Please note that Activities under Additional Financing for the two components will continue to be subject to environmental and social protocols developed and being implemented to date. No social impacts are anticipated concerning completion of the bridge and resealing of the road. In the latter case, activities will be confined strictly to the Right of Way.
ENVIRONMENTAL MANAGEMENT PLAN

The purpose of the EMP is to form a guideline for the management of activities which will be conducted during the construction phase. The management measures provided below, which incorporate mitigation measures provided in Section 6 above, will reduce the environmental impact to within nationally and internationally acceptable levels.

Note that the environmental management measures prescribed below are applicable to construction activities which would be conducted for each of the alternatives, had an alternative alignment been selected. The only major difference would be within the amount of compensation required and affected property owners.

7.1 Institutional Matters

7.1.1 Introduction

This document describes mitigation measures and is mostly prescriptive, identifying specific people to undertake specific tasks, in order to ensure that impacts on the environment are minimised during the construction of the bridges. The EMP is applicable to both the Senqu and Senquynane bridge sites to ensure similar environmental control on these sites. The responsibility for the implementation of this EMP on site rests with the appointed contractor.

7.1.2 Environmental Site agent

The environmental site agent (ESA) is the person responsible for the monitoring of the implementation of the environmental management plan. The ESA will also be responsible for liaison with and reporting to the environmental/social coordinators of MOPWT and NES.

This person may be someone involved with the project acting on behalf of the Developer, but must however be a person with adequate environmental knowledge to understand and implement this management plan. The ESA may not be someone appointed by the contractor and should ideally report to the Developer only.

The ESA has the authority to stop works if in his opinion there is a serious threat to or impact on the environment caused directly by the construction operations. This authority is to be limited to emergency situations (see definitions) where consultation with the RE or Developer is not immediately possible. In all such work stoppage situations the ESA is to inform the RE and Developer of the reasons for the stoppage as soon as possible.
Upon failure by the contractor or his employee to show adequate consideration to the environmental aspects of this contract, the ESA may recommend to the engineer to have the contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the contractor.

7.1.3 Environmental Awareness Training for Site Personnel

All contractor teams involved in construction work are to be briefed on their obligations towards environmental controls and methodologies in terms of this EMP, prior to commencing of the works. The briefing will usually take the form of an on site talk and demonstration by the ESA. The education / awareness programme should be aimed at all levels of management and staff within the contractor team. Refer to the “Do's & Don'ts” summary sheet, included as Appendix E.

7.1.4 Communication Procedures on Site

Each of the books described below must be available in duplicate, with copies for the RE and ESA or alternatively an agreement could be reached to use a single system. These books should be available to the authorities for inspection or on request. Contractors meeting minutes must reflect environmental queries, agreed actions and dates of eventual compliance. These minutes form part of the official environmental record.

7.1.4.1 Site Instruction Entries

The Site instruction book entries will be used for the recording of general site instructions as they relate to the works on site. It will also be used for the issuing of stop work orders for the purposes of immediately halting any particular activities of the contractor in lieu of the environmental risk that they may pose.

7.1.4.2 ESA Diary Entries

The purpose of these entries will be to record the comments of the ESA as they relate to activities on the site.

7.1.4.3 Method Statements

Method statements from the Contractor will be required for specific sensitive actions on request of the authorities or ESA. A method statement forms the base line information on which sensitive area work takes place and is a “live document” in that modifications are negotiated between the Contractor and ESA / RE, as circumstances unfold. All method statements will form part of the EMP documentation and are subject to all
terms and conditions contained within the EMP main document. Refer to the standard method statement sheet included as Appendix F.

A method statement describes the scope of the intended work in a step-by-step description in order for the ESA and RE to understand the Contractors intentions. This will enable them to assist in devising any mitigation measures, which would minimise environmental impact during these tasks. For each instance wherein it is requested that the Contractor submit a method statement to the satisfaction of the ESA, the format should clearly indicate the following:

- **What** - a brief description of the work to be undertaken;
- **How** - a detailed description of the process of work, methods and materials;
- **Where** - a description/sketch map of the locality of work (if applicable);
- **When** - the sequencing of actions with due commencement dates and completion date estimates.

