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APPENDICES
ABBREVIATIONS AND ACRONYMS

ACGF  African Catalytic Growth Fund
BPEHS  Basic Package of Essential Health Services
CA  Consultant Architect
COMAHS  College of Medicine and Allied Health Sciences
DMHT  District Medical Health Team
DSDP  Decentralized Service Delivery Project
EA  Environmental Assessment
EIA  Environmental Impact Assessment
EPA  Environment Protection Agency
EPAA  Environment Protection Agency Act
EMP  Environmental Management Plan
ESMF  Environmental and Social Management Framework
ESMP  Environmental and Social Management Plan
GOSL  Government of Sierra Leone
HSRDP  Health Sector Reconstruction Development Project.
FCC  Freetown City Council
IRCBP  Institutional Reform and Capacity Building Capacity
LC  Local Council
LGFD  Local Government Finance Department
MAFFS  Ministry of Agriculture Forestry and Food Security
MIALGRD  Ministry of Internal Affairs Local Government and Rural Development
MLHSPE  Ministry of Lands Housing Country Planning and the Environment
MOFED  Ministry of Finance and Economic Development
MOHS  Ministry of Health and Sanitation
MWM  Medical Waste Management
NaCEF  National Commission for Environment and Forestry
NEP  National Environmental Policy
NEAP  National Environmental Action Plan
NEPB  National Environment Protection Board
NGO  Non Governmental Organization
NHCWMP  National Health Care Waste Management Policy
EXECUTIVE SUMMARY
The report presents an update of the Environmental Assessment (EA) report and Waste Management Plan of 2002 and updated in 2007 for the Health Sector Reconstruction and Development Project (HSRDP). It now incorporates the Reproductive and Child Health Programme. Those reports were for the rehabilitation and development of Health-facilities and technical programmes for Moyamba, Kono, Koinadugu and Bombali District of Sierra Leone on behalf of the Ministry of Health and Sanitation (MOHS).

The following programmes were included in the EA (2007) update of HSRDP:
- Onchocerciasis Control Programme (ocp);
- Civil Works; and
- Avian Flu

The current update is based on desktop research, site visits and interviews. This report focuses on Two (2) aspects of the Reproductive and Child Health Programme (RCHP -2). This is a follow up on RCHP-1. This update concentrates on Two (2) aspects:
- Civil Works; and
- Technical Programmes of RCHP-2

Unlike the HSRDP, the RCHP-2 shall be nationwide and will involve 1040 health facilities. The Civil Works (section 7) impacts of the rehabilitation of Health Facilities and the auxiliary facilities (Water and Sanitation and Construction of Incinerators).

It has been necessary to review the section completely to include impacts on:
- Physical Environment
The section on the provision of auxiliary facilities has been reviewed to include social concerns.
The impacts and mitigation measures have been discussed in detail and an Environmental and Social Management Plan (ESMP) developed.
A table of severity of impacts has now been included.
The RCHP-2 like the HSRDP has been classified as Category B as there will be no land take and no Resettlement issues will be involved.
The Environmental Management and Legislative Framework have been discussed in Section 4 to include the roles of the newly recruited Environment Protection Agency (EPA) and the Local Councils.
The biophysical and socio-cultural concerns were discussed for 4 focus Districts in 2002/2007. As the RCHP is nationwide, a generic country profile is presented in section 3.
The situation analysis (section 3.3) clearly indicates that whilst the framework for management of medical waste exists, logistics support (equipment and laboratories) as required is inadequate. Training is required for stakeholders at all levels.
The Regulatory and Administrative Framework of the RCHP are discussed in section 8 based on the following documents.

- Climate
- Geology
  - Environmental Quality
- Odour and Dust
- Noise
  - Ecological Resources
- Ground Water
- Surface Water
- Vegetation
- Wildlife
  - Harm Use Value
- Safety and Health

The Regulatory and Administrative Framework of the RCHP are discussed in section 8 based on the following documents.

- Public Health Ordinance (1960)
- Natural Health Policy (2003)
- National Health Care Waste Management Programme Policy (NHCWMP)-2007
SHARP (2003) presented a plan of action to include:
- Advocacy;
- Education and Training;
- Provision of resources;
- Procedures for safe handling, segregations, storage and disposal of medical waste.

Some of these activities were carried out from 2004-2008 and they should continue to be actively pursued during the RCHP implementation.

The NHCWMP (2002) established a comprehensive system for safer management of health care waste to ensure safe working environment for all health staff in Sierra Leone. What is required is the setting up of the structure and sustenance of the system proposed under the NHCWMA.

As the EA (2002; update 2007) did not cover the RCHP the potential negative impacts of the technical programmes of the RCHP have been discussed in section 9. An EMP for the effective management of medical waste generated during the implementation of the RCHP has been presented in section 9 table 5.

The capacity building and training needs for the RCHP have been assessed and the training programme proposed in section 9.1. An indicative budget for the training has also been presented.

It is recommended that a quick nationwide assessment be undertaken of all health facilities under the RCHP. From 5 pilot centres, a quick estimate of medicinal waste generated under RCHP nationwide could be done.

Training of stakeholders in MWM in accordance with this update is priority. Awareness raising in communities on MWM could be undertaken nationwide using local government structures.
INTRODUCTION AND PROJECT BACKGROUND

1.1 Preparation of Environmental Assessment (EA)

The Government of Sierra Leone (GoSL) has received a grant from the African Catalytic Growth Fund (ACGF) of the World Bank (WB) and from the United Kingdom Department of International Development (DFID) to support Sierra Leone to deliver a basic package of health services (BPEHS) nationwide. GoSL under the auspices of the Reproductive and Child Health Program (RCHP) intends to use part of these funds to cover eligible payments for the management of medical waste in the health facilities as well as rehabilitation of health facilities, offices and residential premises for health workers.

The RCHP – 2 is a follow up to the RCHP – 1. The RCHP –1 used the updated ESMP and WMP (2007) of the HSRDP. The objective of Phase – 2 of the RCHP is to increase utilization of a free package of essential health services by pregnant women and children under age of five. For the implementation of the HSRDP an Environment Management and Medical Waste Management Plans (MWMP) were prepared in October 2002 and updated in May 2007. The RCHP is similar to the HSRDP except for the scope. While HSRDP covered only four (4) districts, the RCHP will support activities nationwide.

The objective of the assignment is to update the existing ESMP and MWMP to guide the approaches in addressing Environmental and Social Impacts to undertake appropriate mitigation measure in the Reproductive and Child Health Program (RCHP).

The present Reproductive and Child Health Care Project – Phase 2 (RCHP – 2) is part of the Health Sector Reconstruction and Development (HSRDP) for Sierra Leone.

An Environmental Assessment (EA) and Resettlement Policy Framework (RPF) was done in 2002 for the HSRDP focusing on Four (4) Districts [Moyamba, Kono, Bombali, Koinadugu]. By 2004 as a result of decentralization, Primary Health Care and Waste Management had been devolved to Local Government (City Councils and District Councils). An EIA for Civil Works (Hospital) and Waste Management and establishment of dumpsites in the four (4) focal districts Towns (Moyamba, Kono – New Sembahun, Makeni and Kabala) were done in 2007. The updated Environmental Management Plan, including the Waste Management Plan (WMP) of 2007 is used by Ministry of Health and Sanitation (MOHS) under the HSRDP.

Under the Institutional Reform and Capacity Building Project (IRCBP) an Environmental and Social Management Framework (ESMF) and Resettlement Policy Framework (RPF) was elaborated in 2004. An ESMF for the Decentralized Services Delivery Program (DSDP) was done in 2009 and checklists adopted for use by local councils. The Local Government Finance Department (LGFD) developed an Environmental Safeguards Manual for use by LCs in 2009 following on the recommendation of ESMF 2004. Training was done in the use of the checklists in December 2009. Part of the training dealt with civil works for facilities including PHUS.

The EA (2002) of HRSDP and updated of 2007 covered only Four (4) Districts. The present RCHP – 2 will be supporting activities nationwide. This project will not support interventions that will result in land take or destruction of natural habitats, forests or cultural resources. Civil works will be limited to rehabilitation of health facilities, offices and staff housing. The Medical Waste Management issues have been handled under the Sierra Leone HIV/AIDS Response Project (SHARP) elaborated in 2002. This issue will be looked out for in a more general manner in this document.

The ESMP and WMP of the 2002 and the update of 2007 are being updated in respect of the following:

- The nationwide nature of RCHP;
- Devolution of Primary Health and Secondary Care Services to Local Councils;
- Environmental Management as a result of the establishment of the Environment Protection Agency (EPA, 2008);
- Civil Works;
- Medical Waste Management.

1.2 Methodology
Based on the existing EMP for the HSRDP, the scope of this work will be limited to reviewing, updating and adopting this ESMP for use by the RCHP. This report is based largely on desktop studies of available literature and interviews with stakeholders including:
- World Bank (WB);
- Ministry of Health and Sanitation (MOHS);
- Ministry of Finance and Economic Development (MOFED);
- Decentralization Secretariat (Dec. Sec) of the Ministry of Internal Affairs and Rural Development (IALGRD);
- College of Medicine and Allied Health Sciences;
- Connaught Hospital;
- Private Hospitals;
- Freetown City Council (FCC); and
- One NGO

These are presented in Appendix 1.

Constraints
The clients were on many occasions too busy to grant interviews thus slowing down the work considerably.

1.3 Project Background
During the civil unrest (1991-2002) the country’s physical infrastructure, particularly power, water and sanitation health, Education, Road networks suffered widespread destruction and lack maintenance.

The overall development objective of the HSRDP is to help restore the most essential functions of the health delivery system. The RCHP is part of HSRDP but with different objectives.

1.4 Objective of the phase 2 of the Reproductive and Child Health Project (RCHP)
The objective of phase 2 of the Reproductive and Child Health Project (RCHP) is to increase utilization of a basic package of essential health services (BPEHS) primarily by pregnant and lactating women and children under the age of five (5). The project will directly support delivery of the BPEHS in Sierra Leone through needs and performance based grants to LCs. It will also contribute to building the capacity of the GOSL to deliver these services by focusing on two key system constraints. (a) Monitoring and evaluation and (b) training health professionals.

The interventions included in the BPHES are those that (i) have the greatest impact on the major health problems; (ii) are cost-effective in addressing the problems faced by many people; and (iii)
can be delivered to give equal access to both rural and urban populations. The BPEHS represents
the official policy of the GoSL and the MOHS expects that all NGOs and others delivering health
services in Sierra Leone will use it as the basis for implementing their health programs.
The contents of the BPEHS include:
- Maternal and Newborn Health;
- Child Health and Immunizations;
- Nutrition;
- School and Adolescent Health;
- Essential Drugs and Equipment Supplies;
- Emergency Care;
- Disability; and
- Environmental Health Interventions.

2.0 PROJECT CONTEXT
According to available literature there are two (2) project components:

a) Component 1: Strengthening Service Delivery

This component will provide direct support to service delivery in Sierra Leone through needs and
performance based grants to local councils. The majority of project funds are allocated to the sub-component (Grants to Local Council). Funds will be used to provide support to all 19 LCs to provide services free of charge based on the BPEHS. Under the input based financing, in addition to bulk procurement of drugs, training of community health workers will also be done. RCHP financing for these inputs will be pooled with those of the GOSL and DSDP and follow the same procedures as outlined in the DSDP operations manual. Under the output based financing, LCs will also receive a portion of funds for the satisfactory delivery of a set of outputs. The four (4) outputs selected for the first year are (i) facility-based
deliveries (ii) Antenatal Care of pregnant women (iii) use of insecticide treated bed nets (ITNs) for under fives; and (iv) penta-3 immunization coverage rates of infants.

b) Component 2: Capacity Building

Under this component there will be capacity building of major stakeholders including MOHS, and LC. Technical assistant will also be provided under this component.

3.0 DESCRIPTION OF AREA OF INFLUENCE

The EA of HSRDP (2002; updated 2007) presented the bio-physical and social features of four (4) focused districts. As the RCHP is nationwide, a generic country profile is presented below.

