the construction activities.

Environment:

The surroundings in which humans exist and which comprise:

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

Environmental Authorisation:

A written statement from the relevant competent environmental authority that records its approval/rejection of a listed activity. Approval is usually granted with conditions specifying the necessary measures required to prevent or reduce the effects of environmental impacts during the life of a contract.

Environmental Aspect:

Those components of a company's activities, products and services that are likely to interact with the environment.

Environmental Control Officer (ECO):

The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the EMPr.

Environmental Impact:

Any change to the environment resulting from an environmental aspect (an activity), whether desirable or undesirable. An impact may be the direct or indirect consequence of an activity.

Environmental Management Programme (EMPr):

A detailed plan of action prepared to ensure that recommendations for enhancing positive impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of a project.

Alien Vegetation Eradication Programme:

The organised clearing and rehabilitation of land infested by invasive alien plant species.

External Auditor:

A suitably qualified and experienced independent expert appointed by the applicant.

Interested and Affected Party (I&AP):

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

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

Mitigate:

The implementation of practical measures to reduce adverse impacts, or to enhance beneficial impacts, of an action.

Pollution:

Any change in the environment caused by (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future (after National Environmental Management Act, No. 107 of 1998).

Rehabilitation:

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

1. INTRODUCTION

It is the intention of the Gauteng Department of Roads and Transport to widen bridge 649 and a section of road P249 in Gauteng.

This EMPr addresses the design, construction and maintenance criteria for the proposed widen bridge 649 and a section of road P249 in Gauteng.

Please see sensitivity map at appropriate scale of the proposed project in Appendix 2.

1.1 Preparation of this EMPr

This EMPr was prepared by Dr Jenine Bothma of Chameleon Environmental Consultants.

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(i) Expertise of the EAP

a. The qualifications of the EAP

Dr Bothma has a PhD in Environmental Management. Please find proof of qualification of EAP in Appendix 1.

b. Summary of the EAP's past experience

The EAP that prepared this report is Dr J Bothma from Chameleon Environmental. The Environmental Assessment Practitioner (EAP) has the appropriate skills and experience to undertake the required studies for the proposed project. Dr Bothma has:

- Experience in undertaking environmental studies for linear development projects. The EAP has specific experience in EIAs for National Roads for the South African National Roads Agency Soc Limited and other clients.
- Experience in environmental studies for borrow pits and quarries.
- The EAP is registered as an Environmental Assessment Practitioner with EAPSA with registration number 0082/06.
- Proven ability to timeously produce thorough, readable and informative documents.
- Adequate recording and reporting systems to ensure the preservation of all data gathered.
- A good working knowledge of all relevant and applicable policies, legislation, guidelines, norms and standards.
- The EAP does not have any links to engineering firms, construction companies, or financial institutions, and would be able sign the required

declarations of independence to be submitted to the relevant environmental authorities.

Dr Bothma has a PhD in Environmental Management with extensive experience in the environmental field. She was previously the Environmental Manager for the South African National Roads Agency Soc Limited where she was responsible for the management of the environmental section at the Agency and consequently has gained extensive experience in project management and EIAs for major national road projects. Dr Bothma is a founder member of Chameleon Environmental since August 2006, a specialist environmental consulting company based in Pretoria, South Africa but operates nationwide. The company provides a broad range of environmental consulting services to the public and private sectors.

She has:

- » Twenty-seven (27) years' experience in the environmental field
- » Sixteen (16) years' experience in Project Management
- » Project management of large environmental assessment and environmental management projects.

Please see CV attached in Appendix 1.

Dr Bothma is registered with the Interim Certification Board for Environmental Assessment Practitioners of South Africa and is a member of IAIA SA. She has a PhD Environmental Management and has 25 years of experience in the environmental field. Dr Bothma has extensive experience with conducting Basic Assessments and compiling Basic Assessment reports and Environmental Management Programme Reports.

2. OBJECTIVES OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

The objectives of this Environmental Management Programme are to address environmental issues on site during the design, construction and maintenance of the project. The EMPr will therefore have as a main objective the reduction or mitigation of environmental consequences resulting from the widening of the road and bridge on the particular site.

3. OVERVIEW OF THE PROPOSED ACTIVITY AND THE LOCAL CONTEXT

3.1 Description of Activity

a. The current envisaged scope of work will include the following:

- Widening of Bridge 649 and road P249 and 300m of road to accommodate wider traffic lanes and pedestrian sidewalks, 2 x 3.7m lane in each direction, 2.5m shoulders.
- Working on either sides of the active stream bed with associated removal of soil for the foundations of the bridge to be cast on bedrock.
- Install new F-shape barriers.
- Install back to back guardrails that are connected to end-blocks.
- Cut overgrown vegetation.
- Minor spalling and crack repairs to structure.

b. Borrow Pits and Quarries

There are no borrow pits or quarries associated with the project.

The coordinates for the proposed project are the following:

Alternative:	Latitude (S):	Longitude (E):
• Starting point of the activity	25°47'52.16"°	27°59'30.18"°
• Middle point of the activity	25°47'45.84"°	27°59'26.88"°
• End point of the activity	25°47'40.49"°	27°59'24.45"°

4. OVERVIEW OF THE POSSIBLE ASPECTS THAT COULD LEAD IMPACTS

Table 1 provides a summary of the possible aspects that could lead to impacts.