The Contractor must submit the method statement before any particular construction activity is due to start. Work may not commence until the method statement has been approved by the ESA.

### 7.1.5 Record Keeping

All records related to the implementation of this management plan (e.g. site instruction book, ESA diary, method statements) must be kept together in an office where it is safe and can be retrieved easily. These records should be kept for a minimum of two years and should at any time be available for scrutiny by any relevant authorities.

It is recommended that photographs are taken of the site prior to, during and immediately after construction as a visual reference. These photographs should be stored with other records related to this EMP.

### 7.1.6 Environmental Completion Statement

An Environmental Completion Statement is a report by the ESA to the relevant authorities stating completion of the project and compliance with the EMP and conditions. This statement will be prepared after the final audit after the rehabilitation phase.
7.1.7 Institutional Arrangements

The ESA is responsible for day-to-day monitoring of implementation of the EMP on site. On relatively small projects with limited potential for significant environmental impacts, the RE could be tasked by the Developer to assume the responsibility of the ESA in terms of the EMP. The ESA will commission monthly or bi-monthly external audits for the duration of the construction period, followed by a final audit after rehabilitation. The external auditor will prepare an audit report for the client and for use on site after each audit.

7.2 Environmental Management

Mitigation of the significant construction and operational environmental impacts are provided below. Note that the measures prescribed below may have cost implications and should therefore be incorporated into the tender documentation.

7.2.1 Fencing

- Fencing of the campsite and construction area (if applicable) shall be suitably secured to prohibit access by live stock and local fauna.
- No unauthorised pedestrian or vehicular access shall be allowed into fenced off-limits areas.
- Fencing shall be kept neat at all times. The contractor shall be responsible for the maintenance of all fences.
- If temporary fencing is removed temporarily for the execution of work, the contractor shall reinstate it as soon as practicable.
- Breaches in the fencing must be repaired immediately.
- The purpose of the fenced areas is to control construction and personnel activity within the designated areas, and limit unauthorised access.

7.2.2 Clearing and Grubbing

- Contractor shall at all times carefully consider what machinery is appropriate to the task while minimising the extent of environmental damage.
- Topsoil shall be cleared of woody vegetation and specifically exotic vegetation before ripping and removing.
- The topsoil is regarded as the top 300 mm of the soil profile irrespective of the fertility appearance.
- Topsoil is to be stripped when it is in as dry a condition as possible in order to prevent compaction.
The topsoil, including the existing grass cover is to be shallowly ripped (only the depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process.

Soil stockpiles shall not be higher than 2.5 m or stored for a period longer than one year. The slopes of soil stockpiles shall not be steeper than 1 vertical to 2.5 horizontal.

No vehicles shall be allowed access onto the stockpiles after they have been placed.

Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.

The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This can include the use of erosion control fabric or grass seeding.

If at any stage of the clearing operations archaeological artefacts are unearthed or identified the relevant organisations are to be contacted immediately to conduct a thorough scientific investigation of the finds.

The works shall be cleared of alien vegetation as identified by the ESA. An effort must be made to remove the entire root system where after the plant shall be left to dry out on a hard surface that will not facilitate the germination of seed.

### 7.2.3 Site Buildings / Construction Camp

- The planning and design for the Construction Camp must ensure that there is a minimum impact on the environment. Where possible existing infrastructure and disturbed areas must be used.

- No construction camps will be allowed in sensitive areas such as wetlands.

- All site buildings to be of a container or prefabricated type. With the decommissioning of the structures all compacted platforms and slab foundations must be ripped and removed, unless otherwise negotiated with the local communities.

- All buildings will be soundly built and will not pose a danger to personnel.

- No fires may be allowed outside the construction area / construction camp and adequate fire fighting equipment according to the fire hazard during the construction period must be available on site in good working order (at least one all purpose 12.5 kg extinguisher).

- Welding, gas cutting or cutting of metal will only be permitted inside the working areas.

