ZIMBABWE

ZIMBABWE NATIONAL WATER PROJECT

ENVIRONMENT AND SOCIAL MANAGEMENT PLAN (ESMP)

FOR

MADZIWA WATER SUPPLY SUBPROJECT

MASHONALAND CENTRAL 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

EXECUTIVE SUMMARY

Environmental and Social Impact Assessments were conducted for Madziwa Water Supply in Mashonaland Central, Zimbabwe. The scope of works

Introduction

The Government of Zimbabwe has 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 (one in each of the seven Catchments of Zimbabwe), which are Guruve (Manyame), Gutu (Runde), Lupane (Gwayi) Madziwa (Mazoe), Mataga (Muzingwane), Nembudziya (Sanyati) and Zimunya (Save). As part of the assistance to ZINWA to fully prepare subprojects in the seven ZINWA stations for investment, Castalia reviewed preliminary safeguards (environmental and social) assessment carried out by ZINWA for the 7 priority areas.

Madziwa is a small former mining town in Chaminuka District, Mashonaland Central Province in the north-east part of Zimbabwe. The town lies about 118 km north-east of Harare via Shamva. It is 32km north of Shamva. The responsible local authority is Chaminuka Rural District Council. It was established after amalgamating Shamva Rural Council and Chaminuka District Council in 1994/6 in line with the RDC Act Chapter 29:13.

Madziwa Water Supply Station falls within the Mazowe Catchment as demarcated by the hydrological boundaries in Zimbabwe managed by the Zimbabwe National Water Authority (ZINWA). The water supply station supplies potable water to Madziwa and its surrounding areas

Study Methodology

The safeguards assessments and tools were pitched at a level that satisfies requirements of the Zimbabwe legislation for environmental management (Environmental Management Act) and the relevant World Bank safeguards policies.

Tasks undertaken for the project included an outline description of the baseline environmental setting, identification and analysis of expected, known and predicted direct, indirect, cumulative, short and long term as well reversible and irreversible impacts of the project during the planning, construction, operation. The description of the environmental setting and the analysis of identified and predicted impacts were subdivided into biophysical and socio-economic realms. 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.

The ESMP study was expressly meant to specify and propose measures for avoiding or mitigating the identified and predicted negative impacts while equally specifying and proposing ways of enhancing and boosting all identified and predicted positive impacts.

Legal and Institutional Framing

Zimbabwe's EIA policy emphasizes sustainability principles in project planning, construction, operation as well as in 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/ESMP results on behalf of the Ministry of Environment Water and Climate. The latter is part of the EIA/ESMP review process. 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.

The promulgation of the Environmental Management Act (Chapter 20:27) of 2002 and a number of supporting Statutory Instruments (SIs) listed below now provide a one stop environmental management regulatory package. The establishment of the Environmental Management Agency in November 2006 further consolidated the environmental management function, thereby doing away with duplication and overlaps in the various Government Ministries and Departments with respect to the same function. Some of the SIs enacted in support of the Act are;

a.) Statutory Instrument 6 of 2007 – Environmental Management (Effluent and Solid Waste Disposal) Regulations, 2007;

b.) Statutory Instrument 7 of 2007 - Environmental Management (Environmental Impact Assessment and Ecosystems Protection) Regulations, 2007;

c.) Statutory Instrument 10 of 2007 – Environmental Management (Hazardous Waste Management) Regulations, 2007;

d.) Statutory Instrument 12 of 2007 – Environmental Management (Hazardous Substances, Pesticides and Other Toxic Substances) Regulations, 2007 and,

e.) Statutory Instrument 72 of 2009 - Environmental Management (Atmospheric Pollution Control) Regulations, 2009

The relevant World Bank policies reviewed include:

- O.P 4.01 - Environmental Assessment.
- OP 4.04 - Natural Habitats
- OP 4.36 – Forests

- OP 4.11 - Physical Cultural Resources
- OP 4.12 - Involuntary Resettlement

In screening the projects, it was concluded that the water projects are Category B as they are occurring in already disturbed environments. Impacts on the relevant policies above are very minimal and can be easily mitigated. The compilation of a detailed prospectus which has been submitted to EMA is a first step in the fulfillment of local project screening guidelines. An argument has been made that ESIA exemption needs to be granted for these 7 sub projects given the reasons above.