COUNTRY PROFILE

3.1 The Bio-Physical Environmental Features

Sierra Leone is situated along the Atlantic Ocean in West Africa. It lies between latitude 6°55‘N and 10°N and between longitude 10°14W and 13°17‘W with the total land area of 72,325Km². The country is found at the Western tip of the Upper Guinea lowland forest and is typically tropical. The climate is closely related to the movement of the air masses. The pattern of seasonality is controlled by the North and South oscillations of the Inter-tropical convergence zone (ITCZ). There are essentially two seasons; Wet (May – October) and Dry (November – April) seasons each lasting approximately 6 months. The annual rainfall varies from about 1,800mm in the North east of the country to about 5000mm in the Freetown Peninsula. The coastal areas receive more than 3000mm of rain annually; North central, central and south Eastern regions receive between 2500mm and 3000mm and North receives from 2500mm to less than 2000mm. 80-90% of the total annual rainfalls are received from mid June to the end of October.

About 5-20% of the rain usually falls in the dry season. An analysis of trends in rainfall pattern indicates that there were periods of increased rainfall (1959-60; 1966-1969); decreased rainfall; (1961-1965); drought (1970-1975). Normal rainfall periods (1954-1959; 1976-1981) have also been recorded. From 1981 to 2008 there appeared to be a slight progressive decrease in annual rainfall amounts. The mean monthly solar radiation varies from between 380 cal. Cm⁻² day⁻¹ in March to 280 cal. Cm⁻² day⁻¹ (June – October) with a minimum of 250 cal⁻² day⁻¹ in August.
The average minimum recorded air temperature is 22°C (August) and the highest is 35°C (February – March). The mean average is 26°C. The heavy rains and maritime influences lead to humidity values of up to 92% in the Wet season and 45% inland in the dry season.

3.1.1 Eco-climatic Zones of Sierra Leone
The country is divided into four (4) main relief regions; coastline, interior lowland plains, interior plateau and mountains. The coastline is about 560 Km long and the shelf covers an area (to 200m depth) of 30,000Km². The drainage system consists of a series of rivers from North to South including the following; Great Scarcies, Little Scarcies, Rokel, Jong, Sewa, Moa and Mano. The interior lowland plains extending from coastal terraces in the West to the East of Sierra Leone occupies approximately 43% of the land area. The interior plateau is made up of granite that runs from the northern part of the country to southeast. They seldom rise above 700m and are comprised of alluvial iron stone gravel in the southeastern region while the north end is comprised of weathered outcrops of granite rocks.

The higher mountains are found in the North and East of the country; Loma Mountains and Tingi Hills respectively. The highest peak in the Loama Mountain is the Bintumani and rises to 1945m. The Sankan Biriwah of the Tingi Hills rises to 1885m. The Freetown peninsula is made up of dissected mountainous Peaks with Sugar Loaf and Picket Hills being the highest.

The six (6) major ecosystems are; forest, montane, savana, agricultural, wetland and freshwater and coastal and marine. Each of the ecosystems is characterized by certain dominant vegetation and wildlife.

In 1982, the estimated population of Sierra Leone was 3.2 million. In 2002 the population estimated was 4.9 million and in 2004 the projected population estimated based on the National Recovery Committees is 5.4 million. The population growth rate is about 2%.

3.1.2 International Conventions and Treaties
Sierra Leone is a signatory to numerous international conventions related to environmental management, notably:
- UN Framework Convention on Climate Change (1997)
- Convention on Biological Diversity (1992)
- Convention to Combat of Desertification (1994)
3.2 **SOCIAL ENVIRONMENTAL FEATURES**

Sierra Leone is one of the poorest countries in the world. Sierra Leone’s population of 4.9 million in 2002, which is growing by about 2% annually, is made up of many ethnic groups, the largest and prominent among them are the Mende, Temne, Limba, Kuranko, Susu, Yalunka, Loko, Mandika, Kono, Kisi and the Creoles.

In 2002 Agriculture accounted for more than 50% of GDP, and is the primary economic activity for more than 80% of the population living in rural areas.

| Selected Demographic and Social Indicators
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<td>Sierra Leone</td>
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<td>Population in millions (2001)</td>
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<td>Urban Population (1999)</td>
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<td>Population growth</td>
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<td>GDP per Capital in US$</td>
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<td>Stunting (Children Under five, 1999)</td>
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<td>Child Malnutrition (% of children under 5)</td>
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<td>Infant mortality rate (per 1000, in 2000)</td>
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<td>Child mortality rate (per 1000, in 2000)</td>
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<td>Maternal Mortality (per 100,000, in 2000)</td>
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<td>Life expectancy at birth (years, 1998)</td>
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<td>HIV/AIDS prevalence</td>
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<td>Access to sanitation (2000)</td>
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<td>Access to health services (2000)</td>
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<td>Access to an improved water source (% of population)</td>
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<td>Literacy rate (2000)</td>
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<td>Female</td>
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<td>Gross primary enrolment (2000)</td>
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Following the conflicts of the 1990s, Sierra Leone has made remarkable strides in re-establishing peace and the demobilization of combatants was completed in January 2003. Government has
established its authority nationwide, many refugees have returned, and presidential and parliamentary elections have taken place and local elections were concluded in 2004. There was a change of regime following the 2007 elections.

3.3 SITUATION ANALYSIS
The situation analysis has been carried out using desktop studies, interviews and site visits presented in Appendix 1. As it was not possible to make trips up country the consultant relied on telephone conversations and recent inspection trips made to local councils in the provinces.
The program (RCHP) consist of:
- Civil works; and
- Technical programs.

Civil Works
The site visits indicated that most of facilities (Health facilities, Houses and offices) are in desperate state of disrepair especially for large Hospitals.
Today there are 1040 Health facilities nationwide. These could be subdivided into the following categories or groups:
- Referral Hospital (secondary at district level and tertiary at regional levels);
- Community Health Centres;
- Maternal Child Health Posts; and
- Community Health Posts.

A senior medical program officer preferred to classify the health facilities nationwide into essentially two (2):
- 40 Hospitals; and
- 1000 Peripheral Health Units (PHU)

From interviews and inspections it was found out that water and sanitation at the health facilities is poor. Pipe borne water supply facilities (Connaught Hospital, King Harman Road Satellite clinics, Princess Christian Maternity Hospital, Jenner Wright Under-fives, Bo Government Hospital, Makeni Government Hospital) are either only sparingly functional or are non existent. In the provinces, wells (submersibles, hand dug or boreholes) appear to be more dependable. Some wells dry up during the dry season (Kamabai) or the water is coloured (Binkolo). Some of the well heads are spoilt or wells poorly constructed (with no soak aways). Toilet facilities are also either in a poor state or not functional. Lack of water, blocked pipes and full cesspits with terrible odours are among the problems. VIP latrines in the PHUs are often over subscribed with little night soil attention. Contractors for houses and offices to be rehabilitated must take the provision of water and sanitation facilities into consideration. The Incinerators provided at various times especially in 2007 were made up of local materials (bricks) and have broken down and need rehabilitation.
In a large number of instances lined pits rather than incinerators are used for disposal of wastes. Some new incinerators may have to be constructed and urgently too. Good and functional
incinerators were found in some private clinics including UMC Urban Centre and Sarolla (Freetown).

Apart from the very old constructions that are in poor state of disrepair, most of the houses and offices constructed from 2004 are in relatively good state and appear to be properly maintained by local councils.

**Reproductive and Child Health Program (RCHP) Technical Program**

As indicated earlier one of the objectives of the RCHP is to increase utilization of the Basic Package of Essential Health Services (BPEHS) primarily by pregnant and lactating women and children under the age of five (5).

The BPEHS has the following components, Interventions and Services:

- **Material and Newborn Health**
  - Antenatal Care
  - Delivery and Post-natal Care
  - Post-natal Care
  - Family Planning
  - Care of the newborn
  - Emergency Obstetric Care

- **Child Health and Immunizations**
  - EPI Services
  - Integrated Management of Childhood illness

- **Nutrition**
  - Community Nutrition
  - Micronutrient supplementation
  - Treatment of clinical malnutrition especially Severe Acute Malnutrition (SAM)

- **School and Adolescent Health Services**
  - Information, Education and Communication on Preventive, Curative, Rehabilitative and Promotion Health Services.

The activities under the BPEHS as listed above will generate huge quantities of waste including medical waste. The visits and interviews revealed that there is a breakdown of the Medical Waste Management System put in place under the Environmental Assessment (2001); Waste Management Plan (2002); review and update of EA HSRDP (2007) and National Health-Care Waste Management Programme Policy (NHCWMP) – 2007.

The supplies of basic equipments (Gloves, Needles and Syringes) were found to be irregular and patients are often asked to provide their own supplies including drugs. There were no special
receptacles for medical waste at Connaught. There was no systematic segregation and sharps boxes were absent in most of the health facilities including the main referral hospital (Connaught). There were also no special holding areas for hazardous waste. Sharps and hazardous waste were put into plastic bins and incinerated at lined pits. Health personnel (usually porters) doing the disposal and incineration do not wear protective clothing. Few wheeled bins have been supplied. Some private hospitals simply dispose of sharps and other medical waste along with municipal waste at landfill sites. In one instant the pharmacy reported that sharps were disposed of along the beaches in the tidal plains. Whilst senior medical personnel displayed extensive knowledge of medical waste management, nurses and other middle ranking personnel appear to have possessed rudimentary knowledge only; of both the legislation and management.

Transit points for garbage disposal are often over subscribed and collection are not regular or on daily basis as originally planned. The landfill sites are badly managed especially in Freetown due to insufficient supply of vehicles, front end loaders and compactors. In Bo, Moyamba, Kenema and Koidu-new Sembehun, Solid waste collection and disposal has improved considerably. There are still no designated dumpsites for Makeni and Kabala.

The local councils have plans to establish landfill/dumpsites at every major local district headquarter town.

3.3.1 Implementation
The implementation of the RCHP will lie with both the Ministry of Health and Sanitation (MoHS) and the Ministry of Internal Affairs, Local Administration and Rural Development (MoILARD) represented by the Decentralization Secretariat (Dec. Sec) and the Ministry of Finance – Local Government Finance Department.

From the few observations made in this section the following emerged. The MoHS has designated 5 health facilities per chiefdom, strategically placed and selected in consultation with the communities to begin the implementation of the basic emergency obstetric and new born care under the BPEHS. The 5 stations will be provided with incinerators. Laboratory services will continue to be provided at referral Hospitals, Institutions (University of Sierra Leone, College of Medicine and Allied Health Sciences, Private Clinics etc). It is further planned that each chiefdom will in the future be provided with a laboratory and incinerators. The general opinion is that not every PHU will be provided with an incinerator but collection and delivery of waste to incineration centres has to be enhanced through some form of mobile services. As the service provided will be free there will be increase in numbers of persons to be attended to and the accompanying waste generated. There will be need for increased training of sufficient personnel at all levels to be able to cope with the foreseen planned program. This training must also extend to the effective management of Medical Waste.

The local councils have to be strengthened in order to be able to carry out the new mandate demanded by the Local Government Act (2004). This document focuses on updating the HSRDP Environment Assessment (EA) reports of 2001, updated in 2007 and adopting it for the RCHP. The two (2) main components are for civil works and medical waste management under the technical programmes.
4.0 DESCRIPTION OF THE OVERALL LEGAL, REGULATORY AND ADMINISTRATIVE FRAMEWORKS
Since 2002 the overall legal and the administrative framework for Environmental Management has changed. The National Commission for the Environment and Forestry was set up in 2005 and the Environment Protection Agency (EPA) was set in 2008. The section has therefore been reviewed to reflect those changes. The structure of the EPA has changed and the roles as well.
The regulatory framework for environmental management has altered in the past year (1995-2010)

Organizational Structure of Environmental Management at National and Local levels
4.1 Ministry of Lands, Housing, Country Planning and the Environment (MLHCPE)
There is an overall institutional and legal framework for the management and protection of our environment in the national context. The responsibility for the management and protection of the environment formerly lay with the Department of the Environment of the Ministry of Lands, Housing, Country Planning and the Environment. The political head of the Department of the Environment was the Minister of Lands, Housing, Country Planning and the Environment. The administrative head was the Permanent Secretary who was responsible for co-ordinating the function of the departments within the Ministry viz. Department of Land and Country Planning (DLCP), Department of Surveys and Lands (DSL) and the Department of the Environment, (DOE). He was also the Principal Adviser to the Minister and the vote controller of the Ministry’s budget.
In 2005 the GOSL created the National Commission for the Environment and Forestry (NaCEF) and appointed a Commissioner. The Forestry Division of the Ministry of Agriculture, Forestry and Food Security Safety (MAFFS) and the Department of the Environment (DOE) of the Ministry of Lands, Housing, Country Planning and the Environment (MLHCPE) functioned essentially within the NaCEF framework. The administrative structures and staff were taken over by NaCEF.
In July 2008 the NaCEF was dissolved and replaced by the Environment Protection Agency (EPA) which is headed by an Executive Director. The EPA was established by an Act of Parliament: the Environment Protection Agency Act (EPAA – 2008). The Minister of Lands, Housing, Country Planning and the Environment (MLHCPE) still has the overall responsibility of the EPAA (2008). The DOE and not the Forestry Division is now under the EPA. The Forestry Division reverts to MAFFS.