- The Contractor shall pay the costs incurred to organisations called to put out any fires started by him. The Contractor shall also pay any costs incurred to reinstate burnt areas as deemed necessary by the ESA.
7.2.4 Initial Earthworks and Platforms

- The construction platform for the contractor's camp, as well as the platform for the materials storage area must be appropriately planned.
- The Contractor shall take appropriate and active measures to prevent erosion resulting from his own works, operations and activities as well as stormwater control measures to the satisfaction of the ESA / RE. Restoration costs will be for the contractor's account, should these measures not be reasonably implemented. Aspects normally covered in construction contracts in terms of "protection of works" are standard and are not to be billed or confused with any details covered under environmental requirements.
- During construction the Contractor shall protect areas susceptible to erosion by installing all the necessary temporary and permanent drainage works as soon as possible. All such measures must be discussed with and approved by the ESA / Engineer.
- Measures can include cut off trenches, straw stabilising, brush packing etc.

7.2.5 Explosives Storage

The storage of explosives will be permitted on the following conditions:

- All storage and handling of explosives to be done in accordance with the relevant legal requirements and industry guidelines such as the South African Explosives Act of 1956, or any regulations since published in terms of Section 75 of the Lesotho Environment Act of 2001.
- An explosives and detonator magazine has to be established on site for the storage of explosives.
- The contractor shall submit a proposal as to the design and siting of such magazine to the RE before approval and representation is to be made to the relevant authorising and permitting authority.
- The contractor will be responsible for the fencing and safeguarding of such magazine.
- Only suitably qualified and experienced technicians will be allowed to handle explosives on site.

7.2.6 Vehicle Parking Area

- All vehicles and plant will be allocated a dedicated parking area in the camp site.
- No storage of plant and vehicles will be allowed outside of the designated area.
7.2.7 Service Area / Wash Bay

- All vehicle and plant shall be maintained to ensure that there are no oil or fuel leakages.
- The contractor will provide a dished concrete floor slab to prevent infiltration of petroleum products.
- Drainage from the service area will be channelled into a sump or oil-skimming tank, where it shall be treated to remove oil and/or fuel.
- Drainage from the wash bay platform will firstly be channelled into the skimming tank before being released by drain to the sedimentation pond.
- Soil contaminated by oil, fuel or chemicals shall be removed and disposed of at a permitted landfill site.
- The contractor shall educate workers on the appropriate methods for workshop maintenance and fuel points to prevent fuel and oil being washed out of containment areas.
- Toxins and oil must be recovered from the system at least once a week, and if necessitated more regularly.
- Toxins and oil recovered must be stored in sealed drums in a bunded area and taken to Maseru where it can be recycled by any of the petroleum companies.
- Effluent discharge from the settling ponds shall not exceed the relevant effluent quality standards, such as the South African Water Quality Guidelines Vol 4 for Agricultural use: Irrigation, published by the Department of Water Affairs and Forestry (Second edition, 1996), or any standards since published in terms of Section 36(1)(b) of the Lesotho Environment Act of 2001, as specified under Section 36(1)(b)(iii) – water for agricultural purposes.
- All spillage of oil onto concrete surfaces shall be controlled by the use of an approved absorbent material such as Econosorb or Drizit.
- The servicing of plant and vehicles will not be allowed elsewhere on site.

7.2.8 Separation Tanks

- The contractor shall provide grease and oil separation tanks (if required) at all areas where oil spillage or collection will occur, i.e. workshops, oil storage, vehicle wash areas and fuel points.
- The contractor shall provide a method for oil recovery. Recovered oil shall be collected in drums for recycling or disposed of at a permitted hazardous waste site.
- The contractor will test effluent discharged from the oil skimming tanks for conformance with relevant effluent standards if requested to do so by the ESA when pollution is suspected.
7.2.9 Aggregate Storage

- Materials will be stored inside the camp area as far as possible.
- Fine aggregate shall be stored on a compacted sub-base platform.
- The contractor will ensure (and implement steps if required, e.g. bund walls) that no fine aggregate is washed from the storage area onto the rest of the site.
- Coarse aggregate will be stored as a minimum on a surface of compacted inert sub-base material.
- An approved borrow pit must be used for construction materials.
- Aggregate used shall be stored as compactly as possible so as to minimise the possibility of it spreading across a greater area than necessary and to prevent it from being washed away.