Table 1: List of Possible Aspects

ASPECTS
Design Phase
Poor planning leading to changes in riparian habitat
Inadequate design of infrastructure leading to changes in riparian habitat
Construction Phase
Cleaning and grubbing and bulldozing activities
Compaction of soil
Concrete work
Construction and use of temporary access roads
Construction employment (appoint labourers)
Spoil material generation
Domestic solid waste generation
Spoiling
Earthworks: Excavation
Generation of contaminated water
Handling, storage and disposal of hazardous material
Parking bay for trucks
Lighting activities
Topsoil stockpiles
Mixing of concrete
Overhead work and signalling
Painting
Provision and operation of water washing and toilet facilities
Refuelling of construction vehicles and machinery
Construction solid waste generation
Topsoil stripping
Transportation of hazardous substances
Transportation of spoil material
Use of electricity generators
Welding
Operational Phase
Biodiversity loss
Altered habitat conditions
Rehabilitation Phase

ASPECTS
Biodiversity loss
Compaction and loss of wetland soils during rehabilitation
Alien invasion vegetation leading to altered habitat conditions
On-going erosion and sedimentation of riparian habitat

5. SUMMARY OF POTENTIAL POSITIVE AND NEGATIVE ENVIRONMENTAL IMPACTS

Table 2 provides a summary of the predicted environmental impacts.

Table 2: Potential environmental impacts

Potential impacts:	Significance rating of impacts(Low, Medium, Medium-High, High, Very High):	Significance rating of impacts after mitigation(Low, Medium, Medium-High, High, Very High):
Pre-Construction Phase		
Placement and access of construction camp impact on terrestrial ecology and water	Medium	Low
Design of bridges and culverts not adequate for water crossing	Medium	Low
Construction and Operational phase		
Aquatic		
Loss of riparian habitat and ecological structure;	Medium	Low
Changes to riparian ecological and sociocultural service provision ((Inability to support biodiversity);	Medium	Low
Changes to riparian hydrological function and sediment balance;	Medium	Low
Changes to instream habitat;	Medium	Low
Impacts on instream biota.	Medium	Low
Noise Pollution	Medium	Medium
Air Quality	Medium	Low
Infrastructure and Services (dust generated during earthworks)	Medium	Low
Social Impacts		
Employment Opportunities	High (positive)	High (positive)
Traffic	Medium	Medium
Heritage Impacts	High	Medium
Waste management	Low	Low
Storage of Hazardous Substances	High	Low
Visual Impacts	Medium	Low
Decommissioning and		

Closure phase (refers only to the decommissioning of the construction phase)		
Activity footprint limited	Medium	Low
All disturbed areas rehabilitated	Medium	Low

6. ROLES AND RESPONSIBILITIES

The appointed site manager shall monitor the implementation of this EMPr. The effectiveness of all environmental management measures shall be monitored and audited on a monthly basis and reported at the monthly site meeting between the Contractor, Applicant and the Engineer.

6.1 The Gauteng Department of Roads and Transport

The Gauteng Department of Roads and Transport is the applicant for the approval of the Basic Assessment Report. The Contractor who is awarded the tender for the construction of the project, will, in terms of the tender documentation, be responsible to implement the proposed mitigation measures in this EMPr on the applicant's behalf.

6.2 The Engineer

The Engineer will be responsible for overseeing the overall implementation of the EMPr in accordance with the requirements of the Contracts and the environmental authorisation, on the applicant's behalf. The Resident Engineer will be on site as representative of the Engineer.

6.3 The Contractor

The entity that signs a contract with the applicant that would be responsible to implement the EMPr. The conditions of the EMPr are binding on the Contractor during the life of the contract. The Contractor, in association with the Community Liaison Officer, will source local residents, where possible, for employment on the project.

6.4 Environmental Control Officer (ECO)

The Environmental Control Officer will be appointed by the contractor to ensure that all environmental specifications and EMPr requirements are met at all times. The ECO will report to the Resident Engineer and the contractor.

The ECO's duties in this regard will include, *inter alia*, the following:

- Ensuring that all the environmental authorisations and permits required in terms of the applicable legislation have been obtained prior to construction commencing;
- Monitoring and verifying that the EMPr and environmental authorisation are adhered to at all times and taking action if specifications are not followed.
- Monitoring and verifying that environmental impacts are kept to a minimum;
- Assisting the contractor in finding environmentally responsible solutions to problems;
- Keeping accurate and detailed records of all activities on site;
- Inspecting the site and surrounding areas on a regular basis with regard to compliance with the EMPr and the environmental authorisation;
- Monitoring the contractor's undertaking to provide environmental awareness training for all new personnel on site;
- Ensuring that activities on site comply with all relevant environmental legislation;
- Advising the contractor on any non-compliance with regard to EMPr.
- Undertaking a continual internal review of the EMPr and submitting any changes to the client for review and approval;
- Keeping a register of complaints on site and recording community comments and issues, and the actions taken in response to these complaints.

The ECO must have:

- A good working knowledge of all the relevant environmental policies, legislation, guidelines and standards;
- The ability to conduct inspections and to produce thorough, readable and informative reports;
- The ability to manage public communication and complaints,
- The ability to think holistically about the structure, functioning and performance of environmental systems;
- Proven competence in the application of the following integrated environmental management tools:
 - EIA/BA;
 - EMPr;
 - Environmental auditing;
 - Mitigation and optimisation of impacts;
 - Monitoring and evaluation of impacts;

The ECO must be fully conversant with the BAR and EMPr for the proposed project and all relevant environmental legislation.

6.5 Environmental Auditor

The environmental audit programme should at least include the following:

- Comprehensive environmental audits to be undertaken monthly during the construction phase, to verify compliance with the EMPr, environmental authorisation and construction contracts, and all applicable environmental

legislation. An audit report should contain recommendations on environmental management activities which need to be implemented.

- A comprehensive environmental audit to be undertaken at the completion of the construction phase, to verify compliance with the EMP and all applicable environmental legislation. An audit report should contain recommendations on environmental management activities which need to be implemented within the maintenance phase.

7. MONITORING

Proper monitoring ensures the correct and successful implementation of environmental management measures, to reduce negative impact on environmental conditions.

Monitoring on site should be on a regular basis and be included as a responsibility of the Site Manager.

Monitoring should be focused on on-site conditions during the day-to-day activities and specifically when sub-contractors enter an area for scheduled work or emergency repairs as per the monitoring schedule in Table 3.

