ZIMBABWE NATIONAL WATER PROJECT

ENVIRONMENT AND SOCIAL MANAGEMENT PLAN (ESMP)

FOR

LUPANE WATER SUPPLY SUBPROJECT

MATABELELAND NORTH PROVINCE (LUPANE DISTRICT)

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Abbreviations

AGRITEX	Agriculture Technical and Extension Services
AIDS	Acquired Immunity Deficiency Syndrome
CMB	Cotton Marketing Board
DA	District Administrator
EMA	Environmental Management Agency
EMP	Environmental Management Plan
ESMP	Environment and Social Management Plan
GMB	Grain Marketing Board
HIV	Human Immuno Virus
MGP	Mataga Growth Point
RDC	Rural District Council
SI	Statutory Instrument
STD	Sexually Transmitted Disease
ZESA	Zimbabwe Electricity Supply Authority
ZINWA	Zimbabwe National Water Authority

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EXECUTIVE SUMMARY

Introduction

The Government of Zimbabwehas made a request to the World Bank for financial support to finance a Small Towns Water Supply Improvement Project to be implemented by ZINWA. The project components tentatively include (i) investment in repair and rehabilitation of critical infrastructure in selected water supply stations managed by ZINWA (ii) institutional strengthening of ZINWA including project development and design, financial management, procurement project management and monitoring (iii) technical assistance to assess options for transforming ZINWA to enable it to perform its mandate more efficiently; and (iv) strengthening the capacity of urban and rural local authorities to contract with and oversee operations managed by ZINWA in line with their new mandate of being Water and Sanitation Authorities under the new water policy. A needs assessment survey of 50 small towns and Growth Points resulted in the prioritization of seven stations.This document will focus on the safeguards (environmental and social) assessment that has been carried out by ZINWA for the areaof Lupane.

Project Description

Currently Lupane town is being supplied with clear water from a system of 7 boreholes which are frequently on breakdown, thus negatively affecting the water supply provision in the town. A 240m^3 the treatment plant is currently being constructed downstream of Bubi Lupane dam by ZINWA and is nearing completion.The Lupane UniversityAgricultural section is moving in by end of June 2015, student hostels are currently under construction and new housing areas are being developed for civil servants in Lupane. Lupane has hundreds of stands that need to be serviced and the current reticulation cannot sustain these stands as well as any future developments. There is therefore an urgent need to reticulate the area as soon as is possible. This rehabilitation and expansion project seeks to permanently address the poor water supply service in Lupane by bringing the treatment plant to completion as well as constructing new and bigger reservoirs for the town. Existing boreholes will also be rehabilitated to ensure that they act as a backup option should the treatment plant not be operational at any given time.

Legal and Policy review

There are requirements of the Zimbabwe legislation for major projects that need to be satisfied if the project is to go ahead. The EMA Act makes sure thatEIA acceptance is granted only when the Ministry determines that the assessment of a project and its activities have been sufficiently thorough to adequately identify the environmental impacts, which it is likely to cause, as well as measures for managing them. The Rural District Councils Act makes sure that any development

that takes place within the Rural District Council's area of jurisdiction should be carried out within the provisions of the council's priorities and approved development plans to allow for coordinated and collective approach to development. Another legal requirement extracted from the Parks and Wildlife Act deals with preservation of plants and animals, including specially protected animals and indigenous plants. The project should thus ensure that plants and animals are not negatively affected by any proposed developments. There are many other pieces of legislation that must be satisfied if the project is to be approved by the Government and these include; Public Health Act, Road Traffic Act, National Museums and Monuments Act, Regional Town and Country Planning Act, Water Act, ZINWA Act and Forestry Act. As the Financier, it is World Bank's objective to avoid, where practical, unacceptable adverse environmental, social and/or economic impacts from this project. The World Bank has environmental and social safeguards which will also be reviewed as they seek to protect the World Bank's core values and vision.

Environmental and Social Baseline

The baseline data included relief and drainage, climate data, inventory and distribution of flora and fauna, land-use patterns, and related socio-economic attributes and statistics.There are important project environmental and social settings that were considered to be important for impact identification and mitigation. These include;Population statistics, ie number of men and women in the town, livelihood activities, e.g fishing, farming and water vending, animal statistics in and around the area of Lupane, geology of Lupane, vegetation in and around Lupane, ie importance of teak forests, current and potential land-uses

Stakeholder Consultation

An important insight into the people centered issues was obtained through a limited Stakeholder Consultation with some key stakeholders who included households and key institutions. This involved questionnaire and interviews with institutions such as the Local Board, Lupane Residents, business community, local NGOs, the District Administrator and etc

Impact Evaluation

There are both positive and negative impacts which are predicted to result from project implementation. A number of the socio-economic impacts during the construction and operation such as employment generation and improved availability of water are positive. Most of the

biophysical impacts from planning through to operation are negative and likely to occur but are very few and of a limited nature. These include soil disturbance, reduction of biodiversity through cutting trees, deterioration of air quality and hydrological impacts. These impacts occur within converted/already built-up areas and can be adequately mitigated or in some cases removed through the use of appropriate technology, preventive maintenance and the diligent and prudent application of Safety, Health and Environment (SHE) practices. Most planning and construction phase negative impacts are of limited duration, magnitude and extent with high mitigatory potential. Operational phase biophysical negative impacts are related to increased waste water production as a direct result of the ready availability of water. The project will have positive social impacts during the operation phase. These relate to improved hygiene, starting income generating projects, local economic development, staff retention, and general improvement in the quality of life of people. The project is not going to result in the displacement of people or disturb physical natural resources.

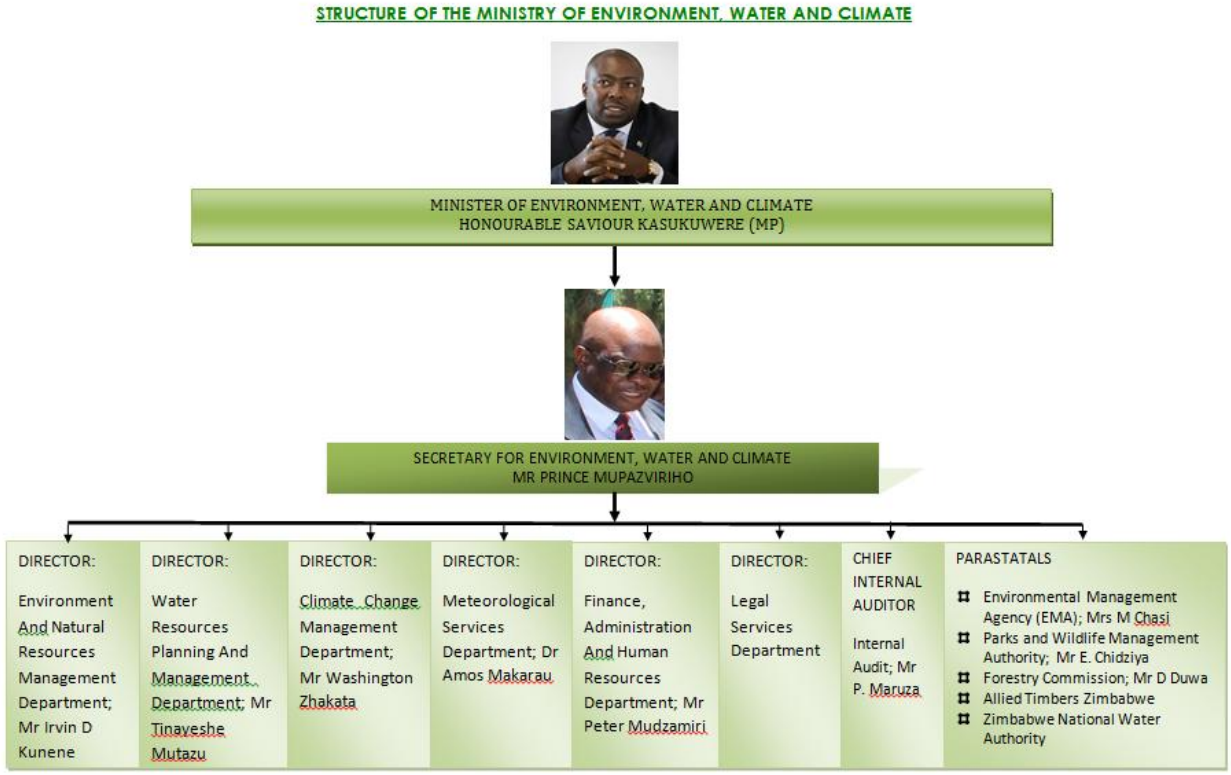
Conclusions and Recommendations

The works planned for the town of Lupane will largely be limited to replacement/upgrading of borehole equipment, raw and clear water mains/pipelines, reservoir tanks and backwash mains and settling pond. In the case of Lupane, new waterworks need to be completed. All engineering works will be undertaken within already converted land uses, which imply very limited negative biophysical or even socio-economic interference with environmental/ecological systems and services as well as livelihoods and social well-being of the neighboring and interested human communities. The minor negative biophysical impacts related to the construction and operation phases (construction equipment/vehicle and construction work force related pollution and externalities and consequences of increasing numbers of residents due to availability of water) can all be adequately mitigated. Furthermore, the health and livelihoods gains by the affected communities from these subprojects are so huge and are bound to overwhelm the minor negative impacts with high mitigatory potential. It is important however to integrate issues of sanitation management in the wake of increased volumes of water available to residents as it will certainly translate to larger volumes of waste water released into the environment.

CHAPTER 1

1.1 Introduction

1.1Ministry of Water, Environment and Climate



The image above shows the structure of the Ministry of Water, Environment and Climate, including the various departments within the Ministry and the parastatals that fall under the Ministry;

Departments

- Environmental and Natural Resources Management
- Water Resources Planning and Management
- Climate Change Management
- Meteorological Services
- Finance, Administration and Human Resources
- Legal Services

Parastatals

- Environmental Management Agency
- Parks and Wildlife Management Authority
- Forestry Commission
- Allied Timbers Zimbabwe
- Zimbabwe National Water Authority

The Functions of the Ministry that are directly linked to the Zimbabwe National Water Authority include the following

- Formulate and implement sustainable policies on the development, utilization and management of water resources in cooperation with user communities and institutions.
- Design, construct and maintain medium to large size dams and water supplies to satisfy present and future domestic, industrial and mining water requirements.
- Provide clear/treated water for urban areas in consultation with the Ministry of Local Government, Public Works and Urban Development.
- Design, construct and maintain dams, weirs and boreholes to meet present and future irrigation requirements.
- Responsible for the overall/national planning, management, regulation and standardization of irrigation development and adoption of appropriate technology.

The chief function of the Ministry in terms of the Environmental issues is;

- To plan, research and develop environmental and natural resources policies and legislation

1.2 ZINWA

The Zimbabwe National Water Authority (ZINWA) is a national organisation, responsible for water resources development and management and providing treated drinking water to small towns, growth centres and government establishments in Zimbabwe. ZINWA has seven sub-offices (catchments) which are based on the seven hydrological catchments in Zimbabwe. The catchments are named as follows;

1. Mazowe Catchment
2. Runde Catchment

3. Manyame Catchment
4. Gwayi Catchment
5. Mzingwane Catchment
6. Save Catchment
7. Sanyati Catchment

ZINWA was established under the ZINWA Act of 1998 and is a body corporate institution which operates on a commercial basis.

In the last decade or so, the performance of ZINWA has been affected by many factors including the economic collapse which resulted in under- funding of both O&M and capital investment. The economic collapse also resulted in loss of skilled human resources especially to neighbouring countries. As such infrastructure deteriorated resulting in poor service delivery. Consequently customers became unhappy and unwilling to pay for the services leading to low revenue collection. This further reduced the capacity of ZINWA to operate the water and sanitation systems effectively. This did not only affect ZINWA, but also other agencies tasked to provide water and sanitation services in Zimbabwe such as local authorities. The collapse of the water and sanitation services in Zimbabwe was linked to the 2008/9 cholera outbreak which affected over 100,000 people and resulted in about 4,300 deaths.

ZINWA operates about 500 water supply stations throughout Zimbabwe. The systems are an assortment of conventional water treatment and supply networks, groundwater fed systems and sand abstraction systems. Most of the water supply systems are in need of urgent repair and rehabilitation. Water supply is erratic in most areas due to the reduced capacity of the systems coupled with recurrent breakdown of key equipment and components of the systems. There are a lot of areas were water and sanitation coverage is below 100%. In such areas communities have resorted to other alternative forms of water supply, many of them unsafe. Over the last few years especially after the cholera outbreak of 2008/9, a number of activities have been carried out mainly by NGOs and donors to restore and improve water supply and sanitation services in Zimbabwe including in areas managed by ZINWA .The aim has been to prevent a repeat of the cholera outbreak and preserve the water and sanitation infrastructure. However a lot still needs to be done in order to completely restore services and achieve sustainability.

1.2.1 Data & Research

The Department captures, processes, analyses, archives and disseminates data pertaining to surface water resources availability.
Subject to the Water Act (Chapter 20:24) and ZINWA Act (Chapter 20:25), and any other enactment, the functions of the department shall be—

- To advise the Minister on the formulation of national policies and standards on hydrology
- To undertake research studies and develop a database on hydrological issues pertaining to or of interest to Zimbabwe and to publish the findings and any other data compiled by the Authority;
- To conduct hydrological and geographical surveys and to produce maps or other information necessary in the planning, development and exploitation of water resources and to publish any such surveys, maps or other information.

1.2.2 Planning

The division is one of the divisions that perform statutory functions. Its mandate is to ensure compliance with the Water Act, national water policy and strategy requirements in relation to water resources planning, development and management. It also does the central management of water permits.

1.2.3Quality Assurance

The division performs the following functions:

- Quality Management System
- Production and Technical Support
- Legal and Statutory Compliance
- Water Resources Protection

1.2.4Commercialisation

- The unit identifies and guides the development of new business opportunities and initiatives, such as new and /or more effective sources of revenue, new area of investment or new technology
- Negotiates and evaluates possible partnerships, strategic alliances, joint ventures etc.
- Generating additional non-core income for the Authority.
- To continuously review the Authority's strategies on the core segments of raw water and clear water to improve the Authority's operations
- To continuously seek modern methods of operational excellence with a view to cut costs for the Authority

1.2.5Design and Construction

The department exists to execute the following functions:

- Designing water conservation works such dams, pipelines, reservoirs and water supply stations
- Construction of all water conservation works such as dams, canals, weirs, pipelines and others
- Ensures the maintenance and safety of water conservation works
- Supervision of contractors doing PSIP projects
- Does engineering consultancy
- Recommends appropriate standards regarding water conservation works and dam safety
- Compilation of budgets for PSIP projects

1.2.6Groundwater and Drilling Services

The Groundwater Department of ZINWA has been involved with borehole drilling since the early 1920s and has thus gained vast amount of knowledge and skills in groundwater development in Zimbabwe.
The Groundwater Department of ZINWA provides technical advice on groundwater planning, development and management to the Ministry of Water Resources Development and Management and is therefore quite conversant with all the legal (regulatory and statutory) requirements associated with groundwater development in the country. This provides for the development and construction of high quality boreholes which meet the national standard on the Development, Maintenance and Management of Groundwater Resources currently under formulation

1.2.7Information and Communication Technology

The ICT Department is responsible for the provision of effective, efficient and responsive information and communication technological services to the various authority departments. The department accepts criticism from its various stakeholders in its bid to offer world class ICT services within the authority.