7.2.10 Cement Silos / Storage

- Cement shall be delivered in sound and properly secured sacks or in approved bulk containers.
- Cement products in sacks shall be stored in an enclosed storage area. The storage facility and surrounding area shall be swept and cleaned regularly as required to ensure that cement products do not enter the surrounding environment.
- Bulk delivered cement products will be stored in approved cement silos.
- Air filters are to be monitored and cleaned and replaced on a regular basis.

7.2.11 Fuel Storage Areas

- The contractor shall provide and maintain bund walls around his fuel storage areas within the site with a sump. Such walls shall be of sufficient height to contain a minimum of 110% of the contents of his fuel storage facilities.
- This shall apply to storage above the ground. No underground fuel storage will be allowed.
- All drainage from fuel storage areas shall be treated to remove oil and fuel.

7.2.12 Dust Control

- The Contractor is to take appropriate measures to minimise the generation of dust as a result of construction works, to the satisfaction of the ESA.
- Dust control by means of water-spraying would be sufficient on these sites.
7.2.13 Batching Plant

- Concrete shall only be mixed in areas which have been specifically demarcated for this purpose.
- All concrete spill shall be promptly removed by the contractor to an approved disposal site.
- After mixing is complete all waste shall be removed from the batching area and disposed of at an approved disposal site.
- No storm water is permitted to flow through the batching site.
- All residue water from concrete batching plants or the surface run-off from them will be led to specially constructed collection ponds.
- Batching plant is to be enclosed by a bund wall with dedicated divisions and compartments for the various types of materials.
- Air filters are to be monitored and cleaned and replaced on a regular basis.
- All effluent from mixer washing, and run-off from batching areas and other work areas shall be contained in suitable sedimentation ponds.
- Sedimentation ponds shall be allowed to dry out on a regular basis to allow for solid material to be removed. This material must be disposed of in a suitable manner, depending on the nature of the material and to the discretion of the ESA.
- Care must be taken to ensure that no water from the construction site enters the agricultural land adjacent to the site, or the natural watercourses.

7.2.14 Access Roads and Accommodation of Traffic

- Existing access roads will be used as far as possible.
- Topsoil shall be removed as described under 'Clearing and Grubbing' prior to the construction of the road.
- All new temporary roads shall be approved by the ESA.
- All temporary roads shall be decommissioned by the contractor and rehabilitated using the stockpiled topsoil.
- During construction the contractor shall protect all areas susceptible to erosion by installing all necessary temporary and permanent drainage works as soon as possible.
- The accommodation of traffic is an important aspect on these roads. Where required, temporary works to facilitate the accommodation of traffic during bridge construction, should be completed first as road closures will not be permitted.

7.2.15 Sanitation

- Adequate chemical latrines shall be provided for all staff.
• They shall be serviced once a week to prevent overflowing.
• All latrines provided by the contractor shall be efficient, sanitary and non-offensive.
• All fees payable to any local authority for removal of night soil (if applicable) shall be paid by the contractor.
• A minimum of one toilet shall be provided per 20 persons at each working area such as the construction camp and bridge.

7.2.16 Temporary Storage of Waste

7.2.16.1 Construction Waste

• Temporary storage of construction waste will be limited on the site, and within the designated areas.
• The contractor will be responsible to remove and transport all waste material off site to an approved site.
• Spoil material will as far as possible be used in the shaping of the area during rehabilitation, or alternatively removed to an identified borrow pit.

7.2.16.2 Domestic Waste

• The contractor shall dispose of all refuse generated by his staff and subcontractors on a weekly basis at an approved disposal site.
• The contractor shall on a daily basis do site clean-ups (chicken runs) of litter other than construction spoil, and dispose of it in designated refuse bins provided on site.

7.2.17 Borrow Pits

• Existing borrow pits will be used as far as possible.
• No areas where water will pond will be allowed at any borrow pit after use due to the risk of children drowning.
• No steep slopes will be allowed at borrow pits.
• All borrow pits to be rehabilitated after use, including battering and shaping, topsoiling and revegetation as described elsewhere in this EMP.