The following Environmental Monitoring Programme shall be implemented:

Table 3: Monitoring programme

ISSUE	FREQUENCIES OF MONITORING	RESPONSIBLE BODY/PERSON
AQUATIC		
Protection of riparian vegetation	Daily	Contractor and ECO
Contamination with oils	Daily	Contractor and ECO
Storm water Management.	Weekly in rainy season	Contractor and ECO
Proper functioning of sanitation systems.	Weekly	Contractor and ECO
SOIL		
Surface or gully erosion on site.	Weekly in rainy season	Contractor and ECO
Soil contamination with oils, petrol, paraffin and diesel.	Daily	Contractor and ECO
Monitoring of topsoil to ensure it does not get contaminated with imported materials or subsoil	Monthly	Contractor and ECO
AIR		
Emissions Control	Daily inspection	Contractor and ECO
Control of domestic fires.	Daily inspection	Contractor and ECO

ISSUE	FREQUENCIES OF MONITORING	RESPONSIBLE. BODY/PERSON
Heavy vehicle emission control.	Monthly	Contractor and ECO
Dust control– wetting when required.	Daily inspection	Contractor and ECO
NOISE		
Noise and vibration control	Daily inspection	Contractor and ECO
VISUAL		
Visual impacts	Monthly	Contractor and ECO
WASTE		
Efficiency of domestic waste collection i.e. number of collection bins and placement and removal by the municipality or contractor.	Daily	Contractor and ECO
Prevention of burning of solid/liquid wastes on site.	Daily	Contractor and ECO
Proper collection, containment and removal of liquid wastes (petroleum, oils & cooking oils)	Daily	Contractor and ECO
The recycling and/or disposal thereof.	Two weekly	Contractor and ECO
The collection and disposal of construction waste (concrete, steel, industrial waste).	Monthly	Contractor and ECO
WEED AND ALIEN VEGETATION CONTROL	Monthly	Contractor and ECO
Monitoring of vegetation establishment.	Monthly	Contractor and ECO
SOCIAL		Contractor and ECO
Inspect overall appearances of site. (cleanliness & housekeeping)	Weekly	Contractor and ECO
Traffic	Daily	Contractor and ECO
Employment	Monthly	Contractor and ECO
Disruption of services	Daily	Contractor and ECO

A series of environmental variables that are to be monitored during the construction phase of the project are the following:

- Water monitoring;
- Noise monitoring;
- Dust monitoring

Water sampling monitoring points will be established at the outset as agreed to by the ECO and Resident Engineer and/or per the Department of Water and Sanitation requirements. The monitoring will be conducted on a weekly basis and the water samples taken to an accredited SANS 17025 certified laboratory for analysis. The

analysis of the samples will be forwarded to the ECO and Engineer who will verify the results.

Noise monitoring will be conducted twice weekly at various points to be agreed by the ECO and Resident Engineer on site.

Dust monitoring will be done visually on a daily basis by the ECO and appropriate actions taken as agreed by the Resident Engineer.

8. LEGAL REQUIREMENTS

The Contractor shall comply with the EMPr, and ensure compliance with the EMPr by any third party appointed by the Contractor to fulfil its obligations within the terms and conditions set out in the Contract.

The implementation of the EMPr is subject to the conditions of the environmental authorisation issued in terms of the EIA Regulations, 2014 by the Gauteng Department of Agriculture and Rural Development.

The list of applicable legislation below is intended to serve as a guideline only and is not exhaustive:

- Conservation of Agricultural Resources Act, 1989 (Act No. 43 of 1989);
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- National Water Act, 1998 (Act No. 36 of 1998);
- National Veld and Forest Fire Act (No. 101 of 1998);
- Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965);
- National Environmental Management Act, 1998 (Act No. 107 of 1998);
- National Environmental Management Biodiversity Act, 1998
- Occupational Health & Safety Act, 1993 (Act No. 85 of 1993);
- Health Act, 1977 (Act No. 63 of 1977);
- Hazardous Substances Act, 1973 (Act No. 15 of 1973)
- National Road Traffic Act, 1996 (Act No. 93 of 1996).

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

9. IMPACT MANAGEMENT OBJECTIVES AND ACTIONS

NAME OF ACTIVITY/ASPECT CAUSING IMPACT	POTENTIAL IMPACT	PHASE In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)	SIGNIFICANCE if not mitigated	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc. E.g. Modify through alternative method. Control through noise control through management and monitoring through rehabilitation.	SIGNIFICANCE if mitigated
Placement and access of construction camp site	Change of land use Landowners, Workers Terrestrial ecology and water	Pre-Construction phase	Medium	Control through: - Land acquisition from landowner; - Appropriate housing for workers; - Placing campsite in	Low

				previously disturbed areas away from watercourses.	
Design of bridges and culverts	Design not adequate for water crossing	Pre-Construction phase	Medium	Modify through proper engineering design for watercourse crossing	Low
River bridges, installing or widening of culverts	<ul style="list-style-type: none"> - Loss of riparian habitat and ecological structure; - Changes to riparian ecological and sociocultural service provision ((Inability to support biodiversity); - Changes to riparian hydrological function and sediment balance; - Changes to instream habitat; - Impacts on instream biota. - Water pollution - Impact on river flows; 	Construction phase Operational Phase	Medium	- Control measures recommended by Specialist to be implemented	Low
Construction activities	Noise Pollution	Construction phase	Medium	Control through noise control measures	Medium
Construction activities	Visual Impact	Construction phase	Medium	Control through visual control measures	Low