The department's major offerings are internet and email service, web services, networking, procurement and maintenance of ICT hardware and software, information security and advisory role in information and communication technologies.

1.3 Overview of the Zimbabwe National Water Project

Seven priority station have been identified, one in each catchment area, for pilot project implementation. These are listed in table 1 below.

Table 1: The stations for the project

Catchment Area	**Station**
Manyame	Guruve
Mazowe	Madziva

Save	Zimunya
Gwayi	Lupane
Sanyati	Nembudziya
Umzingwane	Mataga
Runde	Gutu

1.4 Scope of the ESMP

ZINWA Gwayi Catchment has developed this Environmental and Social Management Plan (ESMP) to identify the environmental and socialmanagement and mitigation actions required to implement the **Lupane water works** project in accordance with the requirements of the legal and institutional framework in Zimbabwe. These requirements have been highlighted in the executive summary under the section titled *legal and institutional framing*

It providesan overview of the environmental and social baseline conditions on the route of the proposed project, summarizes thepotential impacts associated with the proposed rehabilitation and improvement works and sets out the managementmeasures required to mitigate any potential impacts in a series of discipline specific Environmental Management Plans
(EMPs). These EMPs are to be utilized by the contractors commissioned by ZINWA or the funding institution (World Bank) for the project and will form the basisof site-specific management plans that will be prepared by the contractors as part of their construction methodology priorto works commencing.

The potential impacts and associated mitigation measures and management procedures presented in this ESMP arebased on the baseline information and assessments carried out in the area of **Lupane**, hence this document will only be specific to the Lupane water works project and cannot be used anywhere else.

1.5 Potential users of the ESMP

Overally this document will communicate environmental and social expectations and requirements throughout the project team, ie from the Financier, implementing/supervising agency, beneficiaries, contractors and any other key stakeholders. Below are some of the stakeholders that will be expected to find this ESMP useful.

1. World Bank

As the Financier, it is World Bank's objective to avoid, where practical, unacceptable adverse environmental, social and/oreconomic impacts from this project. They would obviously not fund any project that has adverse environmental and social impacts, hence they have a keen interest in

making sure that the outputs or impacts from the project do not have a negative bearing on the World Bank's core values and vision.

2. ZINWA

ZINWA as the national water utility in Zimbabwe owns the infrastructure that will be rehabilitated and new infrastructure that will arise from this project. Overally, ZINWA has theresponsibility for planning, implementation, monitoring and enforcement of activities associated with this project. Therefore ZINWA, through this ESMP will seek to ensure that all works, infrastructure and services that will become a temporary or permanent feature of Lupane do not have an adverse effect on the environment or socially on all the key stakeholders.

3. Contractors

This ESMP is also to be utilised by the contractors commissioned by ZINWA or the funding institution (World Ban) for the project and will form the basis of site-specific management plans that will be prepared by the contractors as part of their construction methodology prior to works commencing. Therefore, all contractors and subcontractors shall comply with and apply the ESMP requirements as applicable to the tasks they are employed to undertake.

4. Lupane Local Board

Lupane Local Board is the Development and Planning authority within Lupane Town. The Board is empowered to plan for the overall development of the Town, hence the reason why they are one of the major stakeholders. In order to safeguard their interests, they must make sure that this project complies with all the necessary requirements in terms of priorities and approved development plans. This means that the ESMP becomes a very important reference document for the Local Board.

5. General public/Consumers/Business community

The project is all about improved service delivery in Lupane and the surrounding areas. The general public, business community and all potential consumers have a part to play in that they must make sure that all their interests, concerns, needs and requirements relating to the project have been addressed fully. Informed participation from them is key for the project to succeed hence the ESMP document is a good record for them to refer to.

6. Environmental Management Agency

The Environmental Management Agency is takes one of the first steps in screening any project on the basis of environmental and social aspects. This document outlines any impacts (positive and negative) of the project as well as any mitigation steps hence EMA will take a keen interest

in the planning of the works and to make sure that the national, regional and local interests in terms of environmental and social issues are catered for.

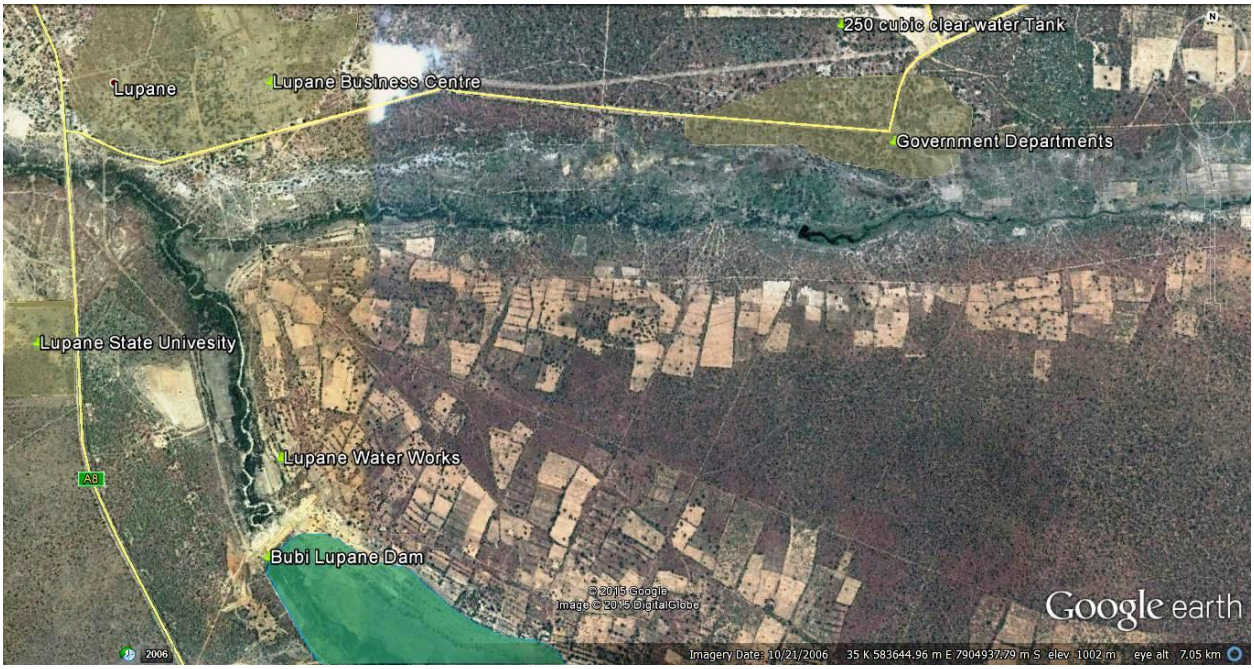
CHAPTER 2

2.0 Introduction

Lupane is situated in the western half of Zimbabwe within the Gwayi Catchment, in Matabeleland Province. Its natural region is designated IV with an average annual rainfall of 400-650 mm. The core livelihoods in surrounding areas are subsistence mixed farming with a bias to animal husbandry by rural populations and scattered medium sized cattle ranchers. Major livelihoods in the settlement, recently elevated to town status, are small General Dealer (hardware and grocery shops) and their workers as well as government employees (mainly police, teachers and nurses. The rest of the workforce comprises of local authorities (RDC, Local Board and DA) and service parastatals such as ZINWA, Agritex, GMB, CMB and others. There are a few light industries and commercial enterprises such as banks and insurance companies. The bulk of the population is involved with vending of a variety of goods and wares ranging from fruits and vegetables, grain, clothing and hardware largely in open markets. Lupane currently has a financial requirement of nearly US$3 million dollars to rehabilitate water supply infrastructure as well create new infrastructure within the area.

2.1Project location

This project is located in Lupane. The former Growth Point was recently officially awarded a town status and provincial capital of Matabeleland Northand lies in the Gwayi water catchment, which is one of the seven catchments of Zimbabwe. Lupane Town is situated about 170km North West of Bulawayo along Bulawayo – Victoria Falls Road on grid reference **064853 o**n the Map No. LUPANE 1827D4 of the 1:50 000 Survey General Map series. There is also a railway line and a siding (Gwayi Siding) about 38km from the town and a gravel road connects the siding to the town.



Google image showing project location

2.2 Project description

The project will have many activities that include pipeline trenching/excavations, construction works, borehole capacity testing and etc. The planning phase will include stakeholder consultations whilst the construction phase will involve cutting trees, excavations, trenching, and construction. The operational phase will be dominated by the water treatment processes, monitoring and control operations and maintenance activities. The town's population is estimated at over 20 000. The project is aimed at catalyzing the connection of water to approximately 10 000 residents in addition to boosting the delivery of water to existing connected residents numbering about 3 000. There are a total of 4 000 serviced residential and yet-to-be serviced stands in the town broken down as follows; High Density (3 000) Medium Density (600) and Low Density (420). Additionally there are 180 serviced commercial stands, 120 industrial stands as well as the Lupane State University, 9 Primary Schools, 4 Secondary Schools, 1 Provincial Referral Hospital and 4 Clinics.

The town's raw water source is the Bubi Lupane Dam with a capacity of 39.09 x $10^6 m^3$ feeding into a treatment plant with a capacity of $240 m^3/h$, which will be adequate to supply the projected population growth. The Treatment Plant is under construction and about 95% complete. Raw Water and Treated Water Mains, as well as the Reticulation networks are also under construction. The treatment plant will include backwash as one of its major processes. Initially

the design didn't include an allowance for managing the wastewater from the backwash process, but the design team has included a design for a settling/recycling pond and a recycling pump to ensure that all wastewater is collected into the pond before being pumped back into the system for treatment. This will ensure that all water discharged to the environment will be of recommended standards.

Projected scope of works

a) Construction of two clear water storage reservoirs 1 x 1000m^3 and 1 x 2280m^3 RC reservoirs complete with booster stations.

b) Reticulation and upgrading the current pipeline network. There will be manual trenching involves distances of between 5-10km and trenches will not be more than 2m deep. The width of trenches is expected to be not more than 1m.

c) Rehabilitation and equipping of 7 boreholes

d) Procurement and installation of leak detection equipment

e) Installation of bulk meters and repairing of all faulty water meters

f) Rehabilitation of leaking reservoirs and installation of water level controls

g) Access road and bridge construction

h) Provision of water quality equipment

2.3 Project cost

Item	Description	Cost
1	Supply and install valves and water meters	31,400.00
2	Rehabilitate existing 7 boreholes, existing booster pump and procure standby unit, repair leaking reservoirs and install water level controls.	39,000.00
3	Complete 240m^3/hr treatment plant, ie electrification, access bridge/roads, fencing. and etc	839,000.00
4	Extend reticulation for new and future connections	201,301.28

5	Equipment package for leak detection (pipe locator, box locator, ultrasonic clamp on meter, 2 x acoustic listening stick, basic leak noise correlator, ground microphone, noise logger (set of six), 10 x sampling customer meters)	30,000.00
6	Chlorination to ground level reservoir system	15,000.00
7	Construction of 2280m3 reservoir c/w booster station and overhead tanks	780,000.00
8	Establish 2 pilot DMAs (bulk meter, pulse sensor, data logger, 3 x pressure gauges/pressure logger, meter box)	10,000.00
9	Construction of 1000m3 reservoir	250,000.00
10	Procure Motor bike and bicycles	4,200.00
	Sub Total	**2,199,901.28**
	P&Gs	**329,985.19**
	VAT	**439,980.26**
	GRAND TOTAL	**2,969,866.73**

N: Bthis was the provisional costing of the project and **US$2,969,866.73**is the approved project funding. However the actual activities and items 1-10 will be different as shown in the Bill of Quantities in the Tender document. The cost highlighted does not include monitoring and implementation costs of this ESMP. The costs have been captured in the Project Management costs for monitoring that will be done by both the PIU and PIT.

CHAPTER 3

Legal and Institutional Framework

3.1 Zimbabwean Legal Framework

The Zimbabwean legal and policy framework for environmental assessment and management highlights the following points:

a) Environmentally responsible investment and development in Zimbabwe must be encouraged through transparent, predictable, equitable and effective administration of the EIA policy.

b) The long-term ability of natural resources to support human, plant and animal life must be maintained. A broad diversity of plants, animals and ecosystems must be conserved.

c) Natural processes such as the recycling of air, water and soil nutrients must be conserved.

d) Irreversible environmental damage must be avoided and any inevitable environmental damage must be minimized through innovative mitigation.

e) The basic needs of the people affected or likely to be affected by a development proposal, including food, water, shelter, health and sanitation must be met.

f) Social, historical and cultural values of people and their communities must be conserved.

In brief, the purpose of the EIA policy is based on the incorporation of sustainability principles in project planning, evaluation and monitoring. It is also based on the understanding that many decisions concerning the environment are dependent upon meaningful public consultation and that upon being accepted, various government agencies with a mandated interest which include the Environmental Management Agency (EMA), should implement the EIA results on behalf of the Ministry of Environment Water and Climate. EMA is accordingly responsible for the EIA/EMP review, implementation and enforcement. The EIA policy also explicitly pays particular attention to the distribution of project costs and benefits in the spirit that as much as possible, development projects should support local as well as national growth. ***A minimum standard is that local people must be no worse off than they were before a project is***

implemented. It is in this spirit that formal EIA documents should be openly accessible to all stakeholders during the scoping stage.