7.2.18 Blasting

• All blasting shall be conducted in terms of the relevant Lesotho and international regulations.
- Blasting shall be limited to a specific period of the day so as to minimise disturbance. This time schedule is to be determined and approved with the RE. It is recommended that blasting take place between 12:00 noon and 15:00.
- A blasting time schedule shall be distributed to all surrounding villages indicating the time and date for blasting activities.
- It may be required to announce the blasting time period prior and upon completion by siren.
- Where blasting is required every precaution shall be exercised to protect the works and persons, animals and properties in the vicinity of the site.
- The contractor shall complete pre- and post-blast surveys in the vicinity of the site.
- The contractor will be responsible for all injury and damage occasioned by any blasting operations and shall compensate for such injury or damage repair.
- All workmen engaged on blasting at the site shall be experienced in this work and shall be familiar with the relevant regulations, copies of which shall be kept on site by the contractor.
- The contractor shall take measures to limit flyrock. This may be achieved by matching the charge to the rock type, by using milli-second delay detonators or by using rubber blasting mats.
- No blasting shall be carried out until permission has been obtained in writing from the RE; who may prohibit the use of explosives near pipelines, cables, roads and villages and concrete already placed and who may restrict the size of charges.
- At all times blasting shall be carried out that ground vibration, air blast and scatter are kept within such limits as to avoid damage to adjacent structures or concrete already placed at the works. Peak particle velocity may be restricted to 50 mm/sec or less at the discretion of the RE.
- Where there is a possibility of shattering rock, the RE may order the contractor to cease blasting and continue to excavate the rock without the use of explosives, by barring, breaking, wedging, line drilling or other approved methods.

7.2.19 Screening

- The process of separating rock material into acceptable grades for backfilling and layerworks material will result in noise and dust.
- The contractor shall suppress dust caused by the screening process.
- The screening process shall be positioned so as not to cause any disturbance to surrounding villages.
7.2.20 Stock Piling and Spoil Material

- All suitable materials excavated shall be used in the construction of the works.
- All unsuitable and surplus spoil rock shall be removed from the site to a dumping site or sites, to be negotiated by the contractor and approved by the RE where it shall be dumped, spread and levelled, all to the satisfaction of the RE and ESA.
- No dumpsite shall be used without the prior written approval of the RE and the owner of the property.
- No spoil material shall be stockpiled in violation of any legal requirement or to obstruct any watercourse or drainage channel.

7.2.21 Concrete Construction

- All cement and concrete batching shall take place within the designated batching plant area.
- Concrete and cement products shall be transported to the construction site with due care. Any spills will be removed and stockpiled on the construction waste area to be removed from site to an approved landfill site.
- Temporary storage of construction spoil will be limited on the site, and within the designated areas.
- The contractor will be responsible to remove and transport all concrete waste material off site to an approved site.

7.2.22 Shaping

- The soil surface shall be contoured, and the edges of all cut and fill areas rounded to fit into the natural landscape.
- Topsoil shall be spread in keeping with the natural topographical form of the site and immediate surroundings.

7.2.23 Topsoil Placement

- Topsoil shall be placed to a minimum depth of 150 mm over all areas that have been disturbed by the construction activity.
- Topsoil placement shall follow as soon as construction in an area has closed.
- All compacted areas shall be ripped parallel to the contours to a minimum depth of 300 mm.
- All areas onto which topsoil is to be spread shall be graded to the approximate original landform and shall be ripped prior to placement.
- Topsoil shall be placed in the same soil zone from which it had been stripped. If there is insufficient topsoil available for a particular soil zone, additional topsoil may be brought from other soil zones at the approval of the ESA.
- Where topsoil that has been stripped by the contractor is insufficient to provide the minimum depth, the contractor shall obtain suitable substitute material from other approved sources.
- No vehicles shall be permitted access onto the topsoil after it has been placed.

7.2.24 Revegetation

- Flat and gently sloping areas shall be ripped in lines 300 mm centre to centre and to a depth of at least 300 mm parallel to the contours prior to revegetation.
- Revegetation of disturbed and work areas shall be done with an indigenous grass mix; similar to what is found in the vicinity of the site.

7.2.25 Storm water Management

- During construction the contractor shall protect all areas susceptible to erosion by installing all necessary temporary and permanent drainage works as soon as possible.
- Any erosion channels developing during the construction period or during the operational and maintenance period shall be backfilled and consolidated immediately and the area restored to the proper condition. All erosion damage shall be repaired as soon as possible. Displaced topsoil shall be replaced.