4.2 Department of the Environment
The then Department of the Environment (DOE) in 1995 developed with World Bank Support, the National Environmental Action Plan (NEAP). This plan is presented in two volumes. Volume 1 analyses the environmental issues in Sierra Leone and the recommended interventions. Volume 2 contains the environmental proposals. A National Environmental Policy (NEP) was prepared in 1994. The goals, objectives and strategies of the (NEP) are outlined below.

4.3 Policy Goals
The goal of the National Environmental Policy is to achieve sustainable development in Sierra Leone through sound environmental management.

4.4 Objectives
① To secure for all Sierra Leoneans a quality of environment adequate for their health and well being;
② To conserve and use the environmental and natural resources for the benefit of present and future generations;
To restore, maintain and enhance the ecosystems and ecological processes essential for the functioning of the biosphere; to preserve biological diversity and the principle of optimum sustainable yield in the use of living natural resources and ecosystems; and

To raise public awareness and promote understanding of the essential linkages between environment development and to encourage individual and community participation in environmental improvement efforts.

4.5 Strategies

The following strategies were suggested to be pursued in order to achieve the policy goals and objectives.

(a) To establish and/or strengthen environmental protection standards, monitor changes in, and publish relevant data on, environmental quality and resource use;

(b) To make prior environmental impact assessment (EIA) of proposed activities which may significantly affect the environment or use of a natural resource and to provide relevant information, in a timely manner, to persons likely to be significantly affected by a planned activity and to grant them equal access and due process in administrative and judicial proceedings; and

(c) To promote environmental management through the creation of administrative and infrastructural support with appropriate financial backing;

(d) To cooperate in good faith with other countries and agencies to achieve optimal use of transboundary natural resources and effective prevention or abatement of environmental protection.

The legal basis for the implementation of the NEAP and for environmental Management and protection in Sierra Leone was the National Environmental Protection Act, 2000.

4.6 The National Environmental Protection Act (NEPA)

The National Environmental Protection Act (NEPA) 2000 empowered the then Department of the environment to perform the following tasks amongst others:

- Screen projects for Environmental Impact Assessment (EIA);
- Issue Environmental Impact Assessment Licenses; and
- Formulate or promote the formulation of, and monitor the implementation of environmental policies, programmes, projects, standards and regulations.

The Environment Protection Agency Act (EPAA) of 2008 gives the new Environmental Protection Agency (EPA) similar powers as NaCEF.

4.7 National Environment Protection Board (NEPB)

The NEPA 2000 also provided for the establishment of an Environmental Protection Board. This Board which was set up had the following functions:

- Facilitates coordination, cooperation and collaboration among government ministries, local authorities and other agencies in areas of environmental protection;
- Review national and sectoral policies and make such recommendations or proposal it may think necessary to the Minister.
- Review environmental impact assessments prepared pursuant to this Act and make appropriate recommendations to the Director.
- Investigate or cause to be investigated, any activity, occurrence or transaction which it considers is likely to have or result in harmful consequences to the environment and advise on measures necessary to prevent or minimize such consequences;
Advise the Minister on areas of environmental protection and control requiring special or additional measures indicating the priorities and specific goals to be achieved;

Undertake or cause to be undertaken specific studies and research aimed at developing strategies for the protection of the environment and make appropriate recommendations to the Minister; and

Consider any other matters which may be referred to it by the Minister and make appropriate recommendations or proposal thereon.

4.8 The Environment Protection Agency (EPA)

The EPA was set up by an Act of Parliament (The Environment Protection Agency Act EPAA 2008). The Minister of MLHCPE retains the overall control of the EPA. Under the EPAA (2008) the EPA has wide ranging functions and powers including:

- Formulation of policies on all aspects of the environment;
- Co-ordination of activities of bodies and agencies that impact the environment;
- Prescription of environmental standards and Guidelines;
- Issuance of environmental permits;
- Enforcement of compliance; and
- Studies and Research.

Unlike the NEPB the Environment Protection Agency Board (EPAB) carries largely oversight and supervisory functions. Like NEPB the EPAB composition is largely statutory with inclusion of many line ministries and units whose activities impact the environment. The Ministry of Finance and Economic Planning is conspicuously absent.

The EPA is headed by an Executive Director and Three (3) Deputy Executive Directors in charge of:

- Field operations and extension;
- Planning, Policy and Research; and
- Finance and administration.

The proposed departments to be established include:

- Chemical Control and Management;
- Information, Education and Communication;
- Environmental compliance and Enforcement;
- Inter-sectoral and International Cooperation;
- Finance Department; and
- Administration

The Provincial and District Environmental Officers are yet to be appointed. At the moment, EPA is underfunded, under resourced, under staffed and lack the full compliment of needed skilled staff to carry out its mandate.

Other sector instruments for the management of the environment include:

3. The Fisheries Management Act (1994)
4. The Public Health Act (1993)
Local Level
At the local level, the environmental sanitation functions are carried out by provincial officers of the DoE (formerly under NaCEF but now under the EPA) of the then MLHCPE through its Assistant Environmental Officers in the Northern, Southern, Eastern Provinces and an officer for the Western Area. At present the main tasks of the Assistant Environmental Officers operating at provincial levels basically include monitoring of environmental programmes and projects, evaluation of environmental degradation and completion of reports.

With the inception of the City and Town Councils in 2005, part of the environmental planning, monitoring and evaluation has been devolved to the councils.

City and Town Councils are charged partly with the responsibility of environmental management and sanitation. Assistant Environmental Health Officers are attached to the councils to offer professional advice and training on the cleaning and physical removal of garbage and disposal by council employees.

The local councils in line with the decentralization process are engaged in a wide range of activities including civil works for infrastructure (schools, health centres, etc), water and sanitation, irrigation, agriculture, and roads. The local councils are expected to screen and partly monitor their projects for environmental management. At the chiefdom level each household is encouraged to clean their environment and remove refuse to safe sites.

Sanitary officers and chiefdom police are empowered to enforce chiefdom byelaws rigorously. Training for chiefdom staff are provided by EHU and NGO’s. GOSL through NaCSA and other NGOs (UNICEF, Action Aid etc) provide services to communities.

4.9 EIA Procedure and Guidelines

The DeE had issued in July 1999 EIA procedures and EIA guideline documents for environmental impact assessment. These documents state the objectives and outline the procedures for an environmental impact assessment, and guidelines which proponents should follow to carry out such assessments. The EIA processes are outlined as follows:

- Integration of environmental considerations in development planning processes, in order to make use of natural resources in a responsible manner; and
- Protection and enhancement of the quality of all life forms;

The present EIA procedures and guidelines under the EPA are very similar to those of 1999 guidelines. The differences lie only in nomenclature.

Responsibilities in Dealing with EIAs – Competent Agency

The present guidelines define the competent Agency as the agency that will have to take responsibility for the EIA process, including the review of the initial proposal, of the reports and of the final decision on the acceptability of the submitted EIA.

It affirms the EPA as the competent authority at the national level in Sierra Leone and the role, in the long term, of regional environmental offices when they are established, in dealing with EIAs at the national level.

EIA Processes and Procedures

The processes and procedures described below have been incorporated into the new EPAA (2008). The processes as described by the guideline are the following:

- Application;
- Prescreening;
• Screening;
• Scoping;
• EIA and Environmental Impact Report; and
• Review and decision by the Competent Agency.

Pre-Screening

At Pre-Screening, the project proponent should establish contact with the competent Agency, establish an official contact person, and provide an initial description of the proposed activity. The competent Agency will register the application.

Screening

For screening into the further stages of the process, the proponent is recommended to appoint an independent consultant to assist in the process. The screening phase should decide the following amongst others:

- The need for and level of assessment;
- The level of Government to be responsible;
- The acceptability of the proposed consultant; and
- The public participation process;

At this phase, the proponent is to submit a screening report to the Competent Agency. The Agency may require the proponent to advertise its application.

Scoping

The scoping process is intended at ensuring that the EIA focuses on the right issues. It will be sanctioned by a scoping report, which is basically meant to be the Terms of Reference for carrying out the EIA. Although not clearly a requirement as per the guideline, it is also recommended that public consultation be undertaken at this stage, to make sure that relevant stakeholders have a say in identifying the issues and impacts that will further be assessed during the EIA.

EIA and EIS

The guideline provides a template structure for the EIA report (or EIS Environmental Impact Statement), as follows:

* Executive Summary
* Project Description
* Description of the Environment
* Description of Project Impacts
* Description of Alternatives Considered
* Assessment of the legal implications of the impacts
* Description of Expected Benefits of the Project
* Description of Methodology
* Evaluation of Impacts
* Mitigating Measures
* Identification of Information Gaps
* Other
* List of Participants
* List of References

4.9.1 Categorization of Projects

The NEPA 2000 and the EPAA (2008) schedule categorizes projects into three “schedules” according to their potential impacts:
- Schedule I includes “projects requiring Environmental Impact Assessment License”.
- Schedule 2 outlines factors for determining whether a project requires an Environmental Impact Assessment
- Schedule 3 outlines contents of Environmental Impact Assessment (EIA)

The project categorization as given in NEPA 2000 has been retained and incorporated into the EPAA (2008).

The National Environmental Protection Board (NEPB) has been screening projects. The NEPB has been replaced by a new board, Environment Protection Agency Board (EPAB). The NEPB as pointed out was under-funded and understaffed and could not fully carry out the roles assigned to it under the EA. The new board may suffer similar fate unless there is increased support from GoSL and other donor agencies. This support will take the form of training some of their staff and recruiting service providers to assist them to carry out their roles of reviewing and clearing sub-projects and of monitoring. Those service providers would be hired as and when required. Under the EPAA – 2008 the EIA processes and procedures including Project categorization remain the same as is outlined above. Only the nomenclature has been altered.

5.0 WORLD BANK ENVIRONMENTAL AND SAFEGUARD POLICIES

The update has been designed so that all investments under the RCHP will comply with all the laws of Sierra Leone and the environmental and social safeguards policies of the World Bank. This section discusses the Banks safeguard policies which may be triggered and their applicability.

The World Bank safeguard policies are as follows:

- Environmental Assessment (OP4.01, BP4.01, GP4.01)
- National Habitats (OP4.04, BP4.04, GP4.04)
- Pest Management (OP4.09)
- Involuntary Resettlement (OP/BP 4.12)
- Forests (OP 4.36, GP 4.36)
- Safety of Dams (OP 4.37, BP 4.37)
- Projects on International Waterways (OP 7.50, BP 7.50, GP 7.50)
- Management of Cultural Property (OPN 11.03)
- Indigenous Peoples (OD 4.20)
- Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)

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In preparing this update, a consideration of the type of future investments planned against the requirements of the Bank safeguard policies, has led to the determination that the following Banks policy is triggered by the project:

- Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)

5.1 Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)

This policy requires environmental assessment (EA) of projects/investments proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus improve decision making. The depth and type of analysis of the EA process depend on the nature, scale, and potential environmental impact of the activities proposed for funding under the project. The EA process takes into account the natural environment (air, water and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, cultural property) and transboundary and global environmental aspects.