3.1.1 Administration of the EIA Policy

The Director-General of EMA has been delegated the responsibility for overseeing the processing of ESIP and ESMP submissions. The Minister is empowered to prescribe any activity, policy or program that in his/her view may cause significant environmental impacts or community disruption. A prescribed activity cannot receive the required authorizations to proceed from the relevant permitting authorities unless, and until, the Ministry has exempted the activity from the requirements of the EIA policy or has granted 'EIA Acceptance'. EIA acceptance is granted when the Ministry determines that the assessment of an activity has been sufficiently thorough to adequately identify the environmental impacts, which it is likely to cause, as well as measures for managing them. All formal submissions under the EIA Policy are made to the Ministry through the Environmental Management Agency (EMA). Pertinent pieces of legislation include;

3.1.2 Environmental Management Act (20:27)

The Environmental Management Act provides for the sustainable management of natural resources and protection of the environment; the prevention of pollution and environmental degradation. The Act covers Environment Impact Assessment for new projects, standards to be adhered to on emissions, conservation of resources and environmental monitoring. Several aspects of this Act are relevant to the seven water supply upgrade projects. While water abstraction projects are prescribed projects listed in the First Schedule as activities for which environment impact assessment is required, the current projects qualify for exemption on the grounds that they are refurbishment/upgrade projects which occur on converted sites. The Act and Statutory Instruments are based on set principles that serve as guidelines for decision-making on policy implementation and these are summarized as follows;

- the EIA must enhance and not inhibit development by contributing to environmental sustainability and is a means for project planning, not just evaluation,
- the EIA policy depends on the normal regulatory functions of permitting authorities to implement the EIA results,

- the EIA policy involves the participation of all government agencies with a mandated interest in the benefits and cost of a project
- the EIA policy pays particular attention to the distribution of project costs and benefits, and
- identification of project impacts and public consultation is an essential part of the EIA policy

The current subprojects, subject to EMA exemption, will need an ESMP for purposes of managing the few negative impacts as well as boosting the obvious positive impacts.

A number of Statutory Instruments (SIs) have been promulgated in support of the Act as follows;

- Waste and Solid Waste Disposal Regulations – SI 6 of 2007

  This SI regulates the disposal of waste (solid waste and effluent). It prohibits any person from disposing waste into a public stream or ground water without a licence. The SI uses the polluter pays principle through licensing which is according to the following classes:

  - ***Blue****: in respect of a disposal that is considered to be environmentally safe*
  - ***Green****: in respect of disposal that is considered to present a low environmental hazard*
  - ***Yellow****: in respect of a disposal which is considered to present a medium environmental hazard, and*
  - ***Red****: in respect of a disposal that is considered to present a high environmental hazard*

This means that the waste streams from the project from the planning through construction phase to the operation phase should not be in the red category. ZINWA will have to comply with the recommended discharge classes.

- Environmental Management (EIA and Ecosystem Protection) Regulations - SI 7 of 2007

The SI deals with regulation of the EIA process and protection of ecosystem. Part II of the Act provides that no project shall be implemented without an EIA having been done. These regulations provide the method of doing the EIA. The developer has to submit a prospectus to EMA who issue a licence if satisfied by the contents of the prospectus. In preparing an EIA, a developer is obliged to consult widely with all stakeholders. The Statutory Instrument prohibits extraction, possession, transportation of sand and clay deposits for commercial purposes without a licence issued by the Agency. The SI also provides for the prevention of veld fires, protection of wetlands and public streams.

This is pertinent for the current project. The proponent will need to ensure that no veld fires are caused by workers at the project site. Licences will be required by appointed contractors for sand abstraction and transportation to the relevant construction sites.

- Hazardous Substances, Pesticides and Toxic Substances Regulations - SI 12 of 2007.

  This instrument prescribes the conditions which have to be observed by employers over the handling of hazardous substances at the workplace, conditions for transporting hazardous substances and procedures to be followed when there is an accidental spillage of the hazardous substances. EMA is empowered to issue spot fines to any person who violates the law. In addition, any person whose substances affect the environment is liable to pay for the cost of restoring the environment i.e. polluter pays principle. The offender is also liable to pay compensation for any damage caused by the offence to any person. The hazardous substances handled during the construction phase of the subprojects include oil and fuel.

There will be a need for ZINWA to comply with this statute in the event that there is a decision to use gaseous chlorine for water treatment processes (operation phase)

- Environmental Management (Atmospheric Pollution Control) Regulations, 2009

The objective of the SI is to provide for the prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It provides for the establishment of emission standards for various sources such as mobile sources (e.g. motor vehicles) and stationary sources. It also covers any other air pollution source as may be determined by the Minister in consultation with EMA. Emissions limits for various facilities and vehicular transport have been set. EMA will issue emission licences for processes that are prescribed under the SI. These licences also embody the "polluter pays" principle. The licences have four bands that is the blue, green, yellow and red. Classification depends on two important variables, the concentration of the emission and the mass flow. Any process which emits emissions above the red class upper threshold value will not be licensed. The emission licences are issued subject to the following conditions; the licence expires on the 31st of December of the year of issue, the licence is not transferable.

The SI will affect emissions from vehicles, generators and pumps/engines as well as dust emissions from the construction through to the operation phase. ZINWA will have to ensure that they comply with this instrument

3.1.3Rural District Councils Act (29:13)

Section 71 (First Schedule) lists the powers of the Rural District Council. Among other things, these include conservation of natural resources, control of bush fires, grazing, animal diseases, sewerage works, pollution, and effluent or refuse selection, collection and disposal etc. In addition to the powers bestowed upon them, Rural District Councils are the Development and Planning authorities within their respective areas of jurisdiction. In this regard, the Act empowers them to plan for the overall development of the Districts.

As development and planning authorities, they are also expected to be aware and guide all development activities carried out by governmental and non-governmental organizations and the private sector within their jurisdiction. Any development that takes place within the Rural District Council's area of jurisdiction should be carried out within the provisions of the council's priorities and approved development plans to allow for coordinated and collective approach to

development. RDCs also issue permits for sand abstraction and this project will have to comply with the necessary permits from the RDC.*In Lupane however, since they were awarded Town status, the Lupane Local Board is directly in charge in the town whilst the RDC focuses on rural Lupane and the other areas in the District.*

ZINWA and any appointed contractor will thus have to ensure that they comply with council laws, ie land for construction and pipeline trenching routes will have to be approved by Lupane Local Board.

3.1.4 Parks and Wildlife Act (20:14)

The Act is administered by the Zimbabwe Parks and Wildlife Authority and deals with preservation of plants and animals, including specially protected animals and indigenous plants. Special protected plants may be protected on land for construction purposes and these should be replanted. The construction and development team should not engage into activities which violate this Act. The lists of specially protected animals and indigenous plants are specified in the Sixth and Seventh schedule of this Act respectively. No person shall hunt or pick any specially protected species unless they have a permit to do so.

Section 40 of the Act lays down controls on hunting and removal of animals and plants thereof from national park areas and the sale of products thereof. Any person hunting any animal in a parks area, removing any animal or part of it, or selling any animal, plant or part of it which has been hunted or which has died in or been removed from a park area, in contravention of regulations for the park area shall be guilty of an offence.

ZINWA must comply with this Act especially in the cutting of trees that will be on the reservoir sites as well on the pipeline route.

3.1.5 Public Health Act (15:09)

This piece of legislation creates the legal framework for the protection of public health in Zimbabwe. Part IX of the Act prohibits the creation of nuisances. Nuisances are defined in this section and local authorities are required to maintain cleanliness and prevent nuisances. Nuisances include premises that promote the spread of infectious diseases, pools of water that may serve as breeding places for mosquitoes, polluted domestic water and accumulation of refuse and any overcrowded dwellings as to be injurious or dangerous to the health of inmates.

Relevant to this proposed project is the possible nuisance arising from litter, dust, noise and stagnant pools of water especially during the construction phase.

Under the Act if a person has been served a notice to remove a nuisance and fails to comply, they will be required to face a magistrate and pay a fine for not complying with the requirements of the notice within the specified time period. Nuisances are of importance in all phases of the operations and care should be taken to keep the project sites clean and free of any nuisances.

ZINWA must comply with this Act in the provision of water that is of WHO and SAZ recommended standards.

3.1.6 Forestry Act (19:05)

Section 38 of the Act provides for the preservation and protection of trees or fruit produce. Section 39 provides for the protection of forest or trees from cutting. The proponent should comply with provisions of this Act. The location of the project infrastructure will be in such a way as to minimize the cutting down of trees and protect all endangered species if any are identified within the proposed project site. Construction workers will be discouraged from cutting down trees for fuel/energy.

Section 34, Part 2, of this Act stipulates that the reduction of a national forest by more than 1% will require the written permission from the Minister of Environment.

ZINWA must comply with this Act especially in the cutting of trees that will be on the reservoir sites as well on the pipeline route.

3.1.7 Water Act (20.24)

An ACT to provide for the development and utilisation of the water resources of Zimbabwe; to provide for the establishment, powers and procedures of catchment councils and Subcatchment councils; to provide for the grant of permits for the use of water; to provide for the control of the useof water when water is in short supply; to provide for the acquisition of servitudes in respect ofwater; *to provide for the protection of the environment and the prevention and control of waterpollution;* to provide for the approval of combined water schemes; to provide for matters relating todam works;

Permits relating to water abstraction and water storage are granted in accordance with this act.

ZINWA will have to comply with the relevant sections in the Act, ie section 9, 13 and 72 which talk about pollution. These sections work hand-in-hand with the EMA Act (20:27).

3.1.8 Regional Town and Country Planning Act (29:12)

The Act provides for the planning of regions, districts and at the local level in order to conserve and improve the physical environment. It is also concerned with efficiency and economy as well as providing mechanisms for the control of all developments. Development permits for new projects are granted under this Act. This has since changed and local Authorities can only issue licences to developers after first having sight of the licence from EMA confirming that an approved EIA has been done or an exemption certificate has been issued.

ZINWA will need to be in compliance with this Act should they decide to further develop their infrastructure, ie, reticulation pipework will need to be done only for areas that have been approved by the Physical Planning Department.

3.1.9 National Museums and Monuments Act (25:11)

The legislation provides for the preservation of ancient, historical and national monuments, relics and other objects or artifacts of historical or scientific value. Section 20(c) requires all commercial developers to carryout archaeological and paleontological impact assessments before any development takes place. Part IV of the Act, Section 21 provides for the notification of discovery of ancient monuments and relics to the National Museum and Monuments. In terms of Section 24, no person shall excavate any ancient monument, and in terms of Section 25, alter, damage or remove from its original site any national monument or relic without the consent of the Executive Director of National Museum and Monuments. It is however important to note that most of proposed site area has already been disturbed. This is also relevant to the 'Physical Cultural Resources' World Bank Environmental and Social Safeguard Policy.

ZINWA or any appointed contractor will need to comply with this Act if any artifacts are discovered during excavations for construction works.

3.1.10 Road Traffic Act (13:11)

The legislation provides for the promulgation of regulations for the control of traffic movements, traffic noise, fumes, safety and the erection of traffic signs. This is particularly important during the construction phase of the subproject where a lot of material movement will be taking place.

There will be need for road crossings for water pipelines and ZINWA will have to comply with this Act.

3.1.11 Occupational Health and Safety in the Work Place in Zimbabwe

At a general level, occupational health and safety laws that are applicable to all employers and employees across sectors are the Labour Act, Chapter 28.01 and NSSA (Accident Prevention) (Workers Compensation Scheme) Notice No. 68 of 1990. There are also sectoral occupational health and safety laws.

ZINWA and any appointed contractor will need to ensure that the health and safety requirements of all workers from the planning to the operation phase are met. NSSA enforces this Act.

3.1.12 Environmental Impact Assessment Guidelines

The Environmental Management Agency has established guidelines for Conducting and Reviewing Environmental Impact Assessments. The guidelines explain provisions of the Act in relation to the environmental impact assessment procedure and outline the level of detail required in the environmental baseline study, impact assessment and the environmental management plan. It is within these basic guidelines read together with the relevant World Bank Environmental and Social Safeguard Policies set out below, that the ESMP has been compiled.

3.2 World Bank Environmental and Social Safeguards Policies

3.2.1 Environmental Assessment O.P 4.01

The Environmental Assessment policy is triggered by this project. The project was screened and categorized in Category B. With this category, the project does not require a full Environmental Assessment due to the fact the scope of works are limited to already existing ZINWA project areas and the potential environmental and social impacts are limited to immediate project areas. This ESMP will be adequate for the proposed project. The screening outcome was also discussed with EMA and it was agreed that the detailed ESMP will be adequate for EMA compliance as well.

3.2.2 Natural Habitats O.P 4.04

The Natural Habitat O.P 4.04 Policy was triggered due to the fact the intended abstraction source for Lupane is a dam which is generally a habitat for some aquatic species like frogs and fish. The mitigation for natural habitat will be formulated as part of the ESMP.

3.2.3 Forests O.P 4.36

The Forest O.P 4.36 was triggered for this project due to the fact that the construction of reservoir tanks at the Lupane station will take place within a natural forest and is likely going to account for a few teak forest trees. The likely less than twenty trees to be cut down on the construction site will require a Forestry Commission license and the trees should be properly cut so that they can be sold to furniture manufacturers.

3.2.4 Physical Cultural Resources O.P 4.11

The Physical Cultural Resources O.P 4.11 was not triggered following detailed consultations with the Lupane Local Board who assured that the project areas are already impacted and does not constitute and potential physical cultural resources.However, a chance finds procedure consistent with the National Museums and Monuments of Zimbabwe and the World Bank will be followed in the event that any such findings are made.

3.2.5 Safety of OP/BP 4.37

The water treatment plant will be fed with raw water from the Bubi Lupane Dam. The project therefore triggers the Safety of Dams O.P 4.37 because the success of the project is based on the integrity of the above dam. In line with this policy, ZINWA will submit dam inspection reports as a measure to ensure that the dam is kept in good working order.

3.2.6 Involuntary Resettlement O.P 4.12

The project does not trigger Involuntary Resettlement O.P 4.12 policy. The project will be implemented within existing ZINWA work stations and the targeted land for tanks belongs to the Lupane Local Board. There are no encroachments on the road reserves and the targeted housing areas are well planned and adequate work space for the installation of the water infrastructure.