Waste Generation	<ul style="list-style-type: none"> - Water Pollution - Nuisance - Visual impact 	Construction phase, Decommissioning, Closure phase	Medium	<ul style="list-style-type: none"> - Control measures to prevent water pollution - Control measures to prevent any nuisance - Control measures to lower visual intrusion 	Low
Vehicle use and maintenance	<ul style="list-style-type: none"> - Hydrocarbon spillage - Air pollution (Emission from heavy vehicles) - Noise 	Construction phase Operational Phase Decommissioning Closure	Medium	<ul style="list-style-type: none"> - Control through noise control measures - Control measures for hydrocarbon spillage - Control measures to lower emissions from heavy vehicles 	Low
Chemical/fuel storage	<ul style="list-style-type: none"> - Water/air/soil pollution - health impacts - accidents e.g. slips, fire, - Contamination of site due to hydrocarbon spillage 	Construction phase Operational Phase Decommissioning Closure	High	<ul style="list-style-type: none"> - Control measures for hydrocarbon spillage - Control measures for water, air, soil pollution - Control measures for emergency preparedness and response 	Low
Construction Activities	Impact on heritage resources	Construction phase	High	Control through permitting from SAHRA	Medium
Inadequate maintenance of road reserve	<ul style="list-style-type: none"> - Possible increase in alien vegetation - Possible erosion of slopes - Culverts not 	Maintenance phase	Medium	<ul style="list-style-type: none"> - Monitoring through removal of alien vegetation - Monitoring measures to prevent soil erosion 	Low

	maintained			- Monitoring measures to prevent culverts from blocking	
Inadequate rehabilitation	<ul style="list-style-type: none">- Compaction of soil- Erosion of Slopes- Increase in alien vegetation- Natural vegetation not established	Decommissioning and closure phase	Medium	Monitoring measures for proper rehabilitation of area following construction	Low

10. IMPACT MANAGEMENT OUTCOMES

The following actions need to be implemented in order to reduce or mitigate the anticipated impact on environmental conditions resulting from activities undertaken.

10.1 Design Phase

The key objectives are to guide the design of the project to minimise the impact on the Hennops river. The table below presents the objectives along with the design criteria to meet these objectives.

Table 4: Key objectives and design criteria for the Hennops river

OBJECTIVE	DESIGN CRITERIA
Ensure on-going functioning of the stream	<ul style="list-style-type: none"> • As far as possible, it should be planned that construction activities should occur in the low flow season. • The footprint areas of the construction activities must be kept to a minimum. It should be designed that all vehicles must use one single designated track and turn-around areas should be located outside of the stream boundary.

10.2 Construction Phase

The following should be implemented during the construction phase:

10.2.1 Aquatic Management

Objective

To prevent any water pollution and ensure conservation of water.

Target

Ensure the proper management of surface and ground water.

Management Actions

a. Surface Water

Mitigation measures as proposed by Flori, 2016:

Construction & Operation Phase

- No temporary accommodation or temporary storage facilities may be setup within 50m of the any river, stream, drainage line or farm dam.
- No temporary facilities (including portable toilets) to be positioned within 50m of the edge of the Hennops River.
- Only existing roads to be used by vehicles during construction as far as possible. Especially in terms of crossing over the river.
- Project activities close to watercourses to be carefully monitored in terms of erosion and possible resulting siltation of watercourses. Weekly inspection of work areas around watercourses to be conducted. Any signs of new erosion and siltation to be rectified immediately. Special attention must be given to the areas around the bridge pillars and the sloped riverbanks.
- Disturbed surface areas to be rehabilitated as part of the construction phase.
- All construction material, equipment and any foreign objects brought into the area by contractors to be removed immediately after completion of the construction phase.
- Proper rubbish/waste bins to be provided. These to be emptied weekly and the waste to be removed to an official waste disposal site. Efforts need to be made to ensure that no debris and litter from contractors gets into the river system. This includes general litter such as plastic bottles and papers.

Maintenance phase (to be implemented in defect liability period for 1 year)

- Mechanical control of alien plants around disturbed areas caused by construction need to be implemented within three months of completion of construction. Thereafter every six months. Mechanical control to be of such a nature as to allow local, indigenous grasses and other pioneers to colonise the previously disturbed areas, thereby assisting in keeping out invasive weed species.
- No chemical control (herbicides) of alien plants to be used within 100m of any watercourses.
- Areas around foundations, culverts, gabions, etc. need to be check before and after the summer rainy season for signs of soil erosion due to stormwater run-off. Such sites need to be modified and rehabilitated to prevent ongoing erosion. These sites need to be monitored more closely than other sites which show no or minimal signs of erosion.
- Inspection of road shoulders in areas of steep topography to be inspected after the summer rainy season for signs of erosion and rehabilitated and rectified as required.

b. Ground Water

Chemical toilets are a cost effective way to provide sanitation facilities at the site, especially if water pollution is possible. Chemical toilets must be maintained weekly and a service contract must be signed with an approved service agent. The chemical toilets shall be weekly cleaned by an appointed contractor.

Responsibility

See under 4.

Monitoring

See monitoring schedule under 5.

Implementation

During the widening of the road and bridge as defined in project description.

10.2.2 Removal of Alien Vegetation

Objective

To ensure removal of alien vegetation on the site.

Target

Removal of all alien vegetation.

Management Actions

- Alien vegetation which becomes established within the site due to construction activities, should be removed before seeding. This will include, for example, service roads, stockpile areas and anywhere where material generated for or from construction has been stored temporarily or otherwise within the site.
- Avoid translocation of topsoil stockpiles from one place to another or importing topsoil from other sources that may contain alien plant propagules.
- Removed vegetation will be disposed of at an approved waste disposal facility.
- Minimisation of the risk of alien invasion can be achieved by rehabilitating disturbed areas as soon as possible.
- A registered pest control operator registered for the industrial application of herbicides will apply herbicides, or will supervise the application of herbicides in compliance with the terms of the Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947).
- The site should be rehabilitated after project completion and rehabilitated with indigenous, endemic vegetation.

Responsibility

See under 4.

Monitoring

See monitoring schedule under 5.

Implementation

During the widening of the road and bridge as defined in project description.

10.2.3 Cultural Heritage and Archaeology

Objective

To identify the procedure when uncovering any archaeological remains or graves and limit visual scarring of the landscape.