7.2.26 Traffic and Plant on Site

- Adequate and appropriate traffic warning signage will be placed along the route to be used by the construction vehicles from the camp and the borrow pit to the site.
- Adequate and appropriate traffic warning signage will be placed along the route to warn public of construction work and heavy vehicle traffic.
- Transporters of fine materials must ensure that their operation does not pose a nuisance through the spillage of material or the creation of dust. The contractor shall remedy, at his own expense, dust generation and spillage where it occurs to an unacceptable level along the transport routes. It is recommended that the load haul of all transport vehicles be covered with tarpaulins.
- Deliveries shall be scheduled for off-peak hour traffic time schedules.
- All trucks and vehicles removing spoil from the site shall have the load areas covered by a tarpaulin to prevent rocks and spoil from falling onto the road surfaces, or causing a nuisance to persons in the vicinity.
7.2.27 Personnel

- Working hours will be agreed upon with the affected communities prior to construction.
- Warning signs must be placed on and around the site as per the occupational health and safety requirements.
- Cooking facilities shall be provided for the construction staff within the confines of the construction camp. No trees may be removed for the making of fires and no collection of wood will be allowed.
- If possible, local kitchens/food services to be utilised for the provision of food to labourers.
- No fires shall be permitted, unless a specifically designated area has been identified and set aside by the RE for that purpose.
- Where there is a particular fire hazard at any point in the construction works the contractor shall ensure that his employees are properly trained in the use of the appropriate fire fighting equipment and that such equipment is on hand at all times.
- The contractor shall refrain from harming or clearing trees, timber and shrubs to any extent other than that indicated by the RE for the execution of the contract.
- The contractor shall take all measures necessary to prevent his staff from hunting, capturing or killing animals and birds in the vicinity of the construction activities.
- The contractor shall take all necessary precautions against trespassing on adjoining properties and shall take care that all livestock, game or crops are not interfered with.
- The contractor shall comply with all safety regulations regarding the electricity supply and he shall take every precaution to ensure the safety of all the people on site.
- The contractor shall ensure that as far as practical, suitable arrangements are made on the site for the maintenance of health, the prevention and overcoming of outbreaks of disease. Adequate first aid and emergency transport services should be available.
- The contractor shall be responsible for his own security arrangements and shall comply with any security instructions, which the RE may issue from time to time.
- The contractor shall ensure that suitable safety regulations and precautions are established and brought to the attention of the personnel. Approved safety helmets and other protective clothing shall be worn where deemed necessary by the RE.
- The contractor shall, at his own cost provide for a constant supply of potable water for human consumption to the site offices and other domestic use on site. The contractor shall allow for chemical testing of water samples on a monthly basis, or more frequently if pollution is suspected by the ESA.
• The contractor is responsible for the behaviour and discipline of all personnel while they are present on the site and shall exercise strict supervision over them at all times.

7.2.28 Personnel Education

• The contractor shall ensure that his personnel are educated and informed as to the requirements of the EMP.
• The contractor shall ensure that his personnel have a clear understanding of the Health and Occupational Safety aspects of the contract works.
• The contractor shall ensure that his staff complies with the EMP requirements for best practice as described by this document.

7.2.29 Works affecting planted fields

• Where the road follows an alignment next to a planted field, due care shall be taken not to disturb the state of the field.
• No vehicular traffic will be allowed in any agricultural field.
• Where required, slopes up to agricultural fields need to be protected to ensure slope stability at all times.
• Compensation for loss of cultivated fields will be as per the Resettlement Plan proposed by Consult 4 (October 2005) will be carried out prior to the commencement of construction. A list of properties to be impacted on the proposed road alignment is indicated in Table 3-1 above.