CHAPTER 4

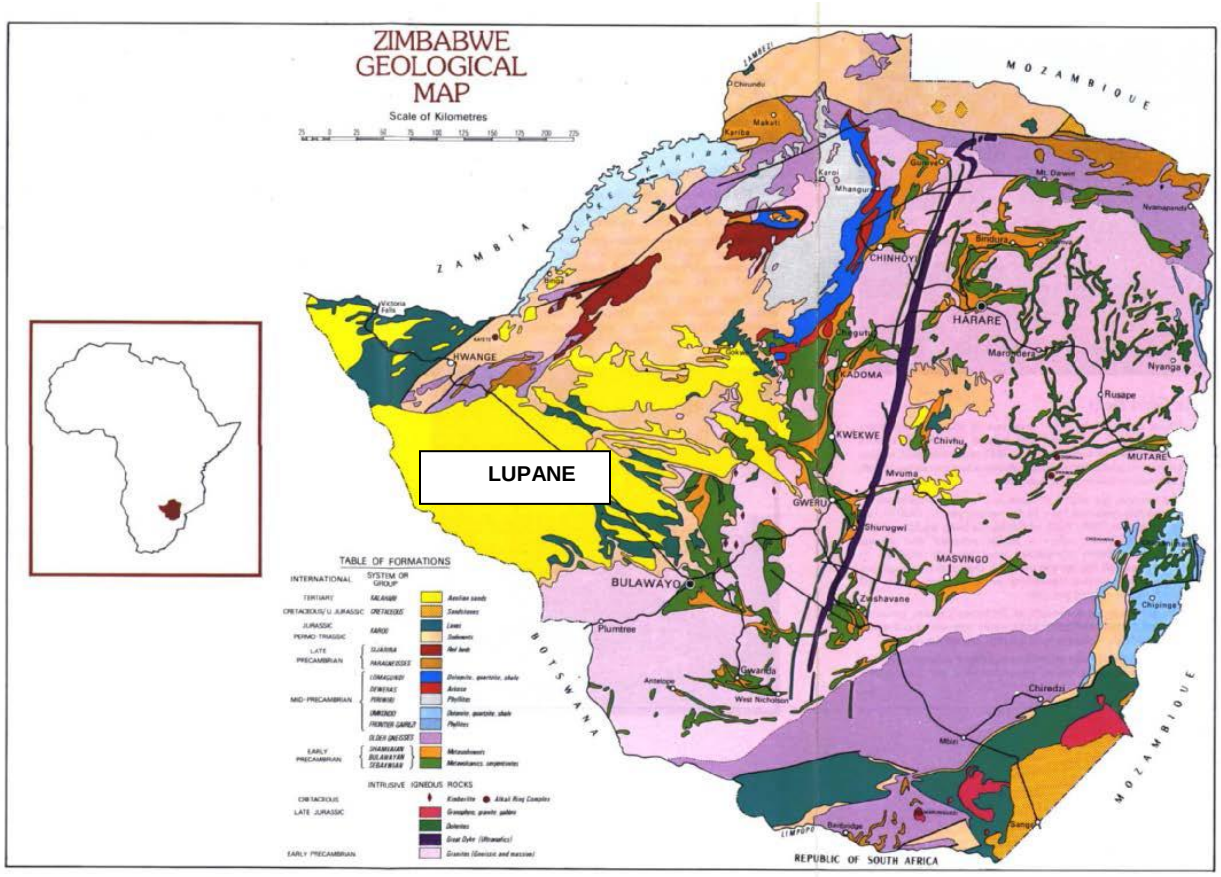
4.0 Environment and Social Baseline

4.1 Environmental baseline

4.1.1Geology

The geology of the country around Lupane town is dominated by thick Kalahari Sand cover overlying Karoo basalts and a variety of Karoo arenites and argillites. Conservative estimates for the Lupane area indicates methane gas resources far in excess of 100 000 million m^3.

Geological map of Zimbabwe showing the area of Lupane



It is unlikely that there will be use of explosives during any trenching or excavations given the depth of the Kalahari sand layer.

4.1.2 Topography

The terrain around the town is characterized by flat and rolling topography with isolated knolls and hills formed by exposed basalts or well indurated sandstones. Altitude ranges between 1000 and 1050 meters above sea level.

4.1.3 Soils

The soils in the vicinity of Lupane are largely derived from the Kalahari Sands and are typically grey sandy loams of generally low cation exchange capacity and therefore of low fertility.

4.1.4 Ecology (Fauna and Flora)

Despite the climate-related limitations and infertile soils, the District of Lupane is well endowed with other natural resources, particularly the indigenous hard wood timber forests that include the Zambezi teak (baikiaea plurijuga), mahogany, and mukwa. The forest reserves are largely due to the moisture retention capacity of the deep Kalahari sands that favour the regeneration of these species.

Images showing the vegetation in the area

4.1.5 Climate

Lupane town is located within agro-ecological region IV which is classified as moderately humid to semi-arid, with low to moderate annual rainfall averaging between 450 to 650 mm per annum. The typical tropical seasons are divided into winter and summer with winter temperatures ranging between 15 and 20 degrees Celsius and summer temperatures ranging between 23 and 32 degrees Celsius. There are occasional incidences of frost in winter.

4.1.6 Water quality

Due to the widespread cover of Tertiary aged Kalahari Sands in the area, there is very limited surface water in small dams or spring fed rivers and streams. The raw water supply for Lupane is expected to come from the Bubi Lupane dam. This dam will be supplying adequate water to the growing town for a long time to come and currently there are no reported cases of water pollution in this dam. The treatment plant currently under construction is a conventional treatment system expected to treat water to the recommended WHO and SAZ

standards. Currently the town is being supplied with water from boreholes and the water is of good quality requiring only chlorine disinfection.

4.1.7 Hydrogeology

The dedicated source of water for the town is Bubi-Lupane Dam with a capacity of 39.09 x 10^6 m^3. Given that the plant has a 240m^3/hr, we expect to be pumping a maximum 16 hrs a day, bringing the annual abstraction volume to 1.4 x 10^6 m^3 which translates to 3.7% of the full supply capacity. Taking into account, raw water uptake by Lupane University, Lupane Women' Centre and other raw water users, the dam is still able to meet the water supply requirements for the town. Agricultural/Farming activities in the town are very low at the moment and mining activities around Lupane are likely to be the chief economic activity.

4.1.8 Current effluent disposal system

Currently the boreholes in Lupane are not generating any effluent, but the treatment plant that is under construction is expected to have a sizeable effluent. The sources of effluent are expected to be; i) backwash process ii) scouring/desludging of sedimentation tank. The plan is to construct a recycling chamber that will collect all the backwash water and desludging water which will then be pumped back into the sedimentation tanks for re-treatment. The remaining solid sludge will be dried on drying beds and converted to other uses.

4.2 Socio-Economics

4.2.1 Administrative arrangements

The Lupane Local Board has various roles in the town. Among other things, these include conservation of natural resources, control of bush fires, grazing, animal diseases, sewerage works, pollution, and effluent or refuse selection, collection and disposal etc. In addition to the powers bestowed upon them, the Board is the Development and Planning authority within Lupane Town. In this regard, they are empowered to plan for the overall development of the Town.

As development and planning authorities, they are also expected to be aware and guide all development activities carried out by governmental and non-governmental organizations and the private sector within their jurisdiction. Any development that takes place within the Local Board's area of jurisdiction should be carried out within the provisions of the Board's priorities and approved development plans to allow for coordinated and collective approach to development. There is a Provincial Development Committee and District Development Committee and these meet regularly to plan and review developmental issues in the district and the province as a whole. Within these committees are clusters, e.g infrastructure development cluster, environment management cluster and etc, which focus on the different aspects of developmental issues. These committees are made up of various government departments that include ZINWA, ZETDC, Ministry of Education, Lupane Local Board, Kusile RDC, Public Works and etc.

4.2.2 Livelihoods

The core livelihoods in and around Lupane are subsistence mixed farming with a bias to animal husbandry by rural populations and scattered medium sized cattle ranchers. Major livelihoods in the settlement, recently elevated to town status, are small General Dealer (hardware and grocery shops) and their workers as well as government employees (mainly police, teachers and nurses). The rest of the workforce comprises of local authorities (Local Board, RDC and DA) and service parastatals such as ZINWA, Agritex, Forestry Commission, Parks and Wildlife, GMB, CMB, PTC and Delta. There are a few light industries (carpentry and furniture manufacturing and commercial enterprises such as banks and insurance companies. The bulk of the population is involved with vending of a variety of

goods and wares ranging from fruits and vegetables, grain, clothing and hardware largely in open markets. Average income for the centre is put at $120 per month though civil servants who make up the bulk of the formally employed population will earn more. There is also water vending around the town, with people selling raw water in drums to those who are unable to source the raw water from the dam. The water vendors charge various fees for a drum to 20litre containers, with some also involved in clear water vending.

The opening of the Lupane State University has seen water demand increase. It is anticipated that this demand will further increase next year with an increased intake. Currently connected households are getting water for an average of 6 hrs per day. Sometimes the water is available at odd hrs i.e. the small hours of the day for upland areas. Some fetch water from the surrounding communal area borehole where they contribute to the borehole maintenance fund. For these households, they spend an average of 2 hours per trip to fetch water from the borehole. One secondary school at the center is not getting any water at all because of low water pressure problems. Water has to be brought in by bowsers to the school.

4.2.3 Population and demographics

The town's population is estimated at over 20 000. Women are estimated at about 60% of the local population, translating to about 12 000. Given that the university has few Engineering and highly Technical courses (courses with low female enrolment), females are also expected to be at least 50% of the University enrolment.Males in the area usually move to South Africa in search of jobs and some stay in Bulawayo where they work whilst their families remain in Lupane. Women are going to be the major beneficiaries in the area. This is buttressed by the Lupane Women' Centre in the area which was established to market and empower women's projects. The former Growth Point was recently officially awarded a town status and provincial capital of Matabeleland North. The project is aimed at catalyzing the connection of water to approximately 10 000 residents in addition to boosting the delivery of water to existing connected residents numbering about 3 000. There are a total of 4 000 serviced residential and yet-to-be serviced stands in the town broken down as follows; High Density (3 000) Medium Density (600) and Low Density (420). Additionally there are 180 serviced commercial stands, 120 industrial stands as well as the Lupane State University, 9 Primary Schools, 4 Secondary Schools, 1 Provincial Referral Hospital and 4 Clinics.

4.2.4 Gender mainstreaming

At household level, women are chiefly responsible for fetching water. Some households are getting water for an average of 6 hrs per day. Sometimes the water is available at odd hrs i.e. the small hours of the day for upland areas. Electrical power is a challenge in Lupane Town and on average there is no power for at least 3-4 days a week. This means that the women are responsible for making sure that all empty containers and buckets in the houses are filled up with water for use when there is no power. Some fetch water from the surrounding communal area borehole where they contribute to the borehole maintenance fund. For these households, women spend an average of 2 hours per trip to fetch water from the borehole.

This project seeks to lessen the burden for women by providing a consistent supply of clear water to their doorsteps.There is a women's organisation, Lupane Women'Centre. The women's grouping is involved in several activities around the town. They are involved in farming (have a raw water connection account with ZINWA). They are also into the hospitality sector where they offer accommodation and food facilities to locals and visitors to the town. In addition to these activities, the women are also involved in art and hand crafting. These women have taken the initiative to improve their livelihoods and the project will assist them through the provision of a consistent supply of clear water and raw water.

4.2.5Land uses

The land use is typically peasant mixed farming with a bias towards ranching. The crops grown are largely small grain (millet and sorghum) and rarely maize. Most households rear cattle, goats, sheep and donkeys. The land belongs where water tanks will be erected belongs to Lupane Local Board and there are no conflicts of uses. The housing units are well planned and they were approved by the Physical Planning Department for Matabeleland North. No evidence of housing units encroaching onto road reserves or other designated areas has been seen in the town.

4.2.6 Sanitation Facilities

The Growth Point has noconventional sewage treatment facility. The Rural District Council acknowledged the inadequacy of this scenario. The septic tank and soakaway system is being use in Lupane town for all occupied structures, whilesome of the residents use pit latrines and very often the open defecation system. Some of the pit latrines are unacceptable close to the

supply boreholes. After project implementation, it will become necessary for the center to upgrade its sewage treatment facility from the septic tank system to the more modern and conventional sewage treatment plants, as well as connect all the residents to the main sewer system.

4.2.7 Public Health

Generally, the project area is free from major disease outbreaks. The area has one of the best district clinics in the country. There have been no major cases reported on water-borne diseases in Lupane due to poor water quality from ZINWA. This is because of the good quality of water from the current source boreholes. HIV and AIDS pose the major health threat to the people of Lupane and the likely proliferation of coal and methane gas mining companies in the areas around Lupane is likely to further worsen the situation.

4.2.8 Occupational health status

Currently the major occupational hazards at our water supply infrastructure include working while fatigued and walking long distances (water supply operatives). There is no pulley system to pull out broken down borehole units and pipes. Operators have to use their hands to manually pull out borehole units and riser pipes through the use of nylon ropes. This is a tiring and dangerous exercise as riser pipes are heavy and might fall onto the operators. Also, the water supply operators have to walk long distances when carrying out meter reading exercises as well as billing statements delivery leading to fatigue. The headwall at the dam is also not protected by a security fence, there is a danger of operators or other local people falling into the spillway discharge channel. The project is expected to address the issue of transport for the operators and the purchase of a mobile pulley that will be used during borehole pulling out. A fence will also be erected at the dam headwall to secure the area against people falling.

CHAPTER 5

5.0 STAKEHOLDER CONSULTATION

5.1 Introduction

A stakeholder refers to any person or group who can be affected, is affected by or think that they are affected by or is affected by the results and or actions taken as a result of a developmental process. Environment Management Act (CAP 20:27), section 4 (2c) says that participation of all interested and affected parties in environmental governance must be promoted and all people must be given an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation. As a result ZINWA engaged on a process where these stakeholders participated in the ESMP process by providing needed information which they think will protect them and the host environment and communities. The above process was carried out as a way of ensuring compatibility of the project with other developmental projects already in existence.

5.2 Objectives of the stakeholder consultation process

The stakeholder process aimed at achieving the following objectives;

1. To inform the stakeholders about the proposed project.
2. To identify potential negative and positive environmental impacts associated with the proposed project.
3. To increase public confidence and enhance a sense of ownership in the operational phase of the project.
4. To ensure the negative impacts are mitigated and benefits are maximized.

5.3 Principles governing public consultation

In the spirit of the Environment Management Act, the following principles were consistently upheld in all the consultancy work;

Inclusivity

The public consultation process covered representation of all relevant stakeholders. To ensure this principle was upheld, the stakeholder list was rationalized by the EMA through the prospectus review.

Open and transparent

In order to enhance this principle, the consultant ensured that all steps and activities of public consultation were understood by all consulted stakeholders.

Relevant

Relevance was also key in this ESMP and was achieved through remaining focused on the project issues that matter. The consultation boundaries also ensured that the consultation process remains relevant to the proposed activities.

Fairness and responsiveness

To achieve the objectives of the stakeholder consultation process there was a need to ensure that the consultation was conducted impartially. All stakeholders were empowered with project information first, and then solicit their informed input.

5.4 Data Collection Techniques

It is also important to note that a there is no one best method of data collection hence a number of these methods were employed in the process. The following stakeholder consultation methods were used

- Questionnaires were administered to various departments and stakeholders.
- A public notice was placed in the Chronicle for distant stakeholders who do not necessarily reside in the project areas but are interested or affected by the project.
- Public meetings were held for local communities.

With this diversity, the consultant is confident that all potential stakeholders were reached and their views were correctly captured.