Existing Environment

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.

Stakeholder Consultation

This involved questionnaire and interviews with institutions such as RDCs, ZINWA, Schools and Hospitals as well as residents.

Analysis of Environmental Impacts

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 projects 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 projects are not going to result in the displacement of people or disturb physical natural resources. Their impacts on the Bank's policy areas are very minimal and as such can be easily mitigated.

Environmental and Social Management and Monitoring Plan

An Environmental Monitoring and Management Plan EMMP is outlined for avoiding/mitigating negative impacts and enhancing/boosting positive impacts. The EMMP buttresses the sustenance of existing environmental management interventions, as well as continuous monitoring of critical environmental parameters. Mitigation costs incurred in the implementation of some of the environmental protection initiatives are generally very low and can be easily offset by recovered benefits of more water, better hygiene and sanitary health.

Conclusions and Recommendations

The refurbishment and upgrade engineering works planned for Madziwa Water Supply station will largely be limited to the settling up of an additional $50m^3$/hr water treatment unit, replacement/upgrading of pumps and motors, raw and clear water mains/pipelines, reservoir tanks and in most cases, backwash mains and settling ponds and the provision of ablution facilities.. All engineering works, including replacement of the current pipeline, 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. None of the subproject activities and impacts are expected to trigger any of the World Bank Environmental and Social Safeguard policies except Environmental Assessment. It is important however to integrate issues of sanitation and wastewater management in the wake of increased volumes of water available to the Madziwa Teacher's residents as it will certainly translate to larger volumes of waste water released into the environment.

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Chapter 1

1. Introduction

1.1 Ministry of Water, Environment and Climate

Since the cholera crisis in 2008, the Government, through MEWC has begun to rebuild the water sector. There has been significant achievements in improving the policy and institutional framework for the sector, but still limited investments to restore services to their former high standard. The Government has received investment support in the urban water sector from the ZimFund and in the rural water sector from DFID through UNICEF as well as support from other Development Partners and the Government's own funds however, investment in small towns and rural growth centers are under-supported. ZINWA is the national water utility that oversees water resources management in the 7 water catchments, and also supplies water to 538 ZINWA stations. These stations range from small rural schemes to large towns. Over US$ 1 billion is needed to rehabilitate all these ZINWA stations, and significant effort is required to transform ZINWA into a commercially viable and customer-responsive modern utility

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. 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.

1.3 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

The EMSP will cover all life cycle stages of the project that includes project design, raw material sourcing, construction, operation and disposal. The project is expected to take 18months to complete construction and a operational design life about 25years. The area be covered under the EMSP include the Madziva area and the surrounding environment to an expected radius of about 20km as well as the whole stretch of the Mufurudzi river up to its confluence with Mazowe river of which after that self purification of the river system is assumed to have naturally occurred

1.5 Potential users of the ESMP

Potential users of the project include all the interested stakeholders which include the following:

Contractors- an EMSP is required as the part of the bidding documents for the contract. Caution should also be taken during the implementation of the project; the contractor should have knowledge of the negative impacts of the activities to the environment.

ZINWA- as the operators of the finished project should have the knowledge and the effects of the mode of operations both to the environment as well as to human safety.

General Public- the beneficiary of the projects that is the general public need to be part of the EMSP. There is need of sense of ownerships of the project from the general public in order to ensure full participation during design, implementation, as well as during monitoring and evaluation.

EMA- as the enforcer of the environmental law, EMA is a potential user of the ESMP for proper monitoring of the negative environmental effects of the whole project life cycle.

RDC- the project falls under the jurisdictions of RDC, the RDC also act as an informer to EMA and are also interests in the environmental issues of the areas under their jurisdictions.