Target

To ensure that any artefact or grave that is uncovered is properly managed and to limit visual scarring of the landscape.

Management Action

- Archaeological material, by its very nature, occurs below ground. The contractor should therefore keep in mind that archaeological sites might be exposed during the construction work. If archaeological material is found, the ECO will be contacted immediately and the occurrence should immediately be reported to a museum, preferably one at which an archaeologist is available. The archaeologist should then be appointed by the contractor and investigate and evaluate the find.
- Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain or as stipulated by the SAHRA.
- The South African Police Services will be informed immediately by the ECO of any grave or human remains discovery.

Responsibility

See under 4.

Monitoring

See monitoring schedule under 5.

Implementation

During the widening of the road and bridge as defined in project description.

10.2.4 Soil Management

Objective

To ensure management of topsoil, that no soil pollution or erosion takes place at the site and sufficient topsoil remains for rehabilitation purposes.

Target

Appropriate mitigation measures must be implemented to ensure management of topsoil, that no soil pollution or erosion takes place.

Management Actions

- Identified areas where erosion could occur must be appropriately protected by installing the necessary temporary and/or permanent drainage works as soon as possible and by taking other appropriate measures to prevent water from being concentrated in rivers/streams and from scouring slopes, banks or other areas.
- Ensure that no erosion or sedimentation occurs. Any areas of disturbed soils where vegetation removal has occurred need to be re-vegetated to prevent erosion and sedimentation.
- Any erosion channels which develop during the construction period must be suitably backfilled, compacted and restored to a proper condition (i.e. vegetated etc.).
- Where excavation takes place, the affected area should be properly stabilised and re-vegetated to minimise erosion risk.
- Stabilisation of cleared areas will be actively managed to prevent and control erosion. The following methods of erosion control could be considered:
 - Use of groundcover or indigenous grass.
 - Construction of cut off berms (earth or rock).
 - Placing of brushwood on bare surface.
 - Hard landscaping e.g. gabions, only under the instruction of the Engineer.
- Monitoring for signs of erosion across the sites shall be undertaken on a regular basis by the ECO, (weekly) and remedial action taken by the contractor, if required, such as rock in fill or the construction of storm water diversion channels.
- Any diesel spillages should be cleaned as soon as possible, should they occur. The responsibility for any spillage treatment will lie with the Contractor who will be liable to arrange for competent assistance to clear the affected area.

Responsibility

See under 4.

Monitoring

See monitoring schedule under 5.

Implementation

During the widening of the road and bridge as defined in project description.

10.2.5 Waste Management

Objective

To properly manage domestic, hazardous and construction waste material on site.

Target

To initiate processes to minimise and prevent environmental impacts due to solid and liquid waste pollution, initiating processes to maximise recycling and complying with the relevant waste legislation.

Management Actions

The management and proper handling of solid and liquid waste is essential. This aspect needs proper control and monitoring during the widening of the road and bridge. Waste is not allowed to be burned on site.

The following steps should be implemented:

Solid Waste

- Wherever possible, materials used or generated by construction will be recycled. Containers for glass, paper, metals and plastics will be provided. Office and camp areas are particularly suited for this purpose. These materials could be sold to appropriate recycling merchants or taken to an appropriate recycling plant.
- The recycling containers will be suitably marked by the contractor.
- All waste bins will have lids and be suitably wind-proof, and be made of a durable, appropriate material.
- A skip or similar should be placed centrally at the construction site. All waste disposal bins should be emptied in this skip and the skip should be emptied on a weekly basis.

- A maintenance contract must be signed with an approved contractor to remove the waste from the site and dispose of at an approved waste disposal site.
- General hygiene conditions should be kept at the waste bins and skips throughout the period of occupation. It is recommended that the areas be disinfected on a regular basis by using a liquid or granular chlorine.
- All used filter materials will be stored in a secure bin for disposal off site. Hazardous waste will not be stored or stockpiled in any area other than that designated on the construction site layout.
- Any contaminated soil should be removed and replaced. Soils contaminated by oils and lubricants will be collected and disposed of at a facility designated by the local authority to accept such contaminated materials.

Liquid Waste

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

Construction waste

Construction steel waste should be collected for recycling purposes. Concrete waste should be collected and placed in specially designated areas on the site for removal by the contractor to the disposal site.

Responsibility

See under 4.

Monitoring

See monitoring schedule under 5.

Implementation

During the widening of the road and bridge as defined in project description.

10.2.6 Noise Management

Objective

To minimise noise impact from construction activities.

Targets

To comply with appropriate SANS noise control legislation.

Management Actions

- The contractor shall ensure compliance with applicable SANS noise standards during the construction phase.
- Construction activities may only take place between the hours of 07H00 and 17H00 weekdays and Saturdays from 07H00 to 13H00 or as per contract documentation. Operation is prohibited on Sundays and public holidays.
- Some of the activities that could constitute a noise nuisance include power tools, reverse safety signals from back actors, loading and shouting by the workers. The contractor shall, therefore, limit this noise as it could be a major disturbance / nuisance to residents.

Responsibility

See under 4.

Monitoring

See monitoring schedule under 5.

Implementation

During the widening of the road and bridge as defined in project description.

10.2.7 Air Quality Management

Objective

To ensure that dust generation is kept to a minimum and does not cause a nuisance to residents and employees.

Target

That no dust nuisance complaints are received from the public.

Management Actions

Air pollution should be managed the following way:

- Dust suppressant techniques for instance water trucks on gravel/dirt access roads, exposed areas, stockpiles etc. where dust is generated.
- Ensuring that the bulldozers and other construction vehicles on site are in an optimal working condition to limit emissions.
- No cooking fires are permitted.
- Burning of refuse, cement bags, etc. is prohibited.
- Facemasks should be provided regularly during periods of high wind generation or when offloading sand for all the employees.