The environmental and social impacts of the RCHP will come from activities and investments made. These activities include rehabilitation of facilities (Health facilities, Offices, Housing and Medical Waste Management).

However, the EA process calls for the Government of Sierra Leone (GOSL), represented by EPA secretariat to prepare an EIA report which will establish a mechanism to determine and assess future environmental and social impacts of the proposed RCHP. The EA then sets out mitigation, monitoring and institutional measures to be taken during implementation and operation of the project investments to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

The policy further calls for the RCHP as a whole to be environmentally screened to determine the extent and type of the EA process. RCHP has thus been screened and assigned an EA category B and C.

Therefore, this update sets out to establish the EA process to be undertaken during implementation of project activities in the proposed subprojects when they are being identified and implemented. (The category shall be determined on a case by case basis).

OP 4.01 further requires that the EA report must be disclosed as a separate and stand alone document by the GOSL and the World Bank as condition for appraisal of the project. The disclosure should be both in Sierra Leone where it can be assessed by the general public and at the Infoshop of the World Bank and that the date for disclosure must precede the date for appraisal of the project.

World Bank Screening Process

The screening process used by the World Bank classifies proposed projects into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

- Category A: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.
• Category B: A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects.

• Category C: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C Project.

• Category FI: A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

The RCHP has been classified as environmental category B. As requested by the Bank, the Government of Sierra Leone had in 2004 prepared an Environmental Assessment (EA) to address the environmental and social concerns related to subprojects.

6.0 GAPS BETWEEN SIERRA LEONEAN LEGISLATION AND BANK POLICIES

Overview
Sierra Leone currently has a comprehensive framework for assessing and managing the environmental impacts of development projects. In comparison with the World Bank Safeguard Policies, it would appear that the Sierra Leonean framework lacks the provision of clear requirements or guidance on the following:

- Byelaws and Regulations in the NEPA-2000; and now EPAA (2008).
- Standards applying to Wildlife Protection and Biodiversity Conservation.

Another issue is that while the responsibility for assessing and mitigating environmental impacts lies with the developers, monitoring falls under the EPA represented by the EPAA. However EPA like NaCEF may lack the logistic capability to carry out the tasks assigned to it by EPAB. Nearly all agencies collecting and managing natural resources and environmental information in Sierra Leone are weak and suffer from lack of human and financial resources. Units established with donor support flourish during the life of the project, but experience slow death following project completion.

Aside from these inadequacies the Sierra Leonean requirements are generally consistent with those of the World Bank.
Consultation and Disclosure Requirements

OP 4.01 requires that for “all Category A and B Projects”, the borrower consults project-affected groups and local non-governmental organizations (NGOs) about the project’s environmental aspects and takes their views into account. The borrower initiates such consultations as early as possible. For Category A Projects, the borrower consults these groups at least twice: (a) shortly after environmental screening and before the terms of reference for the EA are finalized; and (b) once a draft EA report is prepared”.

OP 4.01 further requires that “for meaningful consultations between the borrower and project affected groups and local NGOs on all Category A and B projects proposed for IBRD or IDA financing, the borrower provides relevant materials in a timely manner prior to consultation and in a form and language that are understandable and accessible to the groups being consulted”.

Category B reports for a project proposed for IDA financing are to be made available to project-affected groups and local NGOs, and the public at large in the borrowing country. An EIA report for projects proposed for IDA funding are prerequisites to bank appraisal.

Public consultation and disclosure are addressed by various pieces of Sierra Leone’s legislation and guidelines. Since there are various types of donors whose requirements differ from each other, Sierra Leone’s legislation is more flexible and less stringent than the Bank policies in this respect. However there is no limitation as to the extent and scope of consultation and disclosure, nor as to who should be consulted. There, is no real contradiction between Sierra Leonean legislation and Bank policies, which can be applied to their public consultation and disclosure without violating Sierra Leonean law.

Social Impacts

The sectoral law takes a human rights approach to the environment, which encompasses both the biophysical and social aspect.

6.1 Activities that may Impact on the Environment

The following activities may impact on the environment:

i. Civil Works due to:
   a) Establishment of campsite for the mobilization of construction material;
   b) Demolition of damaged or derelict structures at old site;
   c) Rehabilitation of health facilities, offices and staff housing;
   d) Clearing of vegetation and other materials (soil, bolders etc) at site;
   e) Excavation of pits and burrows to source soils/clay materials;
   f) Use of existing water sources (streams, rivers, wells) for concrete and motar and brick walls for the construction of buildings and other facilities;
   g) Construction of Hand dug wells/bore holes involving excavation and drilling;
   h) Construction VIP latrines involving excavation and filling;
   i) Construction of Incinerators.

ii. Social Impacts
   a) No landtake is envisaged under the RCHP;
   b) The influx of migrants workers and social conflict;
   c) Influx of patients and dependants to health post and hospitals;
   d) Increase pressure on social services.
7.0 ENVIRONMENTAL AND SOCIAL IMPACTS OF THE RCHP-2 CATALYTIC FUND PROJECT

The Environmental and social impacts of the Catalytic Fund Project have been considered in this chapter under the major subproject categories identified in section 6.

The key environmental issues in Sierra Leone have been presented in several documents including the Environmental and Social Management Frameworks (ESMF) IRCBP, (2004), RPF for IRCBP (2004), ESMF for DSDP (2009), EIA Safeguard Manual (2009), and for hospitals EA – HSRDP (2002), EIA for HSRDP (2007).

The critical problems facing Sierra Leone are:

- Deforestation;
- Land degradation;
- Water contamination;
- Loss of biodiversity, habitat and wetlands; and
- Rapid population growth;

The EA (2002; 2007) focused on impacts of the HSRDP in general including civil works. Some of the issues involved in the civil works component as well as social concerns were not included. The impacts of ancillary facilities (Water and Sanitation) were also not adequately dealt with. This section focuses on civil works and presents a severity of impacts.

7.1 Potential RCHP-2 Project – Environmental Concerns

The RCHP-2 Project in general is likely to have positive impacts on the environment in Sierra Leone in the short medium and long term for the following reasons;

- The implementation of this EA update will increase the practice of subjecting development projects to environmental management process. The EA offers the opportunity to identify potential impacts, mitigate them verifiably through monitoring while building capacity for environmental management within institutions, Agencies and local communities.
- The activities to be financed under the RCHP-2 such as rehabilitation of health facilities and, water supply and sanitation facilities, will ensure sustainable use of natural resources by the local communities themselves, thereby providing opportunities for increasing productivity through technical knowledge transfer.

- The RCHP-2 project and other donor financed activities will provide communities with social services (health post and ancillary facilities) thereby increasing the opportunities for an enhanced public health environment.

- The RHCP-2 will pose no direct risk to biodiversity, natural habitats and wetlands as it will not fund activities in protected areas, national parks wetlands or Forest.

The potential negative impacts from the RCHP-2 Projects are:
- Poor planning resulting in poor choice of location of subprojects that ultimately lead to land degradation and soil erosion, water (surface and ground) contamination, degradation of natural habitats and wetland ecosystems.

- During construction – poor performance of civil works contractors (and their supervisors) leading to unsuccessful incorporation of mitigation measures.

- Poor implementation of maintenance plans during operational phases of the public service infrastructure components and/or negligence of staff of failure in the monitoring stage.

**Potential Social Concerns and Impacts**

Sierra Leones’ social problems stem mainly from the effects of the recent political unrests and civil wars in the 1990’s which have worsened poverty and left the society with a tremendous loss of social capital. The following are the main social concerns:

- **Acute poverty**

- The situation with the returnees, internally displaced people, refugees, amputees, orphans, windows and widowers – is impacting every aspect of social and economic life.

- **Lack of shelter** – especially among the returnees and other war victims.

- **Lack of land** – for agricultural activity, human settlement etc.

- **High unemployment** – especially among the youths who cannot find work.

- **Lack of access to micro-credit/micro finance.**

- **Lack of useful and wanted skills** among active and able bodied population.

- **High attraction rate** among skilled workers including health personnel

- **Reduced access to basic medical services.**

- **High maternal deaths.**

- **High infant mortality.**

- **HIV/AIDS.**
7.1.2 Potential positive RCHP-2 Project Social Concerns
The project will have meaningful positive social impacts in the following areas;
- Increased access to health services including reproductive and Child Health Care
- Increase rural economic activity
- Provision of social services especially for Women and Children.
- Increase opportunities for employment, mostly short term employment for local communities.
- Together with the other ongoing – activities of other donors and agencies, the RCHP-2 will demonstrate continued government effort and concern for the plight of the poor
- Provide additional opportunity for participation of communities in local development.
- Capacity building in District/Local Governments and among Town villages and communities through learning by doing methods and formal training etc.
- Capacity Building among Health Personnel also in Medical Waste Management

Potential negative social impacts from the RCHP-2 are:
- Lack of involvement of local communities in the Development Planning processes.
- Exclusion of vulnerable groups from participating in and benefiting from project activities.

Potential Positive Impacts
The potential positive impacts of civil works include;
- Funding the development of infrastructure and services;
- Providing jobs;
- Providing funds for development or maintenance of sustainable practices;
- Providing alternative and supplementary ways for communities to receive revenue from petit trading;
- Poor management of construction waste.

Potential Negative Impacts
Potential negative impacts arising from civil works on environment include;
- Pollution of water, air, vegetation and soils;
- Land degradation;
- Physical impacts arising from infrastructure;
- Destruction of parts of aquatic ecosystems (Marine, Estuarine and Freshwater);
- Possible interference with cultural, historical and archeological sites;
- Loss of environmental functions provided by the natural ecosystems;
- Loss of rare, endangered, threatened species of special concern and species of economic importance;
- Encroachment of ecosystems on disturbance to breeding and nesting grounds; and animal behavior.

### 7.2 Potential Environmental Impact of Civil Works

The potential negative impacts are related to two (2) activities that are either ongoing, completed or to be undertaken:

Rehabilitation of health facilities, offices and staff housing; and

Provision of Ancillary facilities (Water and Sanitation and Incinerators).

#### 7.2.1 Infrastructure Development

The rehabilitation and reconstruction of Health facilities, offices and staff housing, as well as provision of ancillary facilities, (Hand dug wells, VIP latrines and Incinerators) at existing sites will have potential impacts on the following environmental components during preconstruction, construction and post construction phase:

- Physical Environment
- Environmental Quality
- Ecological Resources
- Humans use values
- These are elaborated below.

#### 7.2.2 Physical Environment, Environmental Quality, Ecological Resources and Safety and Health

**Physical Environment**

**Impact on Climate**

The proposed project component of rehabilitation and construction will lead to moderate vegetation cover loss for buildings and ancillary facilities (Water and Sanitation and Incinerators). These construction activities will not cause any appreciable change in wind profile.

**Geology**

Construction activities will result in the removal of soil and rocks present at the site. There will be changes in the topographic height, slope relief intensity, degree of shaping and exposure of the area. During the design, land stability will be integrated in all construction works and planning of the project. The likely interaction between the construction works and the existing land features will involve minimal impact on land stability in the project areas especially during the rainy season.

**Environmental Quality**

**Impact on Air Quality**

**Odour and Dust**

Dust and odour emissions could occur from construction as a result of the following:

- Mobilization of construction machinery;
- Dust emissions during excavations, breaking of rocks and concrete;
- Exhaust emissions from construction machinery;
- Increased levels of road traffic pollutants caused by traffic congestion or increased traffic flows on routes during construction; and
- Wind erosion of the materials in stockpiles.

Air quality will also be impacted by emissions from vehicles and from heavy earth moving equipment used in clearing and operations. The major emissions from construction equipment include:
- Nitrates;
- Carbon monoxide;
- Particulate matter less than 10µ;
- Carbon dioxide; and
- Aldehydes

Dust has the potential to cause nuisance through soiling of property and of vegetation. Respiratory disorders are likely when air quality is impaired. However the likely impact on air quality is localized temporary and confined to construction sites. In civil works of limited nature, Sulphur Dioxide (SO₂) acids of Nitrogen are not higher than World Bank recommended values.

Noise
Noise is one of the negative impacts during the provision of infrastructure facilities. Negative impacts of noise are a result of several factors including:
- Mobilization of construction machinery;
- Acceleration/deceleration/gear changes by vehicles;
- Construction of structures and facilities; and
- Loading, transportation and unloading of materials.