2.0 Introduction

Madziwa is a small town that was established as a result of the mining activities in the area. Madziwa mine used to mine nickel and gold before the mine closed down in 1999. Before mining began, the area was just a small village comprising of a few homesteads. When mining began within the area, this village expanded and developed as the demand for better infrastructure grew. The mining brought about with it development of the area in the form of shops, schools, clinic, churches and irrigation schemes. There is also a safari game reserve within close proximity to the Madziwa area. This safari area in the Umfurudzi Safari Area and is managed by National Parks.

Madziwa water supply station was resuscitated in 2009 by the Zimbabwe National Water Authority to meet the water supply needs of Madziwa Teacher Training College. The station which used to be operated by Madziwa Mine had not been in use for almost 10 years after the mine ceased operations. At full establishment the College has a capacity to enrol and train a total of 2500 teachers in line with national agenda on human capital development as articulated in the medium term blue print Zimbabwe Agenda on Sustainable Socio- Economic Transformation (ZimASSET). However, currently the college is enrolling a total of 836 students. The college is therefore operating at 33% of total capacity. Unreliable and hence insecure water supplies to the station are proving to be a major obstacle to growth of the college operations and other follow on industries. In addition to the college's requirements potable water is required to meet the requirements of the nearby clinic, two schools and the nearby rural business centre.

The water abstraction, supply, treatment and conveyance infrastructure inherited by ZINWA is dilapidated and mostly outlived design capacity. This has resulted in the system recording high water loses adding to the high operation and maintenance costs. Erratic supply of electricity to the station has not helped the situation either.

The socio- economic costs which are being accrued by the nation arising from failure to meet the needs of the clients can never be over emphasised

2.1 Project location

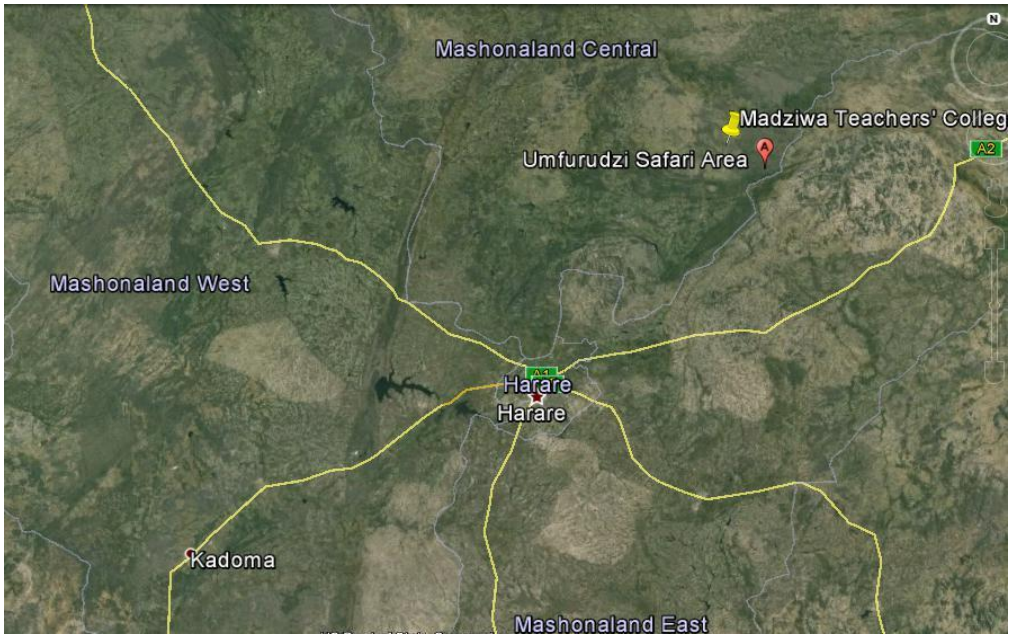


Figure 1:Project Location

Madziwa Teachers College Water Supply Station (MTCWSS) is in Chaminuka District located about 135 km from Harare in Mashonaland Central Province. Its position can be generally defined as: Map Reference: Bushu 1731 B1 Surveyor General's 1: 50 000 Series Grid Reference: 5612