5.5 Stakeholders' list

The following stakeholders were listed for consultation

i. District Administrator.
ii. Ministry of Women Affairs, Gender and Community Development.
iii. Ministry of Health and Child Welfare.
iv. Ministry of Public Works.
v. Local Authority
vi. ZRP.
vii. Local Community groups (Women groups, youth groups, old aged group where applicable).
viii. Residents Association where applicable.
ix. Water committee where applicable.
x. Ward Councilors.

xi. Local Village Head.

xii. Local Chief

xiii. Local business community (representative number)

xiv. Local NGO community

5.6Summary of stakeholder inputs

Name of Stakeholder	Views	Concerns	Suggested Solution	ZINWA's Comment
World Vision Lupane ADP	Erratic water supply mostly affected by power cuts and therefore it's not reliable	Will ZINWA afford consistency water supply	ZINWA must have technical personnel that will regularly monitor the quality of water.	ZINWA will monitor the water quality daily, at the treatment plant, reservoirs and at the furthest consumer. Full hydrochemical tests will be done once a month.
		Consumers may not cope up with rates	ZINWA must be prepared to a reliable service provider	Noted.
Lupane Local Board	Poor water supply	Areas situated on uneven gradient and loose Kalahari sands which are easily washed by drained water	Importation of foreign soils for example gravel.	This has been rectified for the treatment plant which was founded below ground level and by the use of masonry for slope stability.
	Some areas are not reticulated	Straying of Domestic Animals to the project	Fencing of the site	The treatment plant will be fenced off. The project involves reticulation extensions.
R.S Dube Business Centre	Receive water twice a week for few hours and that is not enough		Engage the community	Current shortages will be addressed by the more reliable 240m^3/hr plant and increased storage.
District Administrator	The system is inconsistent	There is little land clearance and forestry	All leakages must be efficiently managed	Leak detection equipment is part of the planned works.

	Some areas (houses) do not receive water	Leakages must be managed properly in the future	Land reclamation must be allowed in case/ after clearance	Noted. All reasonable efforts will be made for reclamation.
	There are no reservoirs to support future infrastructure development	Employment creation	Proper waste management must be done on all materials being in the process	1000m^3 and 2280m^3 are being built in this project. ZINWA will monitor and manage all waste (from the project) properly
	Population boom as a result operational Government complex and Lupane State University will not be supplied adequately	Water supply will improve hence built infrastructure		Current shortages will be addressed by the more reliable 240m^3/hr plant and increased storage.
		The project must be managed by the Local Authority		Local Authority has no capacity to handle the project.
Senzeni Nyoni Stand No. 403 New Stands	Receiving water daily			These stands are not facing water challenges.
	Facing no problem and it seems it's now 100 %			
Z.R.P Lupane	Supply is erratic	No concerns	Not applicable	Current shortages will be addressed by the more reliable 240m^3/hr plant and increased storage.
Stand No 5 vegetable Market	Water shortage	All areas to get eg new stands get water from bush pump		Current shortages will be addressed by the more reliable 240m^3/hr plant and increased storage.
	Bad smell of water sometimes	Everyone should get water		The new treatment plant will ensure water of better quality.
	Dirty water in the morning			Could be a cause of improper pipe scouring.

Lupane Women Centre	The water supply has been inconsistent	Will water continue to be clear once we switch to the new water reticulation	Consultation with the community to find the best way forward	Current shortages will be addressed by the more reliable 240m^3/hr plant and increased storage.
	Water is clear	How will it affect the surrounding community - people have been fishing from the river	Pre Test the water	ZINWA will monitor the water quality daily, at the treatment plant, reservoirs and at the furthest consumer. Raw water testing will be done at the station.
Kusile Rural District Council	Poor, water supply has been unreliable for a long period of time	There will be some light removal of vegetation as clearance for the mainlines	The main pipeline should follow already existing communication lines to reduce vegetation clearance	Noted. Reasonable care will be taken to limit vegetation clearing for reticulation mains.
	Some areas of Lupane Urban have been continuously dry since 2012	The project will provide temporary employment	The project must also undertake to employ and prefer people from Lupane so as to improve on the economic position of the locals	Noted. The contractors will be made aware of the need for locals to be employed, eg for the unskilled labour jobs and skilled where the local labour is available.
	Every time there is electricity failure, there is no water supply	Once water reticulation project is complete, development projects in the new stands will be less costly compared to the current situation as water will be available	The project implementation should have large storage tanks in case there is no electricity and must ensure that all leakages along the pipe line are plugged in time	1000m^3 and 2280m^3 are being built in this project. Leak detection equipment is part of the planned works.
		Hygiene and sanitation will improve as people access flush toilets in the new stands	Have a standby generator in case of emergency	Given the size of the plant, a generator will not be economic. ZINWA to engage ZETDC on a dedicated

				power line.
Lupane State University	Current water supply is inadequate, affected by pump breakdowns. Use of boreholes should be plan "B". LSU intends to bring at least 5000 students, 800 staff.	Land clearance and vegetation. Lack of raw water for agriculture, crop production and animal breeding.	Minimise the land and vegetation clearance. Supply of raw water to the institution from the dam.	ZINWA has included a raw water pipeline in the BOQ. Reasonable care will be taken to limit vegetation clearing for reticulation mains.

The stakeholder consultation process for Lupane involved interviews with the following key stakeholders:

Mr. Dube - Technician, Lupane Local Board

Mr. Roy Moyo - Acting CEO, Lupane Local Board

ZINWA

Business community

Residents

As in the other centers, residents were selected from both areas i.e. those connected and those not connected. The questionnaire guide was used to elicit for information.

5.6.1 Lupane Local Board

The interview with the Local Board highlighted the following issues:

- Lupane is a Town Board. At the moment there are no elected councilors and the town is run by 3 commissioners. Water, sewers and road improvements are the main priority areas for Lupane. These are seen as key to attract growth for the town.
- The impact of Lupane State University has been to increase demand for services like housing in the town.
- Having adequate water will speed up land development in the town. The government complex will be completed quickly and so will other developments in the commercial and residential sectors.
- It will also improve the welfare of the people
- Some public institutions like 1 secondary school is connected but is not getting water because low pressures.

- The University is only getting 10% of its requirements. The clinic under construction has also requested for water
- Council operates 2 boreholes to supplement the water requirements of the town.

The Local Board was very emphatic that an improvement in the water situation would stimulate local economic development. As more reliable water becomes available industrial, institutional and commercial establishments sprout, more jobs will become available in the Lupane. It was mentioned during meetings that most of the commercial and industrial stands at the centre have not been developed because of the problem of water. Even the government complex has not yet developed fully because of the scarcity of water. It is therefore anticipated that as the commercial and industrial areas are developed more jobs will be created. Added to this are the extensive backward and forward linkages that are set to create even more jobs.

The development of a commercial and industrial area of Lupane will inevitably lead to the development of ancillary activities. This will induce the creation of upstream and downstream industries as investors seek to capitalise on the commercial and industrial area as suppliers of inputs, providers of services, processors of goods or users of the products from these areas.

5.6.2 Business community

The business community in Lupane indicated that water was a major problem. Those who run restaurants were concerned that water availability was very erratic resulting in them not being able to meet laid down hygiene standards as stipulated by their licences and the public health regulations. A pulp and paper company that had interests in setting up in Lupane could not because of the problem of the erratic supply of water.

5.6.3 Residents

Availability of water

Water is available to residents on average for 2 to 6 hours per day. The availability is determined by amongst other things the pumping capacity at the boreholes against demand, availability of power (electricity) and water network problems which affect pressure. The location of the houses was also critical in determining the availability of water. Households in the higher areas normally were not getting water at all or at very odd hours when the households are in the lower lying areas are no longer drawing water from their taps. This could be around 1 or 2 am in the morning. This inconveniences the households who then fail to sleep properly or exposes the female residents to rape or robbery as they fetch water from taps outside the house.

Time/Distances to water sources

Unconnected households expressed concern over the distances they have to travel and the time spent fetching water. On average those who are not connected have to walk for up to 1hr one way to the nearest borehole or tap were water is available. Those who fetch water from the borehole in the communal area spend this much time. This is compounded by the fact that they have to carry 20 litre containers to fetch water. These water trips are made 2-3 times per day. Residents indicated that these trips take up a lot of their time and compromises other household chores like cleaning the house and preparing food for children.

Costs of water

The cost of getting water in Lupane is almost similar to that in other towns. There is a general willingness to pay for water. Households who are not yet connected indicated that they are willing to pay $15-20 per month towards water charges. Those who are currently connected are paying an average of $11-17 per month. The unconnected residents sometimes have to rely on water vendors who charge around $5 per 200 litre drum. About 30% of the unconnected households utilize these vendors. Others pay a monthly fee of $5 to those connected and is allowed to fetch water.

Hygiene issues

All the households interviewed and the Local Board voiced their concern regarding the issue of hygiene. The lack of water has resulted in households resorting to using the bush for toilets. This has created an unsustainable situation resulting from the washing away of human excreta into water courses and other environmentally sensitive habitats like dams. Households also indicated that the improvement of the availability of water for households currently receiving water for limited periods and the connection of those who are not yet connected will result in a huge improvement in their domestic hygiene as they will be able to bath and do their laundry more frequently and regularly. They would also be able to improve on domestic activities requiring more clean water like washing of plates.

Speed up Construction

Construction of houses was lagging behind because of the challenges of water. Construction of houses in the new areas of the centres has slowed down. Those constructing houses have to pay vendors to ferry water from the borehole to their stands. As in the other centres, plot owners pay $5 for a 200 litre drum of water. This makes the construction process expensive and slow. Even the Local Board indicated that the rate of construction at the centre for commercial and industrial stands was very low as a result of the lack of water. Only about 30% had completed construction in the commercial and industrial areas and those who had not started cited the problem of water.

Income Generating Activities and Greening

All households interviewed indicated that they will be able to able to have green gardens and lawns around their properties. This is not possible currently due to erratic water supplies and no connections. Some indicated the desire to start income generating projects like poultry at their properties if water were available.

5.6.4 Lupane State University

Lupane State University highlighted that the current water supply situation is very inadequate as borehole pump breakdowns occur frequently. The university pointed out that instead of entirely depending upon boreholes, the borehole system should be plan B/backup option. The full intake for the university is expected to comprise 5000 students and about 800 staff members and the current water supply will not be able to match the demand from the university.

They had some environmental concerns which included land clearance and vegetation. They also expressed concerns about raw water provision where they highlighted that the university's agricultural division was in dire need of raw water for crop production and small animal breeding. After discussions it was proposed that the raw water pipeline should form part of the BOQ for the project.

CHAPTER 6

6.0 IMPACT ANALYSIS AND EVALUATION

6.1 Introduction

The main objective of this ESMP is to promote sustainable development by ensuring that the water supply project does not undermine critical resource and ecological functions or the well-being, lifestyle and livelihood of the communities and peoples who depend on them. As a decision making tool, the assessment sought to inform the decision making process by identifying the potentially significant environmental effects and risks of the proposed project activities, assessing them, evaluating the possibility of alternatives and proposing the mitigation measures of any significant negative impacts through an environmental management plan.

Only those elements of the environment that have a direct bearing on the impact assessment process of the project are discussed. The severity of the potential impacts is largely determined by the state of the receiving environment. For example, the construction of a water pipeline in a pristine wetland habitat would have far more significant ecological impacts than the construction of the same in an already built up residential area.

6.2 General Approach

Table 3.1 was used principally during impact identification and analysis. The type/status (positive, negative, neutral), magnitude/Significance, timing (during design / planning, construction, and operation), duration (short term/temporary, medium, long term/permanent), extend/spatial scale (low, medium, high), mitigatory potential (low, medium, high), acceptability (low, medium, high) and degree of certainty (definite, probable, possible & unsure), of impacts that could result from the water supply were assessed in this section. The evaluation approach implemented in this study is a Receptor-Specific Analysis approach addressing the various sources of impacts from the development project. The analysis covers all potential fields of impacts and/ potential receptors:

- Ambient Air Quality
- Water resources
- Soil

- Biodiversity
- Noise
- Dust
- Waste generation
- Socio-economic Impacts
- Occupational health and safety

The general evaluation process included the following stages:

Step 1: Identification of project activities (sources) and environmental aspects;

Step 2: Identification of potential impacts to people and the environment;

Step 3: Evaluation and assessment of the related unmitigated impact significance;

Step 4: Identification of Best Practicable Environmental Options

Step 5: Re-evaluation and assessment of the mitigated impact significance

Table 3.1: Criteria Used For Assessment of Impacts

ASSESSMENT CRITERIA	RATING	INTERPRETATION OF RATING
TYPE/STATUS	Negative	Process detrimental/adverse to environment
	Positive	Process beneficial to environment
	Neutral	Process neither beneficial nor detrimental
MAGNITUDE OR SINIFICANCE	High(Red)	Of the highest order possible within the bounds of impacts that could occur. In the case of adverse impact there is no feasible mitigation that could offset the impact, or mitigation is difficult, expensive or a combination of these. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt. In the case of beneficial impacts, the impact is of substantial order within the bounds of impacts that could occur.
	Moderate (yellow)	Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of impacts that could occur. In the case of adverse impact mitigation is feasible and fairly easily achievable. Social, cultural and economic activities of communities are changed but can be continued (albeit in a different form). Modification of the process design or alternative action may be required. In the case of beneficial impacts, other means of achieving this benefit are equal in time,

ASSESSMENT CRITERIA	RATING	INTERPRETATION OF RATING
		cost and effort.
	Low (Green)	Impact is of low order and therefore not likely to have real effect. In the case of adverse impact mitigation is easily achievable, or little will be required. Social, cultural and economic activities of communities can continue unchanged. In the case of beneficial impacts, alternative means of achieving this benefit are likely to be easier, cheaper, more effective and less time consuming.
EXTENT OR SPATIAL SCALE	High	Widespread, far beyond site boundary, Regional/National/ International Scale
	Medium	Beyond site boundary, local area
	Low	Within site boundary
DURATION	Long	Permanent, beyond decommissioning
	Medium	Reversible over time, lasts for lifespan of project
	Short	Quickly reversible, less than lifespan of project
MITIGATORY POTENTIAL	High	High potential to mitigate impacts to the level of insignificant effect
	Medium	Potential to mitigate negative impacts. However, the implementation of mitigation

ASSESSMENT CRITERIA	RATING	INTERPRETATION OF RATING
		measures may still not prevent negative impacts
	Low	Little or no measures to mitigate negative impacts
ACCEPTABILITY	High	Unacceptable. Abandon project/process in part or in its entirety
	Medium	Acceptable with regulatory controls and with proponent's commitments
	Low	Acceptable, no risk to public health
DEGREE OF CERTAINTY	Definite	More than 90% sure of a particular fact or the likelihood of an impact occurring
	Probable	Over 70% sure of a particular fact or the likelihood of an impact occurring
	Possible	Only over 40% sure of a particular fact or the likelihood of an impact occurring
	Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring

6.3 Impact Analysis for Lupane

6.3.0 Planning Phase

Some activities for the project have already taken place. The construction of the main water treatment plants is almost complete and hence some of the impacts under this phase have already been felt. The plant is almost 95% complete. The storage tank site close to the residential area has also been selected. The planning phase impacts of the project for the reticulation for the houses and other institutions which have not yet been connected are very minimal. The planning phase normally involves the cutting of trace lines by surveyors and pegging. Impacts normally result from cutting down vegetation, disturbance to soils and dragging of equipment on the ground.