7.2.30 Crossing of the Rivers

• The contractor is requested to notify the Department of Water Affairs in writing of the proposed commencement of construction and provide the department with a construction programme, prior to any work commencing in proximity of the river or riverbank.
• Extreme caution shall be taken during construction owing to the steep, eroded nature of the river embankment. The ESA shall assess any preventable damage caused by the contractor and prescribe rehabilitation measures to be completed at the contractor's expense.
• No construction materials or pollutants, such as cement, shall be allowed to fall/flow into the riverbed.
• No washing of clothes or vehicles will be allowed in the rivers.
• A laundry facility will be provided in the construction camp. The effluent from this facility (grey water) will drain into a French drain system to be constructed for this purpose.
7.2.31 Fauna and Flora

- Natural vegetation shall be kept in as undisturbed a state as possible. Special attention shall be paid to preserve trees and plant communities such as wetlands, sponges, forest of any sort and riparian vegetation.
- Indigenous plants or wild animals (including reptiles, amphibians or birds etc.) may not be damaged or harmed. Vegetation removals as part of the development requirements are excluded.
- All incidents of harm to any animal or natural vegetation (apart from the agreed areas) must be reported to the ESA.

7.2.32 Embankments

- No activity shall be allowed which shall, in any way, create unnecessary disturbance of any river embankment due to the extreme sensitivity of these zones.
- Care must be taken to ensure that machinery used does not erode the embankments further. The embankments are severely eroded in places and the contractor must ensure that no further degradation occurs.

7.2.33 Site Clean Up and Rehabilitation

- The Contractor must ensure that all structures, equipment, materials and facilities used or created on site for or during construction activities are removed once the project has been completed.
- The construction site shall be cleared, and cleaned and rehabilitated to the satisfaction of the ESA, prior to revegetation.

7.2.34 Monitoring

The Roads Implementation Agency (RIA) and Ministry of Works Environmental Unit (RS-EU), in conjunction with the National Environmental Management Council (NEMC)
will be invited to attend environmental steering committee meetings, and will oversee and approve the monitoring done by the ESA.

7.2.35 Monitoring Plan

This section details what needs to be monitored in terms of this EMP, detailing monitoring frequency and reporting requirements.

7.2.35.1 Monitoring Plan for the Construction Phase

Regular meetings will be held between the Developer, the RE, and the ESA. The purposes of the meetings shall be:-

- To establish the suitability of the contractor's methods and machinery in an effort to lower the risk involved for the environment.
- To discuss possible non-conformance to EMP guidelines or environmental legislation
- To assess the general state of the environment on site and discuss any environmental problems which may have materialised.
- To act as a forum for input into the construction phase by the MOPWT representative and external environmental auditor.
- To accommodate the local community in the decision-making process regarding social and environmental issues on site.

Monthly and non-conformance reports should be compiled by the ESA for study by the external environmental auditor, RS-EU, RIA, NEMC and representatives of the WB.

The monthly report should include:-

- Results of all testing performed as per this EMP in the specific month. This testing will be conducted either by an outside contractor or by the ESA with equipment acquired for the project by the contractor;
- A description of exceptional conditions on site whether they be meteorological, personnel related, machinery related, or otherwise stipulated;
- A description of any environmental accident or developments which could potentially develop into a non-conformance event by the contractor; and
- Minutes from the meetings.

Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the contractor and could stand as evidence should legal action be required. A testing sheet with test results included for each infringement indicating the details of the event including position on site, date and time.
If possible a photo should also be included in the report. This report will also suggest mitigation measures to correct the non-conformance (if necessary) and contemplate revisions to any of the strategies used in the construction phase, whether they pertain to monitoring or to construction methods used on site.

7.2.35.2 Testing Frequencies

Compliance monitoring and testing will be done as per this EMP to monitor EMP implementation and compliance and initiate corrective action if required. The ECO will develop sample sheets for regular monitoring and testing, as well as establish a proper filing system for record keeping purposes.

Testing will be done as per relevant Lesotho standards, such as water quality standards. Where no such standards exist, international standards will apply. Testing frequencies for different aspects are listed below:-

- Potable water quality monitoring: every 2 weeks and more often if specific complaints are received from personnel or labourers;
- Discharge water quality monitoring: every 2 weeks and more often if specific complaints are received from personnel, labourers or the public;
- Air quality monitoring only if specific complaints are received;
- Noise monitoring only when specific complaints are received;
- Surface water quality: first samples are to be taken prior to any construction activity to complete the baseline information and records kept, and again if discharge water quality drops to assess impact on the environment;
- Groundwater quality and pump tests of boreholes: first samples to be taken prior to any construction activity to complete the baseline information and records kept. These tests are to be repeated if discharge water quality drops to assess the impact on the environment.
- Erosion monitoring: weekly with details on position, extent and volume recorded accurately;
- Unstable Slope monitoring: weekly with details on position, extent and volume recorded accurately;
- Potholing of completed sections of road: weekly with details on position, extent and volume recorded accurately; and
- Conditions of culverts (records of culverts damaged or blocked): weekly with details on position, extent and volume recorded accurately.