2.2 Project description

Madziwa's population is estimated at about 5 000 and about 1190 households. There are only a total of 13 metered connections. Currently the ZINWA is losing an estimated 60% of raw (untreated) water due to leakages within the raw water pumping system. The project is aimed at replacing 7km of the existing 200mm diameter steel pipes with 160mm diameter PVC pipes, constructing a 50m3/hr conventional treatment unit and replacement of pumping units. Provision has also been put to connect Madziwa Primary School which is running without secured water safe water source.

The water source for Madziwa Teachers College is the Mupfurudzi river storage weir. Upstream dams provide back up when flow in the perennial river dwindles.

The project summary scope of works includes the following;

- Replace raw water pumping mains, dosing equipment and a number of motors and pumps, gauges and valves
- Upgrade raw water abstraction system
- Construct new clear water reservoir tanks, high level raw water holding tank, clear water transmission line, new main to Madziwa primary school, new reticulation around primary school,
- pump house and water sump construction

2.2.1Existing Water Supply Infrastructure

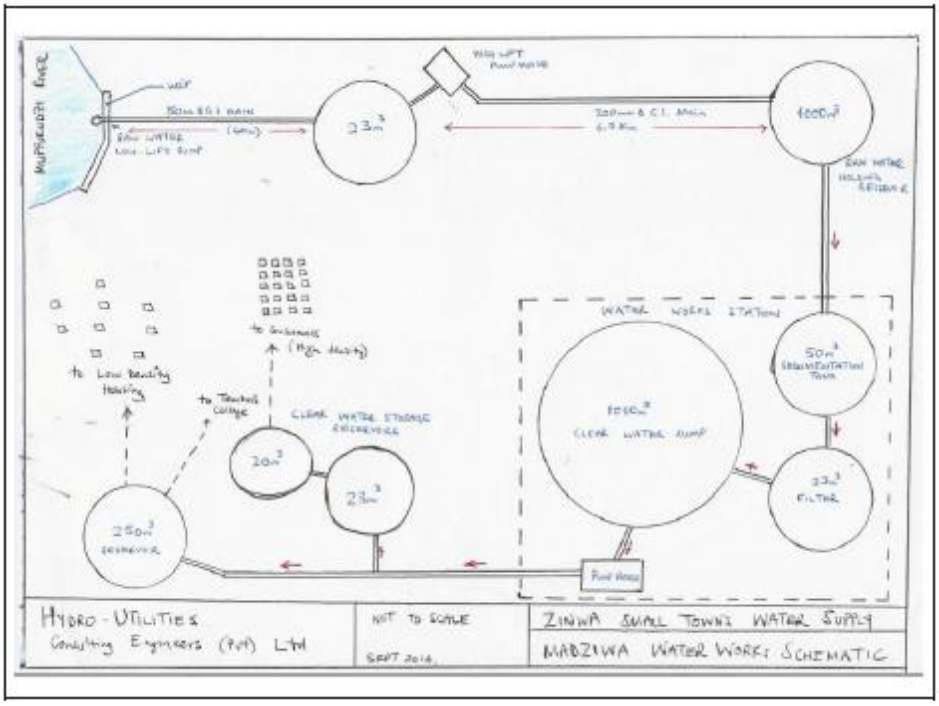


Figure 2:Schematic layout of Mazdiwa Trs' College Water Supply

The raw water source for the station is Mupfurudzi River downstream of Mufurudzi Dam. Water is abstracted from the river at the pick-up weir and pumped direct into raw water sump adjacent to the raw water pump house. Upstream of the pick-up Weir there is Mufurudzi Dam which releases water downstream. The distance between the Dam and the pick – up Weir is approximately 26km. The dam has the following details:

FSC	-	9.619 x 106 m3
Yield at 10% risk	-	2 .746 x 106 m3

Committed - 0.560 x 106 m3

2.2.2 Raw Water Pumping Plant and Mains

There are three pumping stages for the Madziwa TC water supply scheme, (Abstraction; intermediate boosting station for raw water and the clear water point).