Exposure to noise levels above the tolerable threshold of 72 decibels can cause/result in fatigue, tiredness, low morale and decreased production levels and productivity. Tired workers are also prone to accidents and this can contribute to an increase in accidents in the working environment. Increase noise levels cause discomfort to residents and threats to residents. The intensity of noise levels will be intermittent, temporary in nature and confined to day hours only.

Construction and rehabilitation activities would require water for mortar mixing, bathing and laundraing and drinking etc. This will put extra demand on existing surface and ground water sources.

Groundwater
Sinking wells construction of VIP latrines and Incinerators may entail excavation below existing groundwater level when the latter is found within a relatively shallow depth. This will interfere with existing groundwater flow regime and will result in the temporary reversal of groundwater flow. Clearing of the area will change the vegetation cover and will alter groundwater recharge and runoff conditions. Groundwater quality may be impacted by infiltration or seepage where the soil is porous.

Surface Water
Site clearing will produce discharges to surface water flow since interruption and evapotranspiration will be reduced. Surface runoffs especially in the rainy season will increase turbidity, lower productivity and result in degradation of surface water quality. Surface runoff from onsite areas
such as access roads can introduce sediments and nutrients loads into surface water bodies into which it is discharged.

**Vegetation (Flora)**
Clearing land even of limited nature will make plant regeneration more difficult. Native species may be replaced by aggressive opportunistic species.

**Wildlife (Fauna)**
Stocks of animals depend on the existence of habitats of a certain size. Clearing will fragment the habitat and displace the wildlife. Some animal species depend on the existence of other plants and animal species within the habitat for food/nutrients or cover. Clearing and encroachment will alter several of the physical conditions including light, humidity and temperature. The installation of facilities and other construction works will form temporary barriers to the movement of animals. Wildlife will migrate to escape physical disturbance and noise associated with construction activities.

In civil works of limited nature as in RCHP only foraging animals and soil organisms may be impacted.

**Safety and Health**
During operations, provision will be made of a safe and healthy environment for workers and employees.
There are threats to safety and health through:
- Inadequate and clean living facilities;
- Inadequate waste disposal facilities;
- Poor storage facilities for hazardous chemicals and petroleum products leading to spillage and fire outbreaks;
- Industrial accidents;
- Poor occupational hygiene management;
- Illness and Infectious disease outbreaks; and
- Loss of Employment

7.2.3 **Provision of Ancillary Facilities (Water and Sanitation)**

**Beneficial Impacts of Water Supply Systems**
The potential beneficial impacts of water supply systems in the communities are the following:
- Gain in terms of time, that may be used for other productive activities;
- Reduce work burden especially for staff and community;
- Better comfort and domestic hygiene;
- Reduction in water-borne diseases such as dysentery; and
- Capacity building and training in the community, and resulting enhancement of organizational financial and technical capacities of the community.

**Negative Impacts**
The potential adverse impacts that water systems may cause on the biophysical or human environment are as follows:
- The community is made dependent on a more sophisticated system that will require maintenance, organization and finance;
- Water borne diseases (malaria, skin diseases) caused by lack of drainage in the immediate surroundings of wells or water points;
- Groundwater contamination through the well, during construction or operation; and
- Waste material extracted from the well (Hand-dug wells) or waste drilling cutting and drilling mud (boreholes) if not disposed of or reclaimed properly;

Sanitation Facilities

Beneficial Impacts
Potential beneficial impacts of sanitation systems are the following:
- Reduction in water-borne diseases such as dysentery;
- Reduction in the potential for outbreaks of epidemic infectious diseases such as cholera; and
- Capacity building and training in the community, and resulting enhancement of organizational, financial and technical capacity of community.

Negative Impacts
The potential adverse impacts of sanitation systems in the facilities may include the following:
- Impact on groundwater where water table is shallow;
- Impact of potential sludge disposal;
- Potential impact of effluent discharge in water bodies for piped sewerage system; and
- Community is made dependant on a more sophisticated system that will require maintenance, organization and finance.

7.2.4 Provision of Incinerators

Beneficial Impacts of Incinerators
Incinerators have the following beneficial impacts:
- Good disinfection efficiency; and
- Drastic reduction in weight and volume (up to 5%).

Negative Impacts
The potential adverse impacts of incinerators include the following:
- Efficiency of chemical & pharmaceutical waste treatment is good for rotary klin in 95%. For pyrolytic incinerator, very limited for lower temperatures;
- Toxic emissions to air if no control devices;
- Maintaining temperature levels (and efficiency) in field incinerators is difficult; and
- Usually high costs for high temperature incinerators.

The potential impacts of civil works on the Biophysical Environment are also summarized in Table I.

Table 1: Potential Environmental and Social Impacts of Civil works

<table>
<thead>
<tr>
<th>Activities and Sources</th>
<th>Potential Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction and Rehabilitation</td>
<td>Climate</td>
</tr>
<tr>
<td>Leading to Vegetative cover loss</td>
<td>Mild changes in Wind profile</td>
</tr>
<tr>
<td>---------------------------------</td>
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</tr>
<tr>
<td>Site Clearing, filling and construction.</td>
<td>Topography</td>
</tr>
<tr>
<td>Changes in geology and land contours</td>
<td>Land Stability</td>
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<tr>
<td>Mobilization of construction material - Vehicles and machinery at work - Loading and transportation of construction material.</td>
<td>Noise</td>
</tr>
<tr>
<td>Water required for construction activities - Waste water discharge</td>
<td>Water Bodies</td>
</tr>
<tr>
<td>Dust and odour emissions (SO₂ and NOₓ) - Exhaust emissions from construction and normal traffic.</td>
<td>Air Quality</td>
</tr>
<tr>
<td>Land clearing, land leveling and digging</td>
<td>Flora and Fauna</td>
</tr>
</tbody>
</table>

- Provision of WATSAN facilities (During construction and Operation)

- Mild change in micro-level topography and local aesthetics
- Changes in land stability especially during rainy season.
- Noise levels may be high causing discomfort to man and threat to wildlife.
  Impact is intermittent.
- Draw down of available water
- Surface and ground water contamination.
- Nuisance through soiling of property and vegetation.
  Increase in respiratory disorders.
  Impact is localized
- Loss of vegetative cover
- Loss of fauna (mammals birds, insects).
- Changes in soil fauna
- Gain in terms of time, that may be used for other productive activities
- Reduce work burden especially for staff and community
- Better comfort and domestic hygiene
- Reduction in diseases such as dysentery
- Capacity building and training in the community.
Community is made more dependent on a more sophisticated system that will require maintenance and finance.
- Water borne diseases (malaria, skin diseases) caused by lack of drainage in immediate surroundings of water points.
- Groundwater contamination through construction of VIP latrine, boreholes and Hand dug wells.

**Incinerators**
- Good disinfection efficiency;
- Drastic reduction in weight of volume;
- Toxic emission to air if no control devices are installed;
- Smoke nuisance;
- High cost of incinerator;
- Toxic compounds in ashes and waste.

### 7.3 Mitigation Measures

The success of the mitigation measure depends largely on the implementation of the ESMF by all stakeholders. This section attempts to provide detailed accounts of measures that are to be adopted to avoid, reduce or remedy all those adverse impacts as identified in the section dealing with environmental and social impacts of the proposed project.

### 7.3.1 Civil Works

**Construction Phase**

The mitigation measures for the civil works component of the project involve the handling effectively of construction-related wastes so as to remediate their impacts on Land Resources, Hydrological Resources, Air Quality and Noise, Biological Resources, Socio-Economic and Cultural Resources, Public Health and Safety.

**Land Resources**

The contractor’s sites compound shall have adequate living and sanitation facilities for the workers, including an approved plan for solid and liquid waste disposal. The contractor shall have an acceptable Environment, Health and Safety Plan for storage of equipment, petroleum, paint products etc, so as to minimize risk of spillage or leakage, fire, as well as safety and emergency response procedures.
Disposal of excavated materials, removed debris and demolished structural materials shall be transported to authorized dumpsite approved by the supervising architect. Excavated materials shall not be deposited onto adjacent farmlands or terraces.

**Hydrological Resources**
The supervising Architect and the contractor must ensure that the design entails enough mitigation measures and construction controls so that surface and groundwater qualities are maintained within Word Health Organization standards. The design must withstand storms. Certain requirements must be fulfilled including:
- Additional water supplies;
- Erosion controls to prevent siltation;
- Provisions for containment of fuel spills and waste water; and preservation of existing drainage or to minimize dredge and fill.

The contractor shall ensure that the use of water resources for construction activities do not lead to excessive drawn down on the water table or surface water supplies.

**Air Quality and Noise**
The contractor shall take all necessary measures to limit pollution from dust and any wind blown materials during the works. Measures include:
- Utilize water spraying during operations;
- Trucks leaving the sites are properly covered to prevent discharge of dust, rocks, sand etc;
- Stored materials and heaps should preferably be located away from communities and farmlands.

The contractor shall adopt the best practicable means of minimizing noise during construction.

**Biological Resources**
Wherever possible mature trees shall be retained. Cleared vegetation, excavated materials and others arising shall be disposed of at authorized sites inorder to avoid destruction of productive areas, specialized vegetation, known protected habitats or sensitive zones.

**Socio-Economic and Cultural Resources**

**Employment Benefits**
Employment benefit to the local community shall be maximized through labour intensive methods and contracting part of the work with local contractors.

**Public Health and Safety**
The contractor shall take all necessary action to ensure safety and health conditions at the construction site and surrounding communities in his Environment, through Health and Safety Plan. Mitigation measures shall be taken in respect of:

- Reducing construction site risks to the Workers and the Public

Safety rules for work operations shall be instituted by the contractor including, but not limited to, location of plant equipment away from sensitive locations (schools, markets etc), equipment
operation procedures, safety barriers, warning signs, first aid and medical kits and procedures, and safety training for the workers.

- **Reducing health risks among employees and interaction the public**
  Employee rules and information campaigns shall be instituted by the contractor on health practices and communicable diseases including HIV/AIDS. The contractor shall also ensure that treatment facilities are made available.

**Involuntary Resettlement**
As there may be no new landtake, no resettlement issues are foreseen.

**Chance Finds of Cultural Resources**
Any chance finds of archeological or cultural resources during excavation must be reported to the appropriate authorities.

**Post construction Phase**

**Land Resources**
The Maintenance Contractor shall follow the same procedure as the Construction Contractor in having an Environmental, Health Safety Plan for storage of Equipment, petroleum products etc, so as to minimize risks of spillage or leakage, as well as be able to implement a safety and emergency response procedures.

The Maintenance Contractor shall be required to follow procedures similar to those for the construction concerning disposals of excavated materials, removed debris and demolished structures.

**Hydrological Resources**
Maintenance contractor must follow same procedures as the construction contractor in the judicious use of water and the protection from pollution of surface and groundwater resources.

**Air Quality and Noise**
The maintenance contractor shall take all necessary measures to limit pollution from dust and gaseous emissions in their operations as in the construction phase. The best practicable means of minimizing noise during maintenance shall be adopted.

**Biological Resources**
During maintenance work, all steps shall be taken to avoid or minimize damage to biological resources.

**Socio Economic and Cultural Resources**
The maintenance contractor/contractors shall be required to follow procedures similar to those for construction contractors in respect of safety and health of workers and communities. This shall apply in respect of safety benefits and the implementation of the Environment, Health and Safety Plan.
7.3.2 Provision of Ancillary Facilities
The mitigation measures for the impacts on the Biophysical and Social Environment of the provision of water and sanitation facilities in are discussed in this section.

Water
Proper siting of wells will lead to avoidance of sites with poor drainage and sources of contamination that may lead to spread of diseases such as malaria and dysentery.

Groundwater contamination can be avoided by the following:
- Proper sitting of the wells and distribution points;
- Use of biodegradable drilling fluids and mud additives;
- Drainage of the immediate surroundings of the wells;
- Construction of properly designed and water tight well head and proper sealing of pump to well head;
- The pump and other equipment submerged into the well need to be disinfected, initially then each extraction; and
- Initial chlorination of well, after pumping test and pump installation, then periodic chlorination

Waste material extracted from wells or drilling cuttings and drillings mud must be disposed of in an acceptable manner by:
- Drying, spreading on site and recontouring if needed;
- Recycled or disposed of at Dumpsites; and
- Used reagents are to be stored and disposed of at appropriate dumpsites.