Biophysical

6.3.1 Vegetation

This impact has already been felt in most cases. This is because most of the project areas are already built up. It is only in the areas where pipe rehabilitation or construction where careful planning is required as there may be a bit of secondary vegetation. Even the site for the clear water storage tank in Lupane has been cleared of vegetation and the site is almost ready for construction activities. The other areas for reticulation are devoid of vegetation as these are in the built up residential, commercial, industrial or institutional spaces.

The Construction especially of the reservoirs may result in the loss of forest habitat/trees as indicated in paragraphs 3.1.4, 3.1.6 and 3.2.3: there needs to be an assessment of this impact. Before any construction work has begun a detailed baseline survey is required for the conservation and protection of these species.

Assessment for vegetation impacts during planning phase

Assessment Criteria	**Rating**
Type/status	Negative

Extent or spatial scale	Low
Duration	Short
Mitigatory potential	High
Acceptability	Low
Degree of certainty	Probable
Significance before mitigation	Low
Significance after mitigation	Low

This is judged to be an impact of low significance because in 90% of cases there is no vegetation as the areas have been built up.

6.3.2 Mitigation

Avoid disturbing or cutting trees in areas where there is still some vegetation. Spatially restricted areas will be utilized and this is not a significant impact.

6.3.3 Wildlife

In most of the areas there is no wildlife because of their built up nature. In Lupane, there is a bit of wildlife in the form of small mammals such as bush bucks and hares in the area, particularly the area for the water storage tanks. However the planning activities have already taken place.

In paragraph 3.2.2 the natural habitat of the lake is mentioned and the animals it supports. There needs to be an impact assessment on these features prior to operations, construction phase and operations phase.

Assessment for impacts on wildlife during planning phase

Assessment Criteria	**Rating**

Type/status	Negative
Extent or spatial scale	Low
Duration	Short
Mitigatory potential	High
Acceptability	Low
Degree of certainty	Probable for Lupane
Significance before mitigation	Low
Significance after mitigation	Low

This is an impact of low significance because of the low existence of wildlife and short duration of activities.

6.3.4 Soil Impacts

Movement and dragging of equipment on the ground during the time of survey and pegging of lines to be excavated for the pipes to be buried can result in loosening of soil which can potentially result in soil erosion or the generation of dust. However, this is not deemed a significant impact as the pegging and surveying activities are very low key.

Assessment for soils during planning phase

Assessment Criteria	**Rating**
Type/status	Negative
Extent or spatial scale	Low

Duration	Short
Mitigatory potential	High
Acceptability	Low
Degree of certainty	Probable
Significance before mitigation	Low
Significance after mitigation	Low

This is an impact of low significance due to short duration and much localized nature of activities.

The best mitigation measure would be to avoid dragging equipment on the ground and to ensure that there is no loose soil that can be blown away by wind or is washed away by water.

6.3.5 Hydrological and fluvial impacts

The effects of sheet erosion on loose soil if left unattended could trigger a host of negative impacts on water quality, levels and the capacity of water bodies. The negative impacts will accrue from siltation as valuable topsoil finds its way into streams.

Assessment for hydrological impacts during planning phase

Assessment Criteria	**Rating**
Type/status	Negative
Extent or spatial scale	Low
Duration	Short

Mitigatory potential	High
Acceptability	Low
Degree of certainty	Probable
Significance before mitigation	Low
Significance after mitigation	Low

The impact is of low significance.

The best mitigation measures here would be the one described above for soil.

6.3 Construction Phase

This phase will involve the completion of the water treatment works in Lupane. Trenching and laying of water reticulation pipes to residential, industrial and institutional users, sinking of boreholes and in some cases the upgrading and rehabilitation of water pipes and storage tanks.

6.3.3 Soil Disturbance

The trenching for the laying of the water reticulation pipes and the rehabilitation of the existing main pipeline to the water tanks will result in the disturbance of the soil. Trenches will be dug to lay pipes whilst the rehabilitation works will require trenching to lay bigger pipes. This is a temporary impact which will only be felt during the time of digging and laying of pipes.

Assessment for soil disturbance during construction phase

Assessment Criteria	**Rating**
Type/status	Negative

Extent or spatial scale	Low
Duration	Short
Mitigatory potential	High
Acceptability	Medium
Degree of certainty	Definite
Significance before mitigation	Moderate
Significance after mitigation	Low

This impact will definitely occur during trenching and other earth works but its duration is limited to the construction phase only and can be attended to immediately. The spatial scale is very limited and the impact can easily be mitigated.

The soil will be used to cover the pipes once the laying process has been completed. It is recommended that this is done immediately to avoid having mounds of soils lying around.

6.3.4 Dust

A bit of dust will be generated during the trenching and covering up of pipes. This will be a temporary impact which will last during the trenching and covering up of pipes. It is recommended that wherever possible loose soils are sprinkled with water to avoid the creation of dust. In any case the trenches will be shallow; at most they will be about 0.5m deep.

This means that the pipes will have to be laid at leat 0.75-1m deep. The disturbed soil during excavation can easily be washed away by water if left unattended for long periods.

Assessment for dust generation during construction phase

Assessment Criteria	Rating
Type/status	Negative
Extent or spatial scale	Low
Duration	Short
Mitigatory potential	High
Acceptability	Medium
Degree of certainty	Definite
Significance before mitigation	Moderate
Significance after mitigation	Low

This is similar to the above impact on soil disturbance.

It is therefore recommended that pipes be covered as quickly as possible to avoid the soil being washed away. Back filling of the pipes should take place within a day or two to reduce dust from the loose soils from the trenches. This will also forestall dust generation from soil piles left unattended for long periods.

6.3.5 Disturbance of Forests and Biodiversity

The areas to be connected have already been transformed into built up areas. There is very little vegetation and wildlife. As a result, the impact of the project on vegetation and wildlife will be very limited to nothing. The construction site for storage tanks has already been cleared of a few teak trees. If the construction of the Lupane subproject is to have direct minimal disturbance of the forest area, there is need for continuous monitoring of the species biodiversity during the whole project cycle. Engagement of Forestry Commision in protection and reestablishement of disturbed protected species is required.

Assessment for biodiversity during construction phase

Assessment Criteria	**Rating**
Type/status	Negative
Extent or spatial scale	Low
Duration	Short
Mitigatory potential	High
Acceptability	Medium
Degree of certainty	Probable for Lupane
Significance before mitigation	Low
Significance after mitigation	Low

6.3.6 Operation Phase

Biophysical impacts of the operation phase are very limited. These include possible contamination from back washing of filters.Increased volumes of raw water passing through the filter will entail more frequent backwashing and scouring to flush out rapidly accumulating debris and particles and regain the filter head pressure loss. Backwash water is very dirty and there is always a need to have a dedicated backwash line, complete with backflow prevention (Zane, 2005). This is either linked to a sewer main or a series of settling ponds, from which the overflow portion can be decanted into a nearby river while the dirt collects at the bottom. Backwash can also be recycled where water scarcity demands it. When the settling ponds are full, they can be covered up with soil and re-vegetated/reclaimed.

Other generic biophysical impacts will result from knock-on effects of increased water abstraction, increased wastewater production, increased numbers of residents and private

vehicles. Increased wastewater production is a natural consequence of improved water supply and this will strain the sewer treatment plants for the subprojects with common sewer line bursts resulting in malodorous releases and vector-borne transfers. Increasing resident populations come with increased solid waste generation and vehicular exhaust and noise pollution.

Assessment for impacts during construction phase

Assessment Criteria	**Rating**
Type/status	Negative
Extent or spatial scale	Low
Duration	Long
Mitigatory potential	High
Acceptability	Medium
Degree of certainty	Definite
Significance before mitigation	Moderate
Significance after mitigation	Low

6.4 Social Impacts

6.4.1 Planning Phase

The planning phase comprises of activities surveying, pegging and clearing. This is a low-key phase whose socio-economic impacts are not very pronounced unlike those on the physical environment. Most of the impacts are of low significance. This is as a result of the low numbers

of workers needed for the tasks on hand. The most effective mitigatory tool for the positive and negative impacts is efficient supervision and monitoring of the contractor and the terms and conditions of work.

The most prominent positive impact during this phase is employment. The positive impacts are primarily a result of the availability of jobs and increased disposable incomes. The increase in business volumes for existing business units and the creation of new businesses is a direct result of the jobs and incomes arising from the planning phase of the project. Precise numbers and figures, which can only be worked out after the project has kicked off, will determine the levels and types of the impacts. Most of these impacts are of low significance, which again is a reflection of the low numbers and short duration of the pre-construction phase of the project.

6.4.2 Construction Phase

6.4.3 Positive Impacts

The major benefits arising from the act of construction are four fold, namely,

- Employment creation through recruitment of unskilled and semi-skilled labour for trenching and assisting in the construction of water and storage tanks.
- Creation of, and increase in incomes from the new jobs.
- Improvement in standard of living arising from the afore-mentioned increase in disposable income.
- Boosting of existing businesses and creation of new businesses as commercial enterprises benefit from or capitalise on increased purchases generated by increased disposable incomes.

Assessment for job creation during construction phase

Assessment Criteria	**Rating**
Type/status	Positive
Extent or spatial scale	Low

Duration	Short
Mitigatory potential	High
Acceptability	Low
Degree of certainty	Definite
Significance before mitigation	Low
Significance after mitigation	Low

This is a low significance impact on account of the numbers involved and the duration and spatial extend which are very limited.

The impacts originate from actual construction of the water storage tanks and the laying of reticulation pipes plus related tasks such as excavation, clerical work, blasting and security. Most of the impacts are mostly of moderate significance.

6.4.4 Capitalising on the positive impacts

The actual benefits to the local communities in Lupane will depend on the way the proponents and stakeholders behave and/or make decisions regarding implementation logistics. Positive discrimination in the handling of access to benefits will have to be exercised. This means that locals, particularly those from Lupane centre will need to be favoured over outsiders in both the allocation of contracts, business licences and the determination of employment quotas.

The use of local labour for non-skilled and semi-skilled work will have to be written into the tender documents and subsequently used as one of the main scoring criteria for the technical bids by prospective contractors. Having a deliberate bias towards the adoption of labour intensive methods as opposed to capital-intensive methods of construction could widen the labour pool. The level and spread of incomes will be ensured by making sure that respective contractors pay at least the minimum wages for the respective industry as agreed between employer

representatives and unions, chief of which are the Construction and Allied Workers Union and the Employers' Confederation of Zimbabwe (EMCOZ).

6.4.5 Health and Promiscuity

The negative impacts arising from the activities are of low to moderate significance. Some will last well into the operation phase while others are permanent. By far the majority of these impacts are of a socio-economic and political nature. Among the principal ones are:

- Increase in prostitution, promiscuity and immorality as gangs of 'liquid' male workers – single or married – seek 'entertainment' and enjoyment.
- Break-up of the social fabric caused by local males who are led astray by increased incomes and engage in adultery or bouts of drunkenness, or local females who fall for the 'moneyed' local or outside males working on the factory site.
- Increase in Sexually Transmitted Diseases including HIV/AIDS due to increased prostitution and promiscuity.

Assessment for promiscuity, health during construction phase

Assessment Criteria	**Rating**
Type/status	Negative
Extent or spatial scale	Low
Duration	Short
Mitigatory potential	High
Acceptability	High
Degree of certainty	Probable
Significance before mitigation	Moderate

Significance after mitigation	Low

This is a low significant impact because of the duration and spatial extend.

6.4.6 Mitigation

In general the measures include a mixture of moral suasion, preventative strategies, education and legalities. Education, counselling and a penal code will address the health and moral problems. Education on HIV/AIDS as well as a proactive preventive approach like that used by community health workers will reduce the unfettered spread of STDs, including HIV/AIDS. A penal code on errant workers and household heads, as well as drunkards and those proven to be having a hand in breaking up families may need to be worked out in consultation with legal personnel. Making all workers contract workers for a set period will make it easy to get rid of undesirable elements in the workforce.

Prior agreements on quotas, independent monitoring and the recruitment of local labour and installation of own facilities or assistance towards provision of facilities by contractors can deal with resentment, animosity and friction and allay fears of possible sabotage as locals see the project as one big inconvenience with little or no benefits.

6.4.7 Safety

Issues of safety – both for workers and residents are important. Worker safety is guaranteed under the laws of Zimbabwe. Those employed during the construction period should be protected from injury. There is potential for employees to be injured as they dig trenches or work on water pipes. They can injure their hands, eyes or other parts of their bodies.

On the other hand, trenches left uncovered can result in injuries to residents. Children can be vulnerable as they see mounds of loose soil as a potential source of entertainment to play with.

Assessment for safety during construction phase

Assessment Criteria	Rating
Type/status	Negative
Extent or spatial scale	Low
Duration	Short
Mitigatory potential	High
Acceptability	High
Degree of certainty	Probable
Significance before mitigation	Moderate
Significance after mitigation	Low

This is a low to moderate significance impact because of the low numbers of people involved and the probability of accidents happening from the low key activities.

6.4.8 Mitigation

The contractors should ensure that prior to operations, a SHE Management Plan is put in place. Workers should be given adequate protective clothing as per the laws of the land. This will depend on which department they will be working under. They will need overalls, heavy duty boots and noise protection kits if they are working in noisy work place. Every employee on induction will be trained on safety issues to adhere to. No one will be allowed to log in for work without proper protective clothing for respective duties and area of work. Punishments for not adhering to the safety rules must be set and followed while safety awards can also be given to the most disciplined in terms of safety adherence as a way of ensuring safety culture on site.

For the residents, it has already been highlighted that the soils will need to be backfilled as quickly as possible. If left open they should be fenced (temporary fencing during construction) or barricaded using reflective safety tape. The trenches should not be left open for more than 2 days. They should be backfilled immediately. This will forestall the possibility of injuries resulting from people falling into the trenches or injuries to children playing on soil mounds.

6.4.9 Waste Generation

The labour that will be recruited to do the construction work have to dispose of human and other material waste somewhere. There will be off-cuts of pipes and wrapping materials which will need to be disposed of. The logic of labour efficiency will dictate that while they are at work they will opt to dispose of this waste as near to the workstation as possible. Left uncontrolled, this phenomenon will result in litter and excrement dotted all over the proposed development site.