Low Lift Pumps

Water is abstracted from the Mupfurudzi River at a pick up Weir. The original VT pumping configuration was abandoned for the current horizontal split case pumping. Raw water is pumped through a 100mm delivery main. The pump (CEN 125-250) is driven by a 4 pole 15hp electric motor. There is no pump house for the current low lift raw water pumps; the existing pump house is for the highlift raw water booster pumps.

Figure 3:Raw water abrastion point

Booster Pumps

From the sump raw water gravitates to the booster pump house where it is pumped through 7km of a 250mm steel pipe which now very old. There are several leaking sections of the pipeline.

Currently we are estimating that about 60% of pumped water is lost. The raw water rising main is equipped with 2 x 80mm Air valves and 2 scour valves at the high and low points respectively. There are no standby pumps for both low and high lift pumps. At full development both the low lift and high lift pumps would be inadequate to meet the supply.

Due to the high water loses on the raw water rising main, the energy costs due to pumping are approximately two to three fold the normal consumption.

2.2.3 Water Treatment Plant

The existing conventional water treatment plant has a design capacity of approximately $15m^3/hr$. The treatment plant comprises of a Dortmund type metal radial flow sedimentation basin with a matching rapid sand filter unit. Raw water gravitates from the $1000m^3$ sump through a 150mm diameter pipeline.The design-loading rate on the sedimentation tank and the filters cannot be established. However, the observed (through abstract measurements) operating loading rates for the clarifier is $1.25m^3/m^2/hr$ at maximum retention time of 4 hours. This implies that the sedimentation tank will be operating outside the recommended design criteria of L = $0.5m^3/m^2/hr$ and Retention time of 2 to 4 hours. For effective operation the treatment plant was designed with an inline (pulse dosing system) chemical dosing point. Currently there are no dosing pumps for both aluminium sulphate and chlorine. The drip feeding process in not working at all and is never the ideal for the station. Filter backwashing is achieved by pumping clear water from the sump. The sump has capacity of $500m^3$ and at the current and even the projected demand at full establishment is more than adequate.

Figure 4:Water treatment unit

2.2.4 Clear Water Pumping Plant and Mains

The pump house is equipped with one 30m3/hr pump driven by driven by a 15hp (Pumping to Admin) and the other a $10m^3/hr$ pump driven by driven by a 5.5hp (Pumping to Village) electric motors. Clear water pumping main comprises of two pipelines which pumps water to the low and

high density reservoirs. The pipelines are predominately 100mm GI pipes. There is no standby clear water pumps at the station

2.2.5 Storage

The total current storage for clear water at the high density is 2 x 23 m^3 and at the low density is 250 m^3 reservoirs. Water then gravitates to consumers via a trunk gravity main of 100mm diameter steel pipes. The 500 m^3 sump also works as a service reservoir.

2.2.6 Proposals

2.2.6.1 Source

Construction of reinforced concrete pump house at the abstraction point is going to be done. Remedial works such as weed clearing de-silting would be required at the raw water source.

2.2.6.2 Raw Water Pumping Plant and Mains

There is need to replace the aged steel pipe with a 160mm PVC pipe for the entire 7km pumping main fitted with air and scour valves at appropriate sections.

2.2.6.3 Low Lift Pumps and Booster Pumps

In order to avoid the risk of not supplying water due to pump failure it is proposed to provide two pumps one duty and one standby. Measuring devises in the form of bulk meters, pressure gauges are also considered essential for the rehabilitation of the system.

2.2.6.4 Water Treatment Plant

It is proposed to construct a new conventional water treatment plant with a design capacity of 50m^3/hr. The station will operate a normal shift of 8 hours per day hence allowance has been provided for any surge in demand. The existing sump with a capacity of 500m^3 is adequate but requires remedial works on the roof and chemical dosing points. A 23m^3 elevated backwash tank is proposed for backwashing and station use.