Sanitation facilities (VIP latrines)
Avoidance of Groundwater contamination can be achieved through proper siting of the latrine. There should be avoidance of latrines where the highest groundwater level is less than 2m under the bottom of latrine pits or infiltration pits sludge from waste water treatment is to be dried on-site, mixed with earth and used as fertilizers. Wells should be sited at least 50m from the toilet.

Waste materials extracted during excavation or drilling must be dried on site and recontoured if possible. Waste material could also be recycled or disposed of at appropriate site.

Social Environment for WATSAN Facilities
Staff and communities must be organized to take proper care of facilities. This can be achieved by promotion of awareness and technical training.

Incinerators
Some nuisance can be minimized by siting of facilities with appropriate chimney heights. Exhaust gas cleaning facilities should be installed to minimize or control air pollution. The operators must be properly trained and there should be regular monitoring of flue gas. Incinerator ash should be deposited in lined pits within landfill sites. Waste not to be incinerated should be disposed of by other methods.

Table 2 summarizes the Mitigation Measures for both the Construction and Post Construction Phases of the Civil Works as well as the Installation of Facilities.
### Table 2: The Potential Environmental and Social Impacts and Associated Mitigation Measures for Civil Works during construction and Post Construction.

<table>
<thead>
<tr>
<th>Issues/Impacts</th>
<th>Mitigation</th>
</tr>
</thead>
</table>
| Impact on Terrestrial Resources        | - Safe and adequate living and sanitation facilities for workers  
| - Safety accidents and spillage        | - Solid and waste disposal facilities present  
|                                       | - Environmental Health and Safety Plan for Storage of equipment and petroleum products to minimize spillage of leakage.  
|                                       | - Training on safety measures in event of accidents.  
|                                       | - Safety and Emergency response procedures in place  
| Disposal of Waste materials and other debris. | - Excavated materials and debris disposed of at authorized dumpsite  |
| Impact on Hydrological Resources       | - Design entails enough measures to maintain surface and groundwater qualities.  
|                                       | - Design must withstand storms  
|                                       | - Additional water supply sources present.  
|                                       | - Erosion controls to prevent siltation  
|                                       | - Provision for containment of fuel spills and wastewater.  |
| Impact on Air Quality and Noise        | - Utilize water spraying during operations  
| - From dust and wind blown litters     | - Trucks properly covered to prevent discharge of dust, rocks and sand.  
|                                       | - Crushers and other equipment conform to relevant dust emission control standards.  
<p>|                                       | - Stored materials and heaps preferably located away from communities and farmlands. |
| Impact on Biological Resources         | - Avoid or minimize damage to biological resources especially in protected habitats or sensitive |</p>
<table>
<thead>
<tr>
<th>Impact on Socio-economic Resources</th>
<th>Cultural Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Public Health and Safety</td>
<td>- Chance finds of archaeological or cultural resources to be reported to appropriate authorities.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Provision of WATSAN Facilities</th>
<th>Cultural Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Groundwater contamination</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact on Socio-economic Resources</th>
<th>Cultural Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Employment benefit to local communities maximized through labour intensive methods.</td>
<td></td>
</tr>
<tr>
<td>- Contract part of the work to local contractors</td>
<td></td>
</tr>
<tr>
<td>- Reducing construction site risks to the workers and the public by instituting safety rules and operational procedures.</td>
<td></td>
</tr>
<tr>
<td>- Reducing health risks among employees and interaction with the public (Employee rules and information campaigns instituted).</td>
<td></td>
</tr>
<tr>
<td>- Awareness raising campaigns on communicable diseases including HIV/AIDS undertaken</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Provision of WATSAN Facilities</th>
<th>Cultural Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Proper siting of water points and latrines</td>
<td></td>
</tr>
<tr>
<td>- Use of biodegradable drilling fluid and mud additives</td>
<td></td>
</tr>
<tr>
<td>- Immediate surrounding of facilities kept clean</td>
<td></td>
</tr>
<tr>
<td>- Proper construction of facilities</td>
<td></td>
</tr>
<tr>
<td>- Waste materials extracted dried and recontoured on site.</td>
<td></td>
</tr>
<tr>
<td>- Training of staff and communities for the proper care of facilities.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Installation of Incinerators</th>
<th>Cultural Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Incinerators appropriately sited and installed with appropriate chimney heights to avoid smoke nuisance;</td>
<td></td>
</tr>
<tr>
<td>- Exhaust gas cleaning facilities installed to minimize or control air pollution;</td>
<td></td>
</tr>
<tr>
<td>- Operator must be properly trained;</td>
<td></td>
</tr>
<tr>
<td>- Regular monitoring of flue gas;</td>
<td></td>
</tr>
<tr>
<td>- Incinerator ash deposited in lined pits within the landfill sites;</td>
<td></td>
</tr>
<tr>
<td>- Wastes not to be incinerated must be disposed of otherwise or recycled.</td>
<td></td>
</tr>
</tbody>
</table>
The summary of the severity of the impacts is summarized in Table 3 below.

### Table 3: Significance of Environmental Impacts Associated with Proposed Civil Works

<table>
<thead>
<tr>
<th>Medium</th>
<th>Impacts</th>
<th>-/+</th>
<th>D/I</th>
<th>P/S</th>
<th>S/M/L</th>
<th>R/IR</th>
<th>T/P</th>
<th>L/RG/N</th>
<th>A/U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Emission of Gases &amp; Particulates</td>
<td>-</td>
<td>D</td>
<td>P</td>
<td>S</td>
<td>IR</td>
<td>T</td>
<td>L</td>
<td>U</td>
</tr>
<tr>
<td>Change in Surficial Soil</td>
<td>NA</td>
<td>D</td>
<td>P</td>
<td>L</td>
<td>IR</td>
<td>T</td>
<td>L</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Change in Topography</td>
<td>NA</td>
<td>D</td>
<td>P</td>
<td>L</td>
<td>IR</td>
<td>P</td>
<td>L</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Increased Exposure of Area</td>
<td>-</td>
<td>D</td>
<td>S</td>
<td>M</td>
<td>R</td>
<td>T</td>
<td>L</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Change in area water balance</td>
<td>-</td>
<td>I</td>
<td>S</td>
<td>M</td>
<td>IR</td>
<td>P</td>
<td>L</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Ground water</td>
<td>Contamination by metals in soil</td>
<td>-</td>
<td>I</td>
<td>S</td>
<td>M</td>
<td>IR</td>
<td>T</td>
<td>L</td>
<td>U</td>
</tr>
<tr>
<td>Contamination by Waste Disposal</td>
<td></td>
<td>-</td>
<td>I</td>
<td>S</td>
<td>L</td>
<td>IR</td>
<td>P</td>
<td>L</td>
<td>U</td>
</tr>
<tr>
<td>Surface water</td>
<td>Increased surface runoff volumes</td>
<td>-</td>
<td>I</td>
<td>S</td>
<td>M</td>
<td>R</td>
<td>T</td>
<td>L</td>
<td>U</td>
</tr>
<tr>
<td>Increased Sediment &amp; Nutrient Loads</td>
<td></td>
<td>-</td>
<td>I</td>
<td>S</td>
<td>M</td>
<td>IR</td>
<td>T</td>
<td>L</td>
<td>U</td>
</tr>
<tr>
<td>Air Quality, Noise, Odour and Dust</td>
<td>Increased dust emission</td>
<td>-</td>
<td>D</td>
<td>P</td>
<td>L</td>
<td>IR</td>
<td>T</td>
<td>L</td>
<td>U</td>
</tr>
<tr>
<td>Increased Noise emission</td>
<td>-</td>
<td>D</td>
<td>P</td>
<td>L</td>
<td>IR</td>
<td>T</td>
<td>L</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Wildlife</td>
<td>Loss of habitat</td>
<td>-</td>
<td>D</td>
<td>P</td>
<td>L</td>
<td>IR</td>
<td>P</td>
<td>L</td>
<td>U</td>
</tr>
<tr>
<td>Loss of Wildlife</td>
<td>-</td>
<td>D</td>
<td>P</td>
<td>S</td>
<td>M</td>
<td>R</td>
<td>T</td>
<td>L</td>
<td>U</td>
</tr>
<tr>
<td>Change Soil Fauna</td>
<td>-</td>
<td>D</td>
<td>P</td>
<td>M</td>
<td>IR</td>
<td>P</td>
<td>L</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Vegetation</td>
<td>Loss of Plant Communities</td>
<td>-</td>
<td>D</td>
<td>P</td>
<td>L</td>
<td>IR</td>
<td>P</td>
<td>L</td>
<td>U</td>
</tr>
<tr>
<td>Loss of diversity</td>
<td>-</td>
<td>D</td>
<td>P</td>
<td>L</td>
<td>IR</td>
<td>P</td>
<td>L</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Emergence of opportunistic species</td>
<td></td>
<td>-</td>
<td>I</td>
<td>P</td>
<td>L</td>
<td>R</td>
<td>T</td>
<td>L</td>
<td>A</td>
</tr>
<tr>
<td>Socioeconomic Conditions</td>
<td>Improved Health Condition</td>
<td>+</td>
<td>D</td>
<td>P</td>
<td>M</td>
<td>R</td>
<td>P</td>
<td>N</td>
<td>U</td>
</tr>
<tr>
<td>Introduction of New Technology</td>
<td></td>
<td>+</td>
<td>D</td>
<td>P</td>
<td>L</td>
<td>IR</td>
<td>P</td>
<td>N</td>
<td>U</td>
</tr>
<tr>
<td>Increased Access to Area</td>
<td>+</td>
<td>D</td>
<td>P</td>
<td>L</td>
<td>IR</td>
<td>P</td>
<td>N</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Increased employment</td>
<td>+</td>
<td>D</td>
<td>P</td>
<td>L</td>
<td>R</td>
<td>T</td>
<td>N</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Heritage Resources</td>
<td>Chance Finds</td>
<td>NA</td>
<td>I</td>
<td>S</td>
<td>L</td>
<td>IR</td>
<td>P</td>
<td>L</td>
<td>U</td>
</tr>
</tbody>
</table>

**Legend:**
- -/+ - Negative or Positive
- D/I - Direct or Indirect
- P/S - Primary or Secondary
- S/M/L - Short, Medium or Long term
7.4 Environmental and Social Management Plan of Civil Works

The proposed Environmental and Social Management Plan is intended to track the performance of the Environmental and Social Management Process outlined in the EA (2001) and this update for civil works. The monitoring shall be done by key MOHS personnel and stakeholders including LC, EPA, Implementing Partners (service Providers), NGOs, Local Authorities such as chiefs and other community groups and local Environmental committees.