Assessment for waste during construction phase

Assessment Criteria	**Rating**
Type/status	Negative
Extent or spatial scale	Low
Duration	Short
Mitigatory potential	High
Acceptability	High
Degree of certainty	Probable
Significance before mitigation	Moderate
Significance after mitigation	Low

This is an impact of moderate significance on account of the unacceptability of the impact. However, the impact can be easily mitigated.

6.4.10 Mitigation

We recommend a careful planning of waste-disposal during the construction phase. For papers, food leftovers and similar rubbish we propose a well-organise garbage collection and disposal system. This will need the provision of bins, the raising of awareness on indiscriminate dumping by the workforce, and the careful disposal of the rubbish out of site and in a safe place that will not be accessed by scavengers.

For human waste we propose the provision of temporary ventilated pit latrines. These should be set up in such a way that they are spaced across the work area, away from water sources and sacred sites. After the part of the work is done, they can easily be collapsed and covered over gain in a way that will not make it easy for scavengers to access the sites.

6.4.11 Traffic

Movement of construction vehicles bringing in pipes and other supplies has the potential to increase traffic conflict with local traffic and also cause accidents with domesticated animals. Whilst this impact is temporary as it will be felt largely during the construction phase, it is potentially significant as it may result in fatalities through accidents. However, construction vehicles will move outside the project area only when they are bringing in supplies and this will limit the conflict with outside traffic to those times only. Traffic will also increase dust in the area.

Assessment for traffic during construction phase

Assessment Criteria	**Rating**
Type/status	Negative
Extent or spatial scale	Low
Duration	Short
Mitigatory potential	High

Acceptability	High
Degree of certainty	Probable
Significance before mitigation	Low
Significance after mitigation	Low

This is an impact of low significance as the vehicles are expected once in a while hence the limited duration of the impact.

Vehicles bringing in supplies to the project area should not travel at more than 40 kilometres per hour. This will not only ensure that traffic accidents are kept to a minimum, but will also limit the amount of dust generated.

6.4.12 Disturbance of cultural resources

Cultural resources should be preserved under the National Monuments and Museums Act. It is recommended that should any such findings be made, the contractor should report these to the client who should report them to the Department of National Museums and Monuments as per provisions of section 21 of the Act. In such instances works in the affected area should be stopped and advice obtained from NMMZ. The probability of this happening is very low and hence the impact is viewed to be of low significance. If these existed, they could have been disturbed by construction of houses and other buildings. So whilst the Bank's policy on cultural resources (OP 411 Physical Cultural Resources) states that projects avoid these, under the current set up, it is recommended that where they will be construction of water pipelines, contractors avoid areas with grave yards and other known cultural resources like trees with medicinal value or forests used for traditional activities. At the moment the investigation did not come across any such resources. The area for the water tanks has already been cleared.

Assessment for cultural resources during construction phase

Assessment Criteria	Rating
Type/status	Negative
Extent or spatial scale	Low
Duration	Long
Mitigatory potential	High
Acceptability	High
Degree of certainty	Probable
Significance before mitigation	Moderate
Significance after mitigation	Low

6.4.13 Disturbance to other services

The project will involve digging trenches for laying water pipes. It is possible that in some of these areas there could be other buried services like PTC cables, ZESA lines and sewer lines. Reckless digging may end up severing these services which may be buried under ground resulting serious disruption. This is potentially an impact of moderate significance given its probability of occurrence and the easy with which such an impact can be mitigated.

Assessment for disturbance of other buried services during construction phase

Assessment Criteria	Rating
Type/status	Negative
Extent or spatial scale	Low
Duration	Low to medium

Mitigatory potential	High
Acceptability	High
Degree of certainty	Probable
Significance before mitigation	Moderate
Significance after mitigation	Low

Such an impact can be mitigated by liaising with the relevant authorities like ZESA, PTC and council sewer services to get maps of any buries services and determine where they run. This should be done prior to trenching activities in any area.

6.4.14 Water pollution

In the operational phase, the treatment plant will include backwash as one of its major treatment processes. Water pollution by untreated effluent is likely to be a negative impact from the treatment process. The treatment plant that is under construction is expected to have a sizeable effluent. The sources of effluent are expected to be; i) backwash process ii) scouring/desludging of sedimentation tanks and sump. The plan is to construct a recycling chamber that will collect all the backwash water and desludging water which will then be pumped back into the sedimentation tanks for re-treatment. The remaining solid sludge will be dried on drying beds and converted to other uses. Initially the design didn't include an allowance for managing the wastewater from the backwash process, but the design team has included a design for a settling/recycling pond and a recycling pump to ensure that all wastewater is collected into the pond before being pumped back into the system for treatment. This will ensure that all water discharged to the environment will be of recommended standards.

6.5 Socio-economic impacts: Operation Phase

This is the phase with the most durable impacts. Most of the impacts related to this phase will last as long the completed projects are in existence. Some are direct while a significant proportion.

The activities that will generate positive impacts include:

- Investment in the Lupane centre
- Employment creation in provision, operations and maintenance. ZINWA/Local Board will need more people to maintain their system
- Increased disposable incomes due to increased availability of paid jobs.
- Increase in local authority/ZINWA income through rates, rents and user charges
- Development of ancillary activities for production and services upstream and downstream.
- Improvement in hygiene and health, caused by the excellent water quality from the new treatment plant.
- Improvement in the occupational health and safety safeguards
- Income generating activities at household level
- Retention of good quality staff by organizations

6.5.1 Employment creation

As more reliable water becomes available industrial, institutional and commercial establishments sprout, more jobs will become available in the centre. It was mentioned during meetings that most of the commercial and industrial stands at the centre have not been developed because of the problem of water. Even the government complex has not yet developed fully because of the scarcity of water. It is therefore anticipated that as the commercial and industrial areas are developed more jobs will be created. Added to this are the extensive backward and forward linkages that are set to create even more jobs.

This in turn will lead to increased disposable incomes as unemployed or underemployed youths and adults find gainful formal sector employment. Ultimately, the standard of living will improve. A related indirect benefit is the increase in business volumes and transaction arising out of the improved spending power resulting from increased disposable incomes. Existing businesses will see turnover increase, while new business units crop up to take advantage of the now buoyant business environment.

The development of a commercial and industrial area of Lupane will inevitably lead to the development of ancillary activities. This will induce the creation of upstream and downstream industries as investors seek to capitalise on the commercial and industrial area as suppliers of inputs, providers of services, processors of goods or users of the products from these areas.

Assessment for employment creation during operation phase

Assessment Criteria	**Rating**
Type/status	Positive
Extent or spatial scale	Medium
Duration	Long
Mitigatory potential	High
Acceptability	Low
Degree of certainty	Probable
Significance before mitigation	Moderate
Significance after mitigation	Low

The potential for employment during operation phase is very high and significant.

6.5.2 Improvement in hygiene

Hygiene and health of households will generally improve with more water being available for domestic use. Households will be able to use flush toilet. This will reduce the current practice of using the bush as toilets. This will in turn reduce the risks of contamination arising from this practice. Households will also be able to use clean water for washing clothes plates and engage in other household chores requiring more water.

Assessment for hygiene during operation phase

Assessment Criteria	**Rating**
Type/status	Positive
Extent or spatial scale	Low
Duration	Long
Mitigatory potential	High
Acceptability	Low
Degree of certainty	Probable
Significance before mitigation	Moderate
Significance after mitigation	Low

This is a significant positive impact which will last for as the project life time.

6.5.3 Income Generating Activities and Greening

Some of the households indicated that they will embark on income generating projects like poultry and vegetable growing if water is available. They indicated that under the current economic situation it would be desirable to have a project that gives them an income, even just a vegetable garden. However, this is difficult without water close by. The introduction of reticulated water will enable the households to engage in these activities.

Assessment for income generating activities during operation phase

Assessment Criteria	**Rating**
Type/status	Positive

Extent or spatial scale	Low
Duration	Short long
Mitigatory potential	High
Acceptability	Low
Degree of certainty	Probable
Significance before mitigation	Moderate
Significance after mitigation	Low

This is a positive impact of moderate significance and will last for as long as the project is in existence.

6.5.4 Time for other chores

At the moment, the female members of the households in all the centres spend a lot of time fetching water. For some of the households, it can take up to 1 hour per trip using 20-25 liter containers. On average, they visit the water sources 3-4 times per day. This is time which could have been spend on other chores had water been available. The provision of water will mean that the female members of households will have adequate time for other chores like cooking, cleaning the house or looking after children. Sometimes children have to work up early and go to the boreholes first before going to school.

Assessment for increased time for other during operation phase

Assessment Criteria	**Rating**
Type/status	Positive

Extent or spatial scale	Low
Duration	long
Mitigatory potential	High
Acceptability	Low
Degree of certainty	definite
Significance before mitigation	Moderate
Significance after mitigation	Low

This impact will definitely occur and will improve the life of household as they will be able to take time off from their duties of fetching for water.

6.5.5 Speed up Construction

Construction of houses in the new areas has slowed down because of the problem of the availability of water. Those constructing houses have to pay vendors to ferry water from the borehole to their stands. The plot owners pay $5 for a 200 litre drum of water. This makes the construction process expensive and slow. However, it creates employment for those who are in the informal business of ferrying water.

Assessment for speeding construction during operation phase

Assessment Criteria	**Rating**
Type/status	Positive
Extent or spatial scale	Low
Duration	Long
Mitigatory potential	High

Acceptability	Low
Degree of certainty	Definite
Significance before mitigation	Moderate
Significance after mitigation	Low

6.5.6 Loss of livelihood

The down side of the availability of the water is to render those who are working as water vendors jobless. It was not possible to get exact figures of those working as water vendors at housing construction sites, but a livelihood will be definitely lost as result of the reticulation of the water to the households. Those who are engaged in water vending know that it's a temporary activity and will move to other livelihoods.

Assessment for loss of livelihood during operation phase

Assessment Criteria	**Rating**
Type/status	Negative
Extent or spatial scale	Low
Duration	Long
Mitigatory potential	High
Acceptability	medium
Degree of certainty	Probable
Significance before mitigation	Moderate
Significance after mitigation	moderate

This is a negative impact which is difficult to mitigate. There will always be other avenues for vendors to explore.

6.5.7 Safety around raised water tanks

Safety concerns with regard to overhead water tanks in residential areas have been raised as a major issue. Two such facilities will be provided in Lupane. There is fear that children can wonder to water tank sites and climb up risking falling down or into the water tanks. This can result in serious injury or even drowning.

Assessment for loss of safety around raised water tanks during operation phase

Assessment Criteria	**Rating**
Type/status	Negative
Extent or spatial scale	Low
Duration	Long
Mitigatory potential	High
Acceptability	medium
Degree of certainty	Probable
Significance before mitigation	Moderate
Significance after mitigation	Low

This impact can be easily mitigated by fencing off the areas around the tanks and ensuring that there is no easy access. Gates to the tank should always be locked and only those with business at the water tanks are allowed access.

6.5.8 Water Quality

Provision of water in the required quantities/demand matching is not the only benefit that all water consumers expect from a water supply service. The quality of water also plays a critical role in the lives of all water consumers and industries. Residents will require water of WHO and SAZ recommended standards so that their health and hygiene is not compromised. Provision of poor quality water will have a negative impact on the intended beneficiaries, ie diseases. Also, some industries' activities might be affected by water of poor quality, e.g water bottling, swimming pool centres, food outlets and etc. It will therefore be of paramount importance that water quality be monitored wholly. ZINWA will monitor the quality of raw water daily at the treatment plant before treatment. Proper and adequate treatment procedures will be adhered to during the treatment process after which water quality will then be monitored in the clear water sump before water is pumped to the storage reservoirs. Water quality tests will also be conducted at the storage reservoirs as intermediary points before further water quality tests are carried out for the furthest consumers (e.g residual chlorine tests). Tests at all stages will include some/all of the following, pH tests, optimum dosage tests, residual chlorine tests and etc. Full hydrochemical tests will not be done daily though as these take time and specialist testing; hence they will be done on a monthly basis.

6.5.9 Occupational Health and Safety

Currently the major occupational hazards at our water supply infrastructure include working while fatigued and walking long distances (water supply operatives). There is no pulley system to pull out broken down borehole units and pipes. Operators have to use their hands to manually pull out borehole units and riser pipes through the use of nylon ropes. This is a tiring and dangerous exercise as riser pipes are heavy and might fall onto the operators. Also, the water supply operators have to walk long distances when carrying out meter reading exercises as well as billing statements delivery leading to fatigue. The headwall at the dam is also not protected by a security fence, there is a danger of operators or other local people falling into the spillway discharge channel. As part of the mitigation measures for all these identified hazards, the following will have to be done;

- Transport for the operators, ie motorbikes will be purchased.
- Purchase of a mobile pulley that will be used during borehole pulling out.
- A fence will also be erected at the dam headwall to secure the area against people falling.
- All reservoirs will have steel ladders with a safety handrail on both sides
- The treatment plant designs incorporated catwalks and safety handrails on both sides to protect the employees against falling into filter blocks and sedimentation tanks.

- All employees handling chemicals and chlorine will require gas masks/respirators.