2.2.6.5 Clear Water Pumping Plant and Mains

New matching pumpsets and switch gears are required for the clear water pump house. The existing clear water pipelines are considered adequate and functional. A new 90mm PVC clear water pumping main is going to be laid that is to serves Madziwa Primary School. Dosing equipment is also being considered essential

2.2.6.6 Storage

Construction of an additional 1000m^3 raw water reservoirs and a 250m^3 brick reservoir for the primary school and erection of 200m^3 more wear tank at high density and low density suburbs. Remedial works required including installation of bulk water meters.

2.3 Project Cost

Description	**Amount**
P&Gs	173,172.01
Intake works	85,500.00
Raw water conveyance and storage	608,531.41
Water works	268,493.55
Pumping Equipment and electrical	132,141.92
Distribution system and connections	304,626.27
Clear water Storage	438,853.61
Staff Accommodation	122,119.97
Sub Total	2,133,438.74
Contingencies	213343.874
Sub Total	2,346,782.61
VAT	352017.3921
GRAND TOTAL	2,698,800.01

Please note that the highlighted costs are exclusive of ESMP production costs and monitoring. The costs are covered in the main ZNWP document under establishment costs

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.

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;

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.

- 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 may be necessary for sand abstraction and transportation, if required.

- 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.

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.

Rural 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.

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.

Since the scope of works involves the upgrading the existing infrastructure which is not within the Mupfurudzi Game Reserve, the project will not affect the protected area.

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.

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.

Water Act (20.24)

Section 101 of the Act contains legislation against pollution of any water and this is also reinforced by regulations from the Environmental Management Act. The discharge of effluent or waste water into any water body will be regulated by permits to which conditions will be attached, subject to prescribed standards and for which fees are payable (see also EMA Act). Permits relating to water abstraction and water storage are granted in accordance with this act. The various waste streams will be subjected to this legislation.

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.

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.

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.

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.

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 that the intended abstraction source for Madziwa is Mupfurudzi River which is generally a habitat for some aquatic life. The mitigation for natural habitat will be formulated as part of the ESMP. There is need to ensure that there is adequate water for the domestic water supply and also the aquatic life in the river. The abstraction point should also ensure that fish is not entrapped.

3.2.3 Forests O.P 4.36

The Forest O.P 4.36 was not triggered since there are no gazetted forests within the project areas. Installation of the new pipeline will involve replacement of the existing pipeline hence,

minimal tree clearance is expected. The upgrading of the water treatment plant will be limited to the current site of the plant and the area is devoid of the natural vegetation.

Miombo vegetation where pipeline will be constructed

3.2.4 Physical Cultural Resources O.P 4.11

The Physical Cutural Resources O.P 4.11 was not triggered following detailed consultations with the Chaminuka RDC 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

Though the raw water supply is abstracted from Mupfuridzi River, the ddd dam upstream supply raw water during dry season. The success of this project therefore hinges on the integrity of the upstream 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 belong to the Chaminuka RDC. There are no settlements or fields along the transmission line and the land is State land under the jurisdiction of the RDC.

Chapter 4

Environment and Social Baseline

4.1 Environmental baseline

Figure 5. Location of Madziwa Water Supply

Some of the environmental issues that the field trip could gather during the field trip concerning the Madziwa area are listed below:

- The Madzviwa area is a former mine where nickel and gold were mined before mine closure in 1999
- Just before the mine closed, there was a catastrophic incident that occurred. There were huge volumes of cyanide that leaked from the mine and polluted the groundwater. Today, the area remains a hazardous zone in terms of groundwater. Groundwater is not used in this area as it is thought that the area is still polluted with cyanide.
- The surrounding areas of the mine consist of fertile soils and some farmers farm tobacco and maize

There are about 3 small scale irrigation schemes farming beans, green maize and water melons