The ESMF is presented in Table 4 below.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation</th>
<th>Implementation (Cost/Finance)</th>
<th>Monitoring</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitigation Measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE 4: ESMP for Civil Works per subproject.
<p>| Worksite/Campsite management, materials and equipment storage | Selection and storage of topsoil for subsequent reinstatement of the temporary work areas of the site to their original condition. Provision of adequate materials management and safety plan; handover of rehabilitated compound site fully reinstated. Specified provision of bitumen/oil interceptors on all drainage. | Consultant Architect (CA) Contractor/Project) No additional cost | MOHS EPA LC DSDP | During Construction |
| Material Excavation and Deposit | Controlled disposal of cut material and surplus fill. | CA, Contractor (Contractor/Project) No additional cost | EPA LC | Before Commissioning |
| Water Resources Management | Appropriate sourcing of water and prior arrangements with communities. Measures to maintain surface water and ground water qualities. Erosion controls to prevent siltation. Provision for containment of fuel spills and waste water. | CA Contractor (Contractor/Project) 5,000 USD | EPA MOHS LC DSDP |
| Dust, potential pollutants and noise during construction | Water spraying during operations; dust emission controls on crushers and other equipment; Preferably locate heaps away from communities and farmlands; cover material-laden trucks; control of fugitive dust during material delivery. | RE, Contractor (No additional cost; Community collaboration) | EPA MOHS LC DSDP | During Construction |</p>
<table>
<thead>
<tr>
<th>Damage to biological resources during construction</th>
<th>Preservation of mature trees. Disposal of all cleaned vegetation by burying or RE-controlled burning. Avoidance through design adjustments; restoration or protection measures of known protected areas or special habitats.</th>
<th>CA, Contractor (Contractor/Project) No additional cost</th>
<th>EPA MOHS LC DSDP</th>
<th>During Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment benefits</td>
<td>Mechanisms to maximize local employment benefits explored during consultations.</td>
<td>CA, Contractor, Community (No additional cost)</td>
<td>MOHS EPA CA LC</td>
<td>After Construction</td>
</tr>
<tr>
<td>Public health and safety at construction site.</td>
<td>Safety rules for work operations, such as equipment operation procedures, protective hard hats, shoes and clothing for workers; first aid and medical kits and procedures health and safety regulations clearly displayed in English and Krio. Public health and safety measures, such as barriers and warning signs to borrow areas or other dangerous zones; information campaigns on health practices and communicable diseases.</td>
<td>CA, Contractor, Community (Contractor/Project) USD 30,000</td>
<td>EPA MOHS NGO LGFD</td>
<td>During Construction</td>
</tr>
</tbody>
</table>

8.0 THE LEGAL, REGULATORY AND ADMINISTRATIVE FRAMEWORK OF THE REPRODUCTIVE AND CHILD HEALTH PROGRAM (RCHP) – TECHNICAL ASPECT

The brief outline of the technical program of the RCHP has been presented in section 1 and 3. The general regulatory framework has been dealt with and civil works aspect of the RCHP has been dealt with extensively in this update under section of 7. This section focuses on the technical aspects of the RCHP. The situation analysis has been presented in section 3.3.
8.1 Description of the Legal, Regulatory and Administrative Frameworks for RCHP

The legal and administrative framework for environmental management in general has been dealt with in the EA of HSRDP of 2002 revised in 2007, EIA HSRDP on landfilled sites 2007 and revised in 2008. This has been updated in this report of section 4. The MOHS is the statutory body responsible for the management of waste in general.

The legal, regulatory and administrative frameworks are routed in a series of documents:

- Public Health Ordinance – (1960);
- SHARP and HSRDP Waste Management Plan – 2003;
- National Health Policy 2003;
- Local Government Act – 2004;

The various EAs of the HSRDP and updates are well documented and need not be repeated. The Public Health Ordinance 1960 under section 23 imposes a mandatory accountability on everyone who generates or handles waste. The National Health Policy 2003 updates the ordinance and unfolds procedures.

A comprehensive waste management plan was prepared under SHARP in 2003. The MOHS in 2003 established a National Programme for the Safe Management of Medical Waste.

The SHARP Plan of Action included amongst others:

- Advocacy;
- Education and training;
- Provision of resources;
- Procedures for safe handling, segregation, storage and disposal of medical waste; and
- Routine monitoring.

A national Health-Care Waste Management Programme Policy (NHCWMP) was elaborated in 2007. As an addendum to the National Health Policy 2003 the NHCWMP established a comprehensive system of safe management of health care waste to ensure safe working environment for all health care staff in Sierra Leone. This document clearly lays down the blue print for management of all the categories of medical waste. Standards and operational procedures are also laid down.

After going through several institutional and legal changes the Environment Protection Agency was set by an Act of Parliament in 2008. This agency is mandated to supervise and regulate all aspects of environment including the handling and safe disposals of hazardous materials. Prosecutions and penalties for violations could also be carried out by the agency.

The Local Government Act 2004 has devolved certain functions to local council including primary health care and environmental management issues. The Environmental Division of the MOHS provides personnel and technical guidance to local council on health matters including RCHP. Whilst local councils have been trained in the use of the checklist in monitoring general environmental management issues, the RCHP presents a unique situation which requires special
attention and guidance from the MOHS. The MOHS needs to acquire capacity to carry out the RCHP nationwide.

9.0 POTENTIAL NEGATIVE IMPACTS OF THE TECHNICAL PROGRAMMES OF THE RCHP

The potential positive impacts of the RCHP has already been dealt with in section 7 the waste generated as a result of activities under the programme should be disposed of in such a manner that they would pose little or no threat to the environment. The effects of civil works have been dealt with in section 7. The waste generated pose a potential threat to the workers from point of generation to onsite storage, treatment and offsite storage and finally disposed whether through incineration or at landfill site. The potential threats are to medical workers, patients, ordinary unsuspecting public and waste pickers. The potential negative impacts could be managed through the frameworks proposed under SHARP and Waste Management Plan of 2002 and the NHCWMP (2007). If not properly managed the potential for spread of communicable diseases including STD and HIV/AIDS are enormous. An integrated approach requiring the involvement of the Directorate of disease control and prevention of MOHS is required. Activities such as surveillance, community sensitization, training of healthcare personnel and case management should be ongoing. Waste generated include: Needles, Syringes, blades, bottles, chemicals from activities such as Laboratory tests, and immunization; Body fluids and human tissues including fetuses, umbilical cords and placentas; Swabs, gloves, soiled linens; and cans, bottle and bags from feeding programmes. An EMP has been prepared and presented in Table 5. This EMP focuses specially on the RCHP which was not included in the EA (2002; updated 2007) for HSRDP. In that update, (2007) Avian Influenza was the focus. The EMP in Table 5 specifically relate to the RCHP. An indicative budget has been presented which is subject to changes.
<table>
<thead>
<tr>
<th>Activities</th>
<th>Potential Major Impacts/Issues</th>
<th>Mitigation Measures</th>
<th>Monitoring Measures</th>
<th>Monitoring Requirements</th>
<th>Budgets $ (Proposed)</th>
<th>Responsibility for Mitigation</th>
<th>Responsibility for Monitoring and Supervision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenatal care</td>
<td>Laboratory waste, sharps, syringes, poor antenatal care. Risk of Infection</td>
<td>Sharps should be placed in special containers and properly labeled before incineration waste disposal (MWMP)</td>
<td>Implement guidelines and follow good health care practices.</td>
<td>National medical waste management plan, trained personnel, improved mobility and provision of resources.</td>
<td>30,000</td>
<td>MOHS Councils, DHMTs. LGFD DSDP</td>
<td>MOHS Councils, DHMTs. LGFD</td>
</tr>
<tr>
<td>Immunization Laboratory test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery and pre-natal care. Handling human parts, immunization</td>
<td>Risk of cross infection if no proper handling of waste including human parts, waste water, sharps, disposables. Contamination of Soils &amp; groundwater.</td>
<td>MWMP Sharps should be placed in special containers and properly labeled before incineration waste disposal (MWMP). Human parts should be disinfected before disposal.</td>
<td>Implement guidelines and follow good health care practices.</td>
<td>National Medical Waste Management Plan, and National Health Care Waste Management Programme Policy (NHCWMP).</td>
<td>15,000</td>
<td>MOHs Councils DHMTs LGFD Dec. Sec.</td>
<td>MOHs Councils DHMTs. LGFD DSDP</td>
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<td>Postnatal Care</td>
<td>Sharps, disposables</td>
<td>Follow (MWMP). Sharps should be placed in special containers and properly labeled before incineration waste disposal (MWMP).</td>
<td>Implement guidelines and follow good health care practices</td>
<td>National Medical Waste Management Plan</td>
<td>10,000</td>
<td>MOHs Councils DHMTs. LGFD DSDP</td>
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<tr>
<td>Immunization</td>
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<td>Family planning laboratory test, injections</td>
<td>Risk of cross contamination, sharps, disposables</td>
<td>Follow MWMP Sharps should be placed in special containers and properly labeled before incineration waste disposal (MWMP)</td>
<td>Implement guidelines and follow good health care practices</td>
<td>National Medical Waste Management Plan,</td>
<td>10,000</td>
<td>MOHs Councils DHMTs. LGFD DSDP</td>
<td>MOHs Councils DHMTs. LGFD DSDP</td>
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<td>Care of the newborn. Immunization</td>
<td>Risk of accidental infection through poor handling of</td>
<td>MWMP Follow MWMP Sharps should be</td>
<td>Implement guidelines and follow good health</td>
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<td>Category</td>
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<td>Action</td>
<td>Agency</td>
<td>Action Plan</td>
<td>Year</td>
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<tr>
<td>Storage of Medical Waste</td>
<td>Risk to unauthorized persons and workers if not in proper receptacles, and workers not properly protected.</td>
<td>Proper handling and storage including protective gear according to MWMP.</td>
<td>Implement guidelines and follow good health care practices.</td>
<td>National Medical Waste Management</td>
<td>MOHs Councils DHMTs. DSDP LGFD</td>
<td></td>
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</tr>
<tr>
<td>Transport of waste to disposal sites</td>
<td>Risk of spread of diseases, personnel exposure to disease and bacteria</td>
<td>Collect waste in closed containers and transport waste in specialized closed vehicles</td>
<td>Regular supervision of potters, verify the use of special containers for MW, provide training for potters</td>
<td>National Medical Waste Management Plan</td>
<td>MOHs Councils DHMTs. DSDP LGFD</td>
<td>20,000</td>
<td></td>
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<tr>
<td>Disposal at site</td>
<td>Incinerator Impact (Smoke, flue gas, lung diseases)</td>
<td>Proper siting of well construct, Incinerators, ash buried in special lined pits.</td>
<td>Implement guidelines and follow good health care practices.</td>
<td>National Medical Waste Management</td>
<td>MOHs Councils DHMTs. DSDP LGFD</td>
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</table>
9.1 **Capacity Building and Training**

The RCHP – 2, has two (2) basic components:
- Civil works; and
- Technical programs

The role of environmental management of the civil works lies with the Local Councils that have acquired some training in 2009 and need not be repeated here. Under the SHARP Programme some training of the MWM was carried out from 2003-2007. This involved District Medical Officers (DMOs), Environmental Health Officers and Training of Trainers (ToT). Three persons were trained per district.

A trained Environmental Health Officer (EHO) was assigned to each district to serve as District Health Care Waste Officer. Staff of the four Government Satellite Hospitals in Freetown were also trained. It was further recommended that the training should be extended to NGOs, public, private and Paramedical Staff nationwide. This has not been done.

The training of technician to operate medical waste management equipment has not been regular. It is also now recognized that after the devolution, (2004) the Local Council Environmental Committees must now be involved in the process.

There is a need for a nationwide training programme also under the RCHP. The training team should include the following:
- College of Medicine and Allied Health Sciences (COMAHS);
- Paramedical School;
- Nursing Institutions;
- District Medical Health Teams; and
- Private hospitals.

The roles and responsibilities assigned in the EA (2002; updated 2007) for stakeholders has clearly not chanted but the role of LCs have to be emphasized.

9.2 **Proposed Capacity Building and Training Budget**

The capacity of implementing partners is usually low with regards to environmental management. They also have limited access to financial resources, inadequate staff and logistic support (transportation and logistic support).

In terms of capacity building and needs two (2) categories of stakeholders are identifiable.
- i. Managers of LGFD, RCHP managers, DMHT, DMOS, doctors, technicians, Nurses, NGOs and service providers; LC and
- ii. Local communities including tribal headmen, elders, environmental committees of LCs artisans (porters, waste pickers) area committees and town/village health workers.

Training programme shall be held on separate occasions for each of the Two (2) categories.

1. **Training Programme for Managers**

The training programme for managers in category (I) shall be held in Freetown and shall consist of one (1) complete module for nine (9) days. Each complete module of 9 days will cost USD 30,000. The cost estimate include travel allowances, food and per diem for resource persons and participants.
The breakdown and details are given below as follows:

**Environmental and Social Management Process (3 days at USD 10,000)**
- Review of Environmental and Social Management Process;
- Nosocomial Infections;
- Definition and Categories of Medical Waste;
- Adverse Impacts of MWM;
- Segregation, Storage and disposal of Medical Waste;
- Safety precautions and logistics support;
- Roles and responsibilities of stakeholders;
- Public consultations and advocacy;
- Monitoring of subproject performance;
- Monitoring of subproject mitigation.