6.6 ENVIRONMENT AND SOCIAL MANAGEMENT PLAN FOR LUPANE

Table 6.1: Water Supply Project Environmental Management Plan

BIOPHYSCICAL IMPACTS

IMPACT STATEMENT	**PROCESS/ACTIVITY RESPONSIBLE FOR IMPACT**	**PROPOSED MITIGATION OF IMPACT**	**MONITORING AND MANAGEMENT AGENCIES**	**MANAGEMENT AND MONITORING ACTIVITIES**	**TIME FRAME**	**BUDGET (US$)**
Soil disturbance	Walking up and down the proposed trench lines may loosen soil	Avoiding unnecessary movements and pulling of equipment on the ground	Local Board, EMA, ZINWA, Contractor	Check for signs of loose soil along trace lines	Planning phase	Negligible
Siltation	Loose soil can potentially result in siltation during the rainy season	• Attend to loose soil immediately	ZINWA, Contractor	As above	As above	Negligible

IMPACT STATEMENT	PROCESS/ACTIVITY RESPONSIBLE FOR IMPACT	PROPOSED MITIGATION OF IMPACT	MONITORING AND MANAGEMENT AGENCIES	MANAGEMENT AND MONITORING ACTIVITIES	TIME FRAME	BUDGET (US$)
Disturbance of vegetation	Cutting down trees along trace lines and pegging sites	• Avoid cutting down tress • Where trees are cut, There is need for commitment to replanting as close as possible in terms of type (species) and location, and in a greater number than lost (to ensure mitigation is	Contractor, ZINWA	Mark trees to left standing and check for new trees planted	As above	Negligible

IMPACT STATEMENT	PROCESS/ACTIVITY RESPONSIBLE FOR IMPACT	PROPOSED MITIGATION OF IMPACT	MONITORING AND MANAGEMENT AGENCIES	MANAGEMENT AND MONITORING ACTIVITIES	TIME FRAME	BUDGET (US$)
		successful)				
Alteration of soil compaction properties and exposure to erosion	Digging of trenches	Backfill all trenches and sprinkle water on loose soil mounds	EMA, Local Board, ZINWA	Backfilling should be carried out immediately after the laying of water pipes	Continuous	Negligible
Extermination of indigenous species, appearance of new species which could be dangerous	Cutting down of trees and other vegetation during trenching	• There is virtually no indigenous vegetation in the areas. • Avoid the little natural vegetation in	Community, EMA, Local Board, RDC	Check routing of pipes to ensure it does not pass through any remaining vegetated areas	Construction phase	Negligible

IMPACT STATEMENT	PROCESS/ACTIVITY RESPONSIBLE FOR IMPACT	PROPOSED MITIGATION OF IMPACT	MONITORING AND MANAGEMENT AGENCIES	MANAGEMENT AND MONITORING ACTIVITIES	TIME FRAME	BUDGET (US$)
		the area • Once the impact on natural habitat/species in Dam and at the sites of the reservoirs is known, this mitigation measure may need to be updated				
Dust generation	Trenching and backfilling	Sprinkle water on soil and backfill trenches	ZINWA, Local Board, Contractor	Ensure trenches are not left open for more	Construction phase	1 000

IMPACT STATEMENT	PROCESS/ACTIVITY RESPONSIBLE FOR IMPACT	PROPOSED MITIGATION OF IMPACT	MONITORING AND MANAGEMENT AGENCIES	MANAGEMENT AND MONITORING ACTIVITIES	TIME FRAME	BUDGET (US$)
		immediately		than 2 days		
Water contamination	Backwashing activities	Filter integrity to be maintained and adedicated backwash mains and lined backwash ponds	ZINWA, Local Board,	Regular blowing of the filters and replacement after design period	Throughout operation phase	Routine. Backwash and recycling system now budgeted for.

Table 6.2: Water Supply Project Environmental Management Plan: Socio-economic Impacts

IMPACT STATEMENT	PROCESS/ACTIVITY RESPONSIBLE FOR IMPACT	PROPOSED MITIGATION OF NEGATIVE IMPACT (OR ENHANCEMENT OF POSITIVE IMPACT)	MONITORING AND MANAGEMENT AGENCIES	MANAGEMENT AND MONITORING ACTIVITIES	TIME FRAME	BUDGET (US$)
PLANNING PHASE						
Employment creation	Labourers to assist surveyors and peggers	Employ local youths	Local leadership, ZINWA, Contractor	Insist in contractual documents for the employment of locals	Planning Phase	-
CONSTRUCTION PHASE						
Creation of	Laborers for	Employ locals	Contractor	Number of locals	Continuous	–

employment	digging trenches and working with builders on water tanks			youths engaged as labourers		
Increased traffic and pressure on roads	Introduction of construction vehicles in the project area	Enforce speed limits; Maintain local roads	ZINWA, Local Board Contractors	Place speed limit insignia in the vicinity of project; follow a strict road maintenance schedule	Continuous	3 000
Worker safety	Injuries from blasting or use of machinery	Provide adequate protective clothing and awareness	NSSA, ZINWA, Contractor	Check on protective clothing for workers	Construction	2 000
Injury to children and others	Falling into open trenches	Backfill trenches immediately	Contractor, ZINWA	Trenches to be backfilled at most after 2 days. The area in the meanwhile can be temporarily fenced off using materials	Construction	500

				such reflective safety tape		
Health and Promiscuity	Moneyed construction workers engaging prostitutes	Awareness campaigns on AIDS and STIs	Contractor	Worker entertainment activities	Construction	1 000
Disturbance and disruption of buried services	Breaking PTC, ZESA cables or sewer lines	Liaise and consult ZESA, PTC or sewer department for any buries services in areas to be trenched. Get maps of services	ZINWA, Contractor	Ensure services maps are available	Construction Phase	500
Disturbance of physical cultural resources	Digging of cutting down trees or disturbance of forests of cultural value. *Unlikely to occur as pumping*	Avoid areas of cultural value if any	ZINWA, Contractor, Local leadership	Mark all areas of cultural value if any Report findings to National Museums and Monuments	Construction Phase	200

	mains are already in place, reticulation mains will be within the housing units where there are no trees					
Waste generation	Off-cuts, wrappings, packaging, other domestic waste	Reuse all reusable packaging materials Provide proper waste landfill which will be covered after Provide bins	ZINWA Contractor	Make sure bins are used	Construction	1 000
OPERATION PHASE						
Employment and Local Economic Development	Increased incomes from employment as firms open up	Employ locals	RDC, Local Board and local leadership	Number of new firms opening in Lupane	Operation Phase	500

Income generating projects	Availability of water will enable households to embark on poultry and gardening projects and other greening activities	Encourage households to set up projects	RDC, Local Board and Local leadership,	Number of income generating projects set up	Operation phase	500
Improved revenue for ZINWA	Payments for consumption	Implement good billing and collection system Minimize losses through leakages	ZINWA	Amounts collected	Operation phase	1 500
Improvement in hygiene and health	The availability of clean water at primary school will mean of flush toilets, clean drinking water	Ensure water is available for a minimum of 12 hours every day	ZINWA, Local Board	Check down times for water pumping and quantities against demand	Operation phase	2 000

Speed up construction	Will no longer rely on buying water from water vendors	Make water available at least for 12 hrs per day	ZINWA, Local Board	Numbers of houses/businesses/institutions being constructed	Operation phase	500
Loss of Employment for water vendors	Services will no longer be necessary after reticulation to houses and plots	Establish other sources of livelihoods	Relevant government ministries Lupane Local Board	Alternative livelihoods for vendors	Continuous	1 000
Safety around raised water tanks	Children and other people may climb and fall injuring themselves or die	Fence off tanks and keep gate locked	Lupane Local Board ZINWA	Accidents around water tanks	Operation phase	2 000

ENVIRONMENTAL RULES FOR CONTRACTORS

1 General

In addition to these general conditions, the Contractor shall comply with any specific Environmental and Social Management Plan (ESMP) for the works he is responsible for. The Contractor shall inform himself about such an ESMP, and prepare his work strategy and plan to fully take into account relevant provisions of that ESMP. If the Contractor fails to implement the approved ESMP after written instruction by the Resident Engineer (RE) to fulfill his obligation within the requested time, the ZINWA as the project implementer reserves the right to arrange through the Project Manager (PM) for execution of the missing action by a third party on account of the Contractor.

1.1 Notwithstanding the Contractor's obligation under the above clause, the Contractor shall implement all measures necessary to avoid undesirable negative environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by any environmental performance requirements specified in an ESMP. In general these measures shall include but not be limited to:

1.1.1 Minimize the effect of dust on the surrounding environment resulting from earth mixing sites, land clearing , dispersing coal ashes, vibrating equipment, temporary access roads, etc. to ensure safety, health and the protection of workers and communities living in the vicinity of dust producing activities.

1.1.2 Ensure that noise levels emanating from machinery, vehicles and noisy construction activities (e.g. excavation, blasting) are kept at a minimum for the safety, health and protection of workers within the vicinity of high noise levels and nearby communities.

1.1.3 Ensure that there is no disturbance of existing water flow regimes in rivers, streams or dams

1.1.4 Prevent oils, lubricants and waste water used or produced during the execution of works from entering into rivers, streams, and other natural water bodies/reservoirs, and also ensures that stagnant water within the working area is treated in the best possible way to avoid breeding of mosquitoes.

1.1.5 Upon discovery of ancient heritage, relics or anything that might or believed to be of archeological or historical importance during the execution of works, immediately report such findings to the PIT so that the appropriate authorities, including the NMMZ may be expeditiously contacted for fulfillment of the measures aimed at protecting such historical or archaeological resources.

1.1.6 Discourage construction workers from engaging in the exploitation of natural resources such as hunting, fishing, and collection of forest products or any other activity that might have a negative impact on the social and economic welfare of the local communities.

1.1.7 Implement soil erosion control measures in order to avoid surface run off and prevents siltation, etc.

1.1.8 Ensure that garbage, sanitation and drinking water facilities are provided in construction workers camps.

1.2 The Contractor shall indicate the period within which he/she shall maintain status on site after completion of civil works to ensure that significant negative impacts arising from such works have been appropriately addressed.

1.3 The Contractor shall adhere to the proposed activity implementation schedule and the monitoring plan / strategy to ensure effective feedback of monitoring information to project management so that impact management can be implemented properly, and if necessary, adapt to changing and unforeseen conditions.

1.4 Besides the regular inspection of the sites by the RE for adherence to the contract conditions and specifications, the ZINWA appointed a Safeguards Officer (SO) based at Catchment offices to oversee the compliance with these environmental conditions and any proposed mitigation measures. In all cases, as directed by the RE and SO, the Contractor shall comply with directives from such inspectors to implement measures required to ensure the adequacy rehabilitation measures carried out on the bio-physical environment and compensation for socio-economic disruption resulting from implementation of any works.

1.5 Ensure service maps are available to prevent disturbances and disruption of buried services such as electricity or telecommunication cables or sewer pipes.

2 Worksite/Campsite Waste Management

Ensure service maps are available to prevent disturbances and disruption of buried services such as electricity or telecommunication cables or sewer pipes.

All waste containers, litter and any other waste generated during the construction shall be collected and disposed off at designated disposal sites in line with applicable EMA requirements and conditions set in the ESMP.

All drainage and effluent from storage areas, workshops and camp sites shall be captured and treated before being discharged into the drainage system in line with EMA’s waste and effluent disposal requirements.

Construction waste shall not be left in stockpiles along the roads, but removed and reused or disposed of on a daily basis at designated disposal points.

3 Rehabilitation and Soil Erosion Prevention

3.1 To the extent practicable, the Contractor shall rehabilitate the site progressively so that the rate of rehabilitation is similar to the rate of construction.

3.2 Always remove and retain topsoil for subsequent rehabilitation around temporary camps as possible and re-vegetate areas not required after construction.. Topsoil shall not be stored in large heaps. Low mounds of no more than 1 to 2m high are recommended.

3.3 Revegetate with local plant species that will control erosion, provide vegetative diversity and, through succession, contribute to a resilient ecosystem.

3.4 Ensure soil is stockpiled for future use and used to re-profile and rehabilitate closed affected areas.

3.5 Backfilling should be carried out immediately after the laying of the water pipes to prevent exposure to erosion that result in siltation of rivers and dams.

3.6 All open trenches should be fenced off with reflective tape material as they pose a potentially serious safety hazard to the school children and local population (especially at night) or provide proper demarcation and display warning signs.

3.7 Use dust suppression measures such as sprinkling water on soil in working sites and access roads.

3.8 Use only approved sites for sand abstraction pits and solid waste disposal.

4 Water Resources Management

4.1 Abstraction of water from wetlands shall be avoided.

4.2 No construction water containing spoils or site effluent, especially cement and oil, shall be allowed to flow into natural water drainage courses.

4.3 Wash water from washing out of equipment shall not be discharged into water courses or road drains.

4.4 Site spoils and temporary stockpiles shall be located away from the drainage system, and surface run off shall be directed away from stockpiles to prevent erosion.

5 Traffic Management

5.1 Access roads shall not traverse wetland areas.

5.2 Upon the completion of civil works, all access roads shall be ripped and rehabilitated.

5.3 Place speed limits insignia in the vicinity of projects as there will be increased traffic and pressure on roads.

5.4 Maintain local roads and follow a strict road maintenance schedule.

5.5 Ensure that vehicle washing and machinery maintenance is done only in authorised areas (away from waterways).

6 Blasting

6.1 Blasting activities shall not take place less than 2km from settlement areas, cultural sites, or wetlands without the permission of the RE.

6.2 Blasting activities shall be done during working hours, and local communities shall be consulted and notified on the proposed blasting times.

6.3 Noise levels reaching the communities from blasting activities shall not exceed 90 decibels or as guided by the National Social Security Authority (NSSA)

7 Health and Safety

7.1 In advance of the construction work, the Contractor shall mount an awareness and hygiene campaign. Workers and local residents shall be sensitized on health risks particularly of HIV/AIDS

7.2 Provide safety equipment and adequate protective clothing and awareness to all construction workers to prevent or reduce injuries from work related activities.

7.3 Provide worker entertainment activities and awareness campaigns on STIs and HIV/AIDS to prevent or minimize the spread of STIs and HIV/AIDS through promiscuity of moneyed construction workers engaging prostitutes.

7.4 Adequate signs to warn pedestrians and motorists of construction activities, diversions, etc. shall be provided at appropriate points

7.5 Construction vehicles shall not exceed maximum speed limit of 40km per hour.

7.6 Seek approval for transportation, use, storage of hazardous chemicals.

7.7 Handle and store all hazardous materials in line with their corresponding Materials Safety Data Sheets.

8 Repair of Private Property

8.1 Should the Contractor, deliberately or accidentally, damage private property, he shall repair the property to the owner's satisfaction and at his own cost. For each repair, the Contractor shall obtain from the owner a certificate that the damage has been made good satisfactorily in order to indemnify the Client from subsequent claims.

8.2 In cases where compensation for inconveniences, damage of crops etc. are claimed by the owner, the Client has to be informed by the Contractor through the SE. This compensation is in general settled under the responsibility of the Client before signing the Contract. In unforeseeable cases, the respective administrative entities of the Client will take care of compensation

9 Contractor's Safety, Health and Environment Management Plan (SHE-MP)

9.1 Within 6 weeks of signing the Contract, the Contractor shall prepare an SHE-MP to ensure the adequate management of the health, safety, environmental and social aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an EMP for the works.

9.2 The Contractor shall prepare bi-weekly progress reports to the RE on compliance with these general conditions, the project ESMP if any, and his own SHE-MP.

9.3 It is advisable that reporting of significant SHE incidents be done "as soon as practicable". Such incident reporting shall therefore be done individually. Also, it is advisable that the Contractor keeps his own records on health, safety and welfare of persons, and damage to property. It is advisable to include such records, as well as copies of incident reports, as appendices to the bi-weekly reports.

10 Training of Contractor's Personnel

The Contractor shall provide sufficient training to his own personnel to ensure that they are all aware of the relevant aspects of these general conditions, any project ESMP, and his own SHE-MP, and are able to fulfill their expected roles and functions.

11 Cost of Compliance

11.1 It is expected that compliance with these conditions is already part of standard good workmanship and state of the art as generally required under this Contract. The item "Compliance with Environmental Management Conditions" in the Bill of Quantities covers these costs. No other payments will be made to the Contractor for compliance with any request to avoid and/or mitigate an avoidable SHE impacts.