A suitable watering management programme (using water tankers or irrigation equipment and sprayers) to suppress fugitive dust emissions should be devised by the contractor. Dust is mainly generated from material stockpiles, unpaved access roads and loading operations. This may need to be increased on windy days.

Responsibility

See under 4.

Monitoring

See monitoring schedule under 5.

Implementation

During the widening of the road and bridge as defined in project description.

10.2.8 Stockpiles

Objective

To ensure that stockpiles are appropriately managed.

Target

To prevent erosion, sedimentation and unsafe slopes of any stockpiles.

Management Actions

- Stockpiling of topsoil for rehabilitation should occur. The Contractor shall remove all topsoil from the designated sites, and stockpile it in berms

(piles) no greater than 1.5 m in height. The topsoil should be kept separate from subsoil and imported materials.

- The stockpiles shall be vegetated with an indigenous and endemic grass seed to maintain fertility.
- The stockpiles shall not be compacted in any way. The stockpiles are to be maintained in a weed free condition. These stockpiles shall then be used in the rehabilitation phase.

During the life of these temporary stockpiles, the contractor will ensure that they are:

- Constructed and maintained so as to avoid erosion of the material and contamination of the surrounding environment.
- Ensure that no excessive dust is generated from these stockpiles.
- Topsoil stockpiles shall not have slopes steeper than 1 vertical : 2 horizontal.

After the stockpiled material has been removed, the site shall be re-instated to its original condition. No foreign material generated/deposited during construction shall remain on-site. Areas affected by stockpiling shall be landscaped, top soiled, grassed and maintained.

Responsibility

See under 4.

Monitoring

See monitoring schedule under 5.

Implementation

During the widening of the road and bridge as defined in project description.

10.2.9 Storage of Hazardous Materials

Objective

To ensure proper storage of hazardous materials like gas, fuel and oils in order to prevent environmental pollution and degradation and human exposure to danger.

Targets

To initiate processes to minimise and prevent environmental impacts and human exposure due to hazardous material pollution.

Management Actions

- Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials (i.e. diesel) will be stored in a secured, well ventilated appointed area that is fenced and has restricted entry.
- Refuelling of vehicles, plant and equipment shall be done at a designated area according to prescribed standards at all times. Steel drip trays shall be used to prevent spillages.
- Servicing of equipment will only take place in these areas and no spillages will be permitted on site.
- The Contractor will comply with all relevant legislation with regard to the transport and storage of such substances. The Contractor will provide proof that relevant authorisation to store such substances has been obtained from the relevant authority.
- The Contractor will comply with all applicable by-laws with regard to safety and the transport of hazardous materials.
- The storage of hazardous substances in excess of 200 litre generally requires municipal Fire Chief approval. The contractor is required to obtain this approval.
- Hazard signs indicating the nature of the stored materials shall be clearly displayed on the storage facility or containment structure. Before containment or storage facilities can be erected, the Contractor shall furnish the Resident Engineer with details of the preventative measures that are proposed to be installed in order to mitigate against pollution of the surrounding environment from leaks or spillages.
- Fire-fighting and spill kits should be available on site at all times.
- The preferred method for hazardous material storage shall be an impervious concrete floor that is bunded. The method statement shall also indicate the emergency procedures to be implemented in the event of misuse or spillage of substances that will negatively impact on an individual or the environment.

The following shall be adhered to:

a. General

A bund provides containment for any loss of chemical / oil from the storage tank and associated pipe work. It should consist of a base and surrounding walls, which must be constructed of, or lined with, a material impermeable to the substance stored. Ideally, pipe work should not pass through the bund wall. However, if this is unavoidable, the material used for sealing around the pipe must be resistant to attack by the substance stored and the overall integrity of the bund should not be compromised.

b. Rainwater

Although in some areas rainwater will often evaporate from within the bund, a collection sump should be included in the base. If there is a need to remove accumulated rainwater, this should be done with a manually operated pump or by bailing from the sump. This water may be contaminated and should be disposed of with care to ensure no pollution occurs. There must be no outlet directly connecting the bund to any drain, sewer or watercourse or discharging onto a yard or unmade ground.

c. Capacity

There are two acceptable methods for calculating bund capacity. Normally, the capacity of the bund has been calculated to give containment for 110% of the total volume for single tanks and hydraulically linked tanks. Where two or more tanks are installed within the same bund, 110% of the largest tank or 25% of the total capacity of all tanks, whichever is the greater, is used.

d. Maintenance of storage tanks

Bunds, tanks and pipe work should be inspected regularly by the ECO and ECO for signs of damage and should be checked at least weekly. Any accumulated rainwater, oil or debris should be removed and any defects to the bund wall or lining should be repaired promptly using the appropriate technique to ensure the bund retains its integrity. Damage to the tank or pipe work should be dealt with immediately.

Responsibility

See under 4.

Monitoring

See monitoring schedule under 5.

Implementation

During the widening of the road and bridge as defined by project description.

10.2.10 Disruption of Services**Objective**

To limit disruption of essential services.

Targets

Adequate stakeholder consultation to limit disruption of essential services.

Management Actions

- Resident should be informed in advance of possible disruption in the disruption of any services.

Responsibility

See under 4.

Monitoring

See monitoring schedule under 5.

Implementation

During the widening of the road and bridge as defined by project description.

10.2.11 Disruption of Traffic

Objective

To limit disruption of traffic.

Targets

Adequate public consultation to limit disruption of traffic and compliance with the National Road Traffic Act, 1996 (Act No. 93 of 1996).

Management Actions

- Proactive planning with reference to the undertaking of the construction activities outside peak hours will mitigate against the potential traffic congestion that could result.

Responsibility

See under 4.

Monitoring

See monitoring schedule under 5.

Implementation

During the widening of the road and bridge as defined in project description.

10.2.12 Employment Opportunities

Objective

To provide employment opportunities to the local residents.

Targets

Adequate public consultation to provide employment opportunities.

Management Actions

- The contractor, in association with the Community Liaison Officer, will source local residents, where possible, for the project.