**Environmental and Social Policies, Procedures and Guidelines (3 days at USD 10,000)**
- Review and discussion of Sierra Leone’s environmental policies, procedure and legislation.
- Review and discussion of Bank’s safeguard policies
- Legislative framework for MWM in Sierra Leone
- Strategies for consultation, participation and social inclusion.

**Selected Topics on Environmental Protection (3 days; USD 10,000)**
- National Resources Management;
- Pollution of air, water and land;
- Operations and Impacts of incinerator;
- Management of Landfill/Dumpsites

Cost of Complete Module = USD 30,000.

II. **Proposed Training Programme for Communities**

A three (3) training programme for communities shall take place in each of three (3) regions and shall Cost USD 15,000 each.
The selected topics shall include the following:
- Project Origins and Types of subprojects;
- Awareness on positive aspects of MWM;
- Awareness of the negative aspects of MWM;
- Setting up of Waste Management Committees (WMC);
- Technical Training on operations of Incinerators;
- Technical Training on Operation and Management of Landfill/Dumpsites
- Training of WMC;
- Training of artisans (Waste Collectors, Waste picker etc) on refuse management.
- Environmental and General Sanitation Promotion;
- Financial Obligations of Committees

Cost of complete module = USD 45,000

Total Financial Implication of Capacity Building and Training = USD 75,000

10.0 UPDATE ON THE IMPLEMENTATION OF THE 2007 ESMP
The HSRDP’s ESMP proposes a series of interventions as follows. In 2007 the status was presented as is reported below but comments are indicated with asterix.
The following activities have been conducted in line with the ESMP in Sierra Leone:

1. MOHS has established a National Medical Waste Management programme within its Environmental Health Division with a programme manager appointed. The programme has since 2004 Financial Year been made a COST CENTER with annual GOSL budgetary allocations.

   * Apparently these allocations are inadequate as narrated by program manager thus affecting progress.
2. GOSL funds are annually allocated to the programme.
   * It is expected that under RCHP funds allocated will be adequate.

3. All health facilities nationwide, at least, segregate their SHARPS.
   * This is no longer true as regular training did not continue and supplies are irregular and in some cases nonexistent.

4. The programme has designed and distributed a burn pit to all government facilities nationwide. This is working well, under existing circumstances.
   * Some LC facilities do not have either pits or incinerators.

5. The programme is supported by SHARP and HSRDP;
   * The RCHP is expected to provide sufficient funding to be able to sustain both.

Under SHARP
1. Completed the assessment of healthcare waste management situation in Sierra Leone;
   * This was in 2003 and needs considerable updating in the light of nationwide coverage.

2. Developed a comprehensive waste management plan;
   * This has been achieved and updated in 2007.

3. Trained three (DMO and two EHOs) trainers (TOT) per district on safe management of healthcare waste and prevention of Noscomial infections;
   * This training needs to be extended also to LCs.

4. Every District Medical Officer has assigned one of the trained Environmental Health Officers (EHOs) as the District Healthcare Waste Officer (Programme Focal Point);
   * More EHOs need to be assigned at chiefdom level under the RCHP.

5. Develop and distributed Guidelines for Medical Waste Management in Sierra Leone;
   * These guidelines need to be upgraded and redistributed.

6. Strengthened the functional capacity of the programme with one 4WD pick-up van, one desktop computer, one printer, and photocopier;
   * More equipment and mobile services need to be provided.

7. Trained Staffs of the four Government Satellite Hospital in Freetown;
* Under the RCHP more staff are required and training institutions should be strengthened.

8. Technical Assistance to develop a national medical waste management policy;

* The National medical waste management policy has been developed in 2007.

**Under HSRDP**

1. Print and distribute of guidelines for medical waste management;

* This is very urgent but must be done within framework of the SHARP policy.

2. Technical Assistance to develop De Mont Fort Incinerator; it concluded with Mark 8a for the PHUs and the Mark 9 for District Hospital and is MOHS technology of choice for the time being, since WHO approves of its application in tropical developing countries.

* The incinerators were built from local maternal and have short live spans.

3. Trained NGOs, Public, Private and Paramedical Health Care Staffs countrywide on healthcare waste management;

* This is urgent should RCHP succeed.

4. Training of Technicians to operate medical waste management equipments in healthcare facilities; this is ongoing.

* This program should be carried out on a regular basis if the facilities are to be properly managed and sustained.

With regards to the successful implementation of the RCHP (technical aspect) the consultant has considered the following:

i. There will be enormous quantities of waste generated nationwide in implementing the RCHP through activities such as laboratory tests, immunization, delivery, postnatal care, care of the child etc.

ii. There is potential risk of cross contamination of infectious diseases if the programme is not managed properly.

iii. The disposal sites for medical waste contaminate ground water and soils if not managed professionally. It has been suggested that the areas where medical waste are disposed of especially at landfill/dumpsites be demarcated and fenced in order to prevent access by unauthorized persons.
In the EA of 2002, the following activities were to be conducted:

- Advocacy at national level to secure government commitment.
  
  This was done in a limited manner but for the purposes of RCHP this should be undertaken routinely.

- Develop a national policy and regulatory framework on waste management.
  
  This has to be done since 2007 as NHCWMP.

- Integrate waste minimization into national purchasing policies.
  
  This has to be done inorder to ensure sustainability.

- Make instruments to develop plan of action with practical targets and budget for the health institutions.
  
  The template have been developed as related by the manager of the Medical Waste Programme.

- Develop educational materials and training modules for:
  
  a) Health workers;
  
  b) Medical waste handlers;
  
  c) Municipal waste handlers;
  
  d) The population
  
  This is very urgent and NGOs and Advocacy groups could help with facilitation.

- Organize training at District and Chiefdom levels for health-care workers and the community on the risk associated with health-care waste and safe management practices, with priority for waste-handlers;
  
  Some training was organized between 2004-2007 but should be repeated involving LCs.

- Make available the materials to facilitate medical waste management.
  
  These are now available and should be printed and distributed.

- Ensure that all health-care establishments segregate their waste into harmful and non-harmful categories;
  
  The capacity to enforce this regulation is inadequate and should be strenghtened.

- Ensure that all health-care establishments implement safe handling, storage, transportation, treatment and disposal options;
This has yet to be achieved due to lack of resources and trained manpower.

- Include health-care waste management and prevention of nosocomial infection into the training curricula of Nurses, Public Health Inspectors, Community Health Officers and Doctors;

  It has been confirmed that training institutions (COMAHS, Paramedical School, Nursing institutions) have developed modules for use.

- Ensure incinerator flue gas cleaning by installing cleaning devices;

  This has to be revisited as to how incinerators are constructed and the health facilities.

- Ensure routine monitoring of impact through process indicators.

  This would involve building capacity at all levels especially for LC.

**Supplementary Waste Management Plan for Reproductive Child Health Care Program (RCHP).**

In addition to the above, the following are major activities to be included in the present supplementary management plan for RCHP,

- Strengthening of existing institutions of higher learning (Public and Private) to provide appropriate training on Medical Waste Management;
- Improving laboratory facilities for the RCHP nationwide;
- Provision of adequate resources for the purchase of vital equipment including receptacles for the storage and transportation of Medical Waste;
- Provision of protective gear for workers handling medical waste;
- Clear demarcation of and provision of onsite and offsite storage areas;
- Provision of decontamination facilities including autoclaves (also locally fabricated) and/or chemical methods;
- Improving transportation facilities for medical waste disposal;
- Improvement in the regular collection and disposal of medical waste from private clinics and pharmacies;
- Clear demarcation of medical waste disposal areas including landfill dumpsites;
- Provision of appropriate incinerators of the De Mont Fort Type;
- Encouragement of private sector involvement in Medical Waste Management.
11.0 CONCLUSIONS

The main findings are as follows:

1. The RCHP is well conceived as its coverage is nationwide targeting the most vulnerable groups (pregnant women, lactating mothers, babies under five). The services are expected to be free under the BPEHS.

2. The 1040 Health facilities, including offices, and ancillary facilities (WATSAN facilities) would generate wastes which could be managed using guidelines provided in various documents including this EA update. Local councils through the LGFD have been trained as Environmental Safeguards manual developed in 2009. This training is expected to be extended to Environmental Committees and Contractors.

3. The facilities provided would generate huge quantities of waste 25% of which Medical Waste. As the BPEHS is expected to provide free medical services, the programme is expected to produce as much as 4 times (4 x) what is produced at the moment. The medical waste therefore needs to be managed properly.

4. Among the critical requirements for the success of the Medical Waste Management (MWM) process are the provision of water and sanitation facilities. In major hospital pipeborne water delivery has almost broken down. The incinerators provided were of local fabrication which did not meet the prescriptions for the recommended De Mont Fort Type.

5. The institutions providing training in MWM lack the resources to train at all levels. Modules should be developed for all categories of health workers handling medical waste including those of RCHP at referral Hospital at district and chiefdom level.

6. There is need for awareness raising among the public and target beneficiaries on MWM. Local Government structures should be utilized.
12.0 RECOMMENDATIONS

1. There is a need for quick assessment nationwide to establish amongst others the state of the health facilities before rehabilitation. The assessments should include the needs on basic equipments including vehicles.

2. The pilot projects (5 centres per district) should be replicated only after a thorough review and evaluation.

3. That more personnel be trained also at local cadre level in order to sustain the programme.

4. A quick assessment of the state of MWM nationwide needs to be undertaken. The evaluation of the success of the National Programme for the Safe Management of Medical Waste Programme be undertaken and strengthened under the RCHP.

5. Local Council Environmental Committees be also trained in MWM in order to improve their monitoring capacity.

6. Awareness raising and community sensitization be undertaken using Local Government Structures on the MWM.
# Appendix I

## List of Persons Contacted

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Date</th>
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<tbody>
<tr>
<td>Dr. S.A.S. Kargbo</td>
<td>Program Director RCHP (MOHs)</td>
<td>3rd March, 2010</td>
</tr>
<tr>
<td>Dr. Magnus Gborie</td>
<td>Director of Planning and Information (MOHs) HRSDP.</td>
<td>3rd March, 2010</td>
</tr>
<tr>
<td>Dr. S. Mgbiti</td>
<td>Planning and Evaluation (MOHs)</td>
<td>3rd March, 2010</td>
</tr>
<tr>
<td>Mr. John Tommy</td>
<td>Director of Medical Waste Management Project (MOHs) Consultant SHARP Project</td>
<td>4th March, 2010</td>
</tr>
<tr>
<td>Mr. R. Scott</td>
<td>Biochemical Lab Manager (Connaught Hospital)</td>
<td>4th March, 2010</td>
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<tr>
<td>Ms S. Bonie</td>
<td>Nurse, Connaught Hospital</td>
<td>5th March, 2010</td>
</tr>
<tr>
<td>Ms. Lilian Kabba</td>
<td>Nurse, Connaught Hospital</td>
<td>5th March, 2010</td>
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<tr>
<td>Mr. C. Bah</td>
<td>Pottal Pharmacy</td>
<td>5th March, 2010</td>
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<tr>
<td>Dr. R.G. Johnson</td>
<td>IMBO, USL Consultant to World Bank</td>
<td>6th March</td>
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Site Visits

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<td>Kingharman Road Satellite</td>
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<td>PCMH</td>
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<td>Jenner Wright Children’s Hospital</td>
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<td>Sarolla Hospital</td>
<td>8th March, 2010</td>
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<tr>
<td>UMC Urban Centre</td>
<td>8th March, 2010</td>
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Appendix II

DOCUMENTS CONSULTED

- The Public Health Ordinance (1960)
- The Environmental Assessment for HSRDP (2001; updated 2007)
- The ESMF and RPF IRCBP (2004)
- EIA HSRDP for Dumpsite/Landfill Site (2007; updated 2009)
- ESMF, RPF Waste Management in Freetown (2009)
- Environment Protection Agency Act (2008)
- Sierra Leone HIV/AIDS Response (SHARP) and HSRDP Waste Management Plan (2002)
- ESMF, DSDP (2009)
- Environmental Safeguards Manual for IRCBP/LGFD, 2009
- National Health – Care Waste Management Programme Policy (NHCWMP – 2007)