Open communication channels must be maintained between the Contractor, the ESA and the local communities. This will be necessary for the negotiation of the construction camp site, negotiation of the operating times and blasting times. This will also provide for feedback from the communities regarding potential conflict areas and facilitation the resolution of any conflicts.
CONCLUSIONS

A comprehensive field survey and I&AP consultative process was conducted in order to identify affected stakeholders along the route alignment. As a result of this, key environmental, social and economic concerns were raised by various stakeholders, which include loss of livelihoods, security concerns and health and safety issues. These concerns and issues were then addressed through a detailed impact assessment process. Based on the outcomes of the impact assessment, the following conclusions can be drawn:-

1) The construction of the Senqu and Sengunyane Bridges will have a moderate to high impact on the hydrological environment, particularly during the construction phase. These may include changes in hydrological functioning in the river channel, sedimentation occurring around the pillars, and increased sedimentation related to erosion. The construction and design layout of the bridges has been formulated to minimise the impact on hydrological regimes after construction.

2) Dust and emission generation will be problematic during the construction phase, particularly where the road passes in close proximity to residences or places of social/cultural interest. This may have environmental as well as health implications.

3) The proposed infrastructure project will result in the creation of jobs during the construction phase. The significance of the impact, although positive, can be increased through the use of local labour from surrounding communities. The influx of labourers can have an additional negative impact through increased transmission of HIV/AIDS or other STD's in previously inaccessible areas.

4) Clearing of vegetation will have a moderate impact on biodiversity. This may have an additional (indirect) implication with regard to loss of grazing on communal grazing area.

5) The construction of the two bridges and connecting road will greatly improve access to the Hloahloeng area after construction. This translates to improved access to education, healthcare and commercial facilities.

6) The construction of the access roads and bridges will impact negatively on land use, in particular land currently under cultivation in the Ha Nkau region. In addition to this, the potential exists for the loss of communal grazing land and sterilisation of land for future cultivation/other use. Compensation, in terms of the RAP prepared by Consult 4 (2005) will be required for loss land tenure.
It is critical that the project EMP described above is applied to mitigate significant impacts which may arise during the construction phase. The following general recommendations have been highlighted:

- Erosion control measures must be implemented throughout the project area where required and rehabilitation measures instituted.
- Effective storm water management systems and structures must be put in place to ensure hydrological functioning.
- Suitable compensation must be provided to identified affected land owners (Table 3-1) in accordance with strategies identified in the Resettlement and Compensation Policy Framework (Consult 4, September 2003) and Resettlement Plan (Consult 4, October 2005).
- Additional public consultations must be conducted once the alignment has been finalised, in order to improve the compensation calculation process. This will include formal community meetings and individual consultations.
- Local labour must be used as far as possible during the construction phase.
- Labourers must be educated and trained to provide much needed skills which they can utilise on other projects.
- Labourers must be educated in terms of health issues, and in particular HIV/AIDS/STD's.
- Traffic calming measures should be introduced along the alignments to reduce traffic speeds and associated risk to local roads users such as pedestrians or livestock.
- Strict control must be instituted at the construction camp, to monitor and mitigate all potential impacts associated with such camps.

In addition, it is recommended that:

- The findings of the EIA be considered and EMP implemented.
- The mitigation of negative impacts as described in the impact evaluation tables and as elaborated by the Environmental Management Plan be implemented.
- The EMP to be revised on finalisation of the design and layout.
- Ensure that Public Participation continues through the construction phase through community liaison and the establishment of forums to ensure community support for the project and addressing of concerns. Existing social and communication structures to be utilised as far as possible.
- Due care and responsibility be applied as detailed in the EIA and EMP.
- It is further recommended that the planning and design of the road be finalised and suitable design intervention implemented where required to
minimise/reduce the impact on the receiving physical, biophysical and social environments.