Responsibility

See under 4.

Monitoring

See monitoring schedule under 5.

Implementation

During the widening of the road and bridge as defined in project description.

10.2.13 Visual Impacts

Objective

To limit visual impacts as a result of the project.

Targets

The reduction of visual impacts as a result of the construction activities and the camp site.

Management Actions

- Existing vegetation that act as screening material should, where possible, not be unnecessarily removed.
- Where areas are going to be disturbed through the destruction of vegetation, i.e. the contractor must be contractually obliged to replace any indigenous trees that are destroyed;

- The indigenous trees should be identified by the ECO and demarcated before construction commences.
- Rehabilitate disturbed areas as soon as practically possible after construction. This should be done to restrict extended periods of exposed soil;
- If practically possible, locate construction camps in areas that are already disturbed or where it isn't necessary to remove established vegetation;
- Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitive visual receptors;
- Keep the construction sites and camps neat, clean and organised (i.e. no littering) in order to portray a tidy appearance;
- Screen the construction camp and lay-down yards by enclosing the entire area with suitable material of no less than 2 m height;
- The success of hydro-seeding and grass planting must be monitored over a period of 1 year and be repeated in areas of low success.

Responsibility

See under 4.

Monitoring

See monitoring schedule under 5.

Implementation

During the widening of the road and bridge as defined by project description.

11. REHABILITATION

After the completion of the construction work, all site facilities that were utilised during construction need to be removed and the site needs to be rehabilitated.

11.1 General Rehabilitation Measures

OBJECTIVE	ACTION	ACTIVITIES
To ensure that the activity footprint is limited and that no unnecessary disturbance of natural areas takes place	Limit activity footprint	<ul style="list-style-type: none"> • Minimise the duration of disturbance: prompt, progressive and ongoing revegetation of indigenous, endemic vegetation and/or stabilisation of all disturbed areas as soon as final grades are achieved help to minimise the length of time that disturbed areas are exposed to the erosive forces of wind; • Minimize forward clearing to retain as much of the existing vegetation as possible.
To ensure that disturbed areas are rehabilitated after construction has been completed.	Re-vegetate all disturbed areas after final earthworks have been completed.	<ul style="list-style-type: none"> • Re-vegetate all disturbed areas with indigenous, endemic seed mixtures; • Re-vegetation must be conducted by utilising hydro-seeding methods; • The hydro-seeding must be conducted by a suitably qualified specialist/contractor; • The hydro-seeding mixture must be certified weed free.
To ensure that only indigenous species are utilised for re-vegetation	Implement an indigenous seed mixture during hydro-seeding	<ul style="list-style-type: none"> • Utilise a certified indigenous grass mixture for rehabilitation purposes as identified by the ECO;
To ensure that the stream area is functional and to limit siltation	Erosion control and rehabilitation	<ul style="list-style-type: none"> • Areas which are at risk of erosion and areas which have already been eroded/ incised along the river are priority areas. • Reprofiling and stabilisation needs to take place after construction has been completed. • Obtain relevant legislative approval for any activities

OBJECTIVE	ACTION	ACTIVITIES
		<p>to be undertaken within the riparian zone to rectify excessive erosion.</p> <ul style="list-style-type: none"> • Reprofiling of the banks of disturbed drainage areas to a maximum gradient of 1:3 to ensure bank stability • Reseed any areas where earthworks have taken place with indigenous grass seed mixtures to prevent further erosion.
To prevent siltation and preserve and improve ecological integrity of the stream	Implement adequate stormwater management	<ul style="list-style-type: none"> • Adequate stormwater management must be during construction in order to prevent erosion and the associated sedimentation of the riparian and instream areas, as these systems have aquatic communities which rely on stream substrates clear of sediment and on clear, fast flowing water. • Sheet runoff from cleared areas, paved surfaces and construction roads needs to be curtailed. • Runoff from these surfaces should be slowed down by the strategic placement of berms.
To ensure that rehabilitation has been effectively conducted	a monitoring plan which must be measured	Refer to monitoring plan in table 3.

11.2 Acceptable Cover and Trees

The following are indicated for establishing of an acceptable cover:

Where indigenous seed, harvested from the site or commercial seed were used, acceptable cover will mean that:

- Not less than 80% of the area seeded will be covered with acceptable plants;
- There will be no bare patches greater than 1m² in dimension throughout the area.

- In the case of grass or sedge sodding, acceptable cover will mean that the full area will be covered with live grass at the end of any period not less than three months after sodding.
- Where this cover is not achieved, the Contractor will, at his own expense, plant additional grass and tend it in a similar manner to the original planting until the acceptable cover is achieved.
- In order to assist the proposed project in having a positive effect on the environment and mitigate negative impacts on local aesthetic appeal and habitat, the following recommendations are made:
 - Every alien tree species to be removed, is to be replaced elsewhere in the open space area by one indigenous tree species from minimum 50L (Approximately 2m tall) container size.
 - Every indigenous tree species to be removed, is to be replaced elsewhere in the open space area by two indigenous tree species from minimum 50L (Approximately 2m tall) container size.
 - Upon completion of rehabilitation and landscaping it must be ensured that the trees are monitored until such time as they are healthy and well established. Any trees which die should be replaced and any trees which are struggling should be assisted in becoming established.

12. REPORTING

12.1 Good Housekeeping

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

12.2 Record Keeping

The ECO shall ensure that a filing system identifying all documentation related to the EMP is established.

A list of reports likely to be generated during the project is set out below:

- Environmental Management Programme.
- All communications detailing changes of design/scope that may have environmental implications.
- Monthly site monitoring reports.
- Occupational Health and Safety reports.
- Complaints/communication register.

- Incident and accident reports.
- Emergency preparedness and response plans.
- Permits and legal documents,
- Monthly site meeting minutes during operation.
- Environmental authorisation by GDARD.