4.1.1Geology

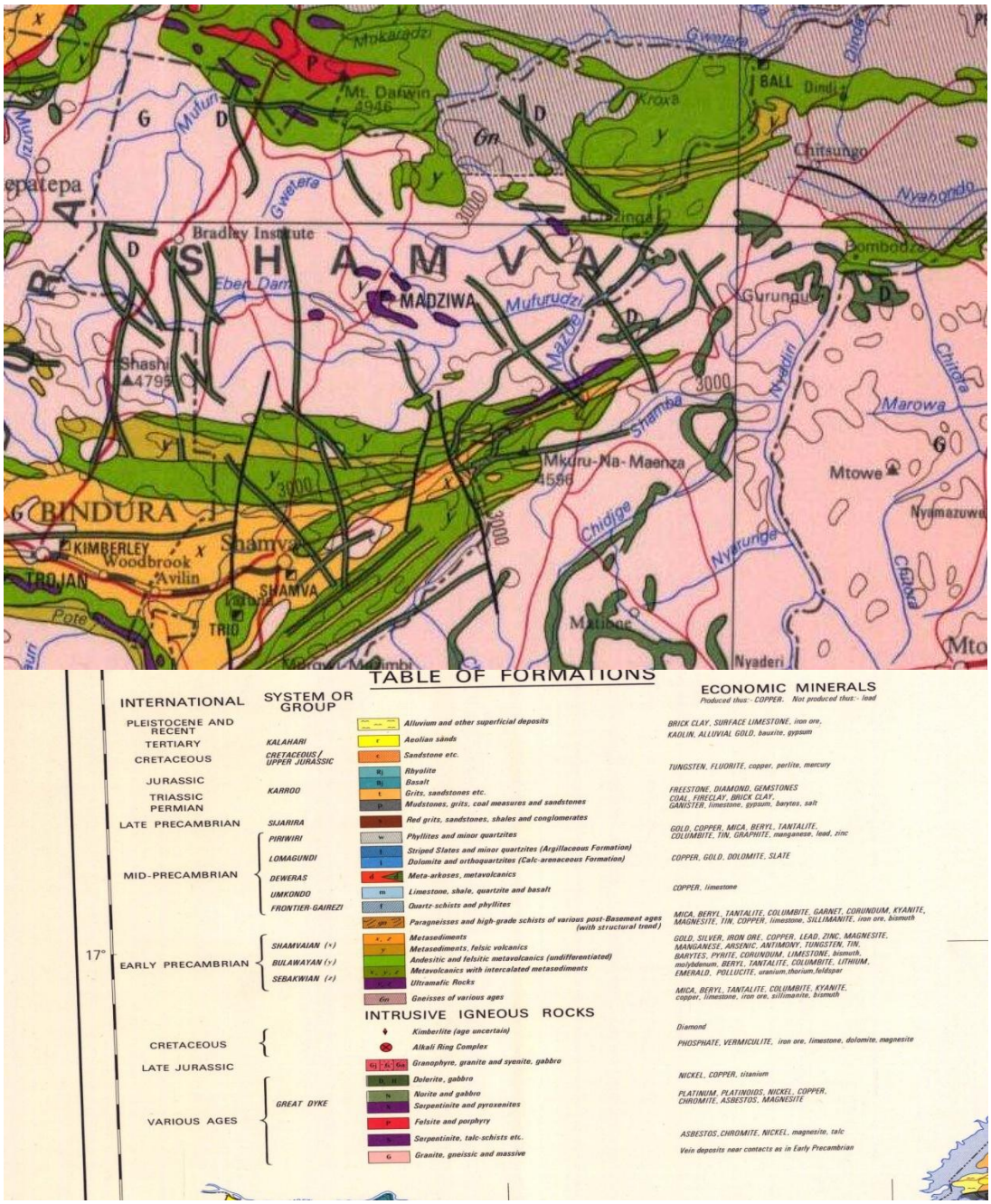


Figure 6. Geological Map of Madziwa Area

The geology around Madziwa is dominated by Archaean greenstone rocks of the Upper Bulawayan volcanic rocks and Shamvaian volcanic and sedimentary rocks.

4