12.3 Environmental Document Control

The ECO shall be responsible for establishing a procedure for environmental document control.

The Contractor shall ensure that documents are periodically reviewed and revised, where necessary, and that current versions are available at all locations where operations essential to the functioning of the EMPr are performed.

12.4 Environment Awareness Plan

The Contractor shall ensure that its employees and any third party who carries out all or part of its obligations under the Contract are adequately trained with regard to the implementation of the EMPr, as well as regarding environmental legal requirements and obligations. All employees will have an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. The environmental training should, as a minimum, include the following:

- Understanding, and importance of, and the reasons why, the environment must be protected.
- Ways to minimise the environmental impacts.
- Requirements of the EMPr.
- Prevention and handling of fire.
- Emergency procedures.
- The significant environmental impacts, actual or potential, as a result of their work activities.
- The environmental benefits of improved personal performance.
- The importance of not littering.
- The need to use water sparingly.
- Details regarding archaeological and/or historical sites that may be unearthed during construction, and the procedures to be followed should these be encountered.
- The procedures which should be followed should a grave be encountered or unearthed during the construction phase.

All works which may pose a hazard to humans, animals and flora are to be adequately protected and appropriate warning signs erected.

The Contractor shall provide adequate and operational fire safety equipment at all times. Personnel on-site shall be trained how to operate fire extinguishers etc. As the construction related works are to occur within the natural environment – i.e. the veld, fire-fighting equipment appropriate to veld fires should be sourced.

The use of construction vehicles shall be restricted to authorised personnel, and the speed limits adhered to at all times. The construction vehicles shall also be restricted in terms of overloading (weigh-bridge to be supplied by the contractor).

12.5 Induction training

In the case of permanent staff the contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) induction training shall be conducted on a weekly basis by the ECO or as determined by the Engineer.

13. EMERGENCY MANAGEMENT

Accidents as a result of a chemical or hazardous substance spill, (typical incidents of 50 litres and higher), must be reported by the contractor to the local Environmental Authority within 24 hours after the incident.

In the case of a fuel/oil spillage, the following steps should be followed:

- The spill should immediately be contained by the contractor to prevent excessive spreading,
- The incident site should immediately be cordoned off to prevent access and possible spread of the spilled material,
- Any recoverable material should immediately be removed and placed in separate containers,
- The spilled material should be picked up and removed from the site to a registered waste disposal site,
- If required the rehabilitated area should be seeded with an appropriate indigenous seed mixture to facilitate the growth of vegetation cover in this area,

Any chemical or hazardous substance spill should be treated with the highest urgency and importance.

In all cases the following criteria should be followed:

- Containment of substance,
- Prevention of contamination by substance,
- Recovery of substance,
- Recycling of substance,
- Removal of substance,
- Rehabilitation of area.

14. INCIDENT REPORTING AND REMEDY

If a leakage or spillage of hazardous substances occurs on-site, the local emergency services must be immediately notified of the incident by the contractor. The following information must be provided:

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

Written records must be kept by the Contractor's ECO on the corrective and remedial measures decided upon and the progress achieved therewith over time. Such progress reporting is important for monitoring and auditing purposes by the ECO. The written reports may be used for training purposes in an effort to prevent similar future occurrences.

15. CHECKING AND CORRECTIVE ACTION

The ECO will audit the effective implementation of the EMPr monthly. Auditing will serve to assess the following:

- The implementation of the EMPr in full;
- The assessment of the effectiveness of mitigation measures;
- The implementation of recommended corrective actions;
- The effectiveness of communication and record keeping.

The records of audits must be kept for submission to and for review by management.

15.1 Non-Compliance and Remedial Action

The ECO will monitor the ongoing conformance or lack thereof by the Contractor and sub-contractors. In any non-conformance report ("NCR") the ECO must also stipulate the recommended corrective action that must be taken to remedy such non-conformance. The Contractor is deemed not to have complied with the EMPr if, *inter alia*:

- There is evidence of contravention of the EMPr specifications within the boundaries of the construction-site, site extensions and haul/access roads.
- There is contravention of the EMPr specifications that relate to activities outside the boundaries of the construction-site.
- Environmental damage ensues due to negligence.
- Construction activities take place outside the defined boundaries of the site without the approval of the Engineer.
- The Contractor fails to comply with corrective or other instructions issued by the Site Manager within a specific time period.
- Littering by the Contractor on-site.
- Lighting of illegal fires by the Contractor on-site.
- Persistent or un-repaired oil leaks from the Contractor's vehicles.
- Excess dust or excess noise emanating from site.
- Possession or use of intoxicating substances by the Contractor on-site.
- Any Contractor vehicles being driven in excess of designated speed limits.

- Removal and/or damage by the Contractor to cultural or heritage objects on-site.
- Urination and defecation by Contractor staff anywhere except in designated areas.

15.2 Remedial Action

Remedial action shall be managed by the Contractor in two categories:

a. Specified Corrective Action

This constitutes remedial or mitigatory measures specified by the ECO in any NCR, coupled with a specified time limit within which the specified corrective action must have been completed, at the expense of the party identified in the NCR as being responsible for carrying out the said work.

The ECO may on request and in his/her sole discretion, grant an extension of time for the implementation of such corrective action. If the said corrective action has not been carried out within the period stipulated by the NCR, the non-conformance in question shall be dealt with as per b. hereunder.

b. Formal Remedial Work

Where a non-conformance has resulted in environmental damage to the site which cannot be rectified as per the ECO's specified corrective action or where the Contractor has failed to carry out any of the specified corrective actions within the prescribed time limit (or permitted extension thereof), the Resident Engineer shall convene a meeting between representatives of the client and the Contractor, at which appropriate remedial work/mitigatory measures shall be discussed and agreed, and failing agreement within 10 days, such dispute shall be resolved in accordance with the dispute resolution provisions contained in the Contract.

APPENDIX 1: EAP EXPERTISE

APPENDIX 2: SENSITIVITY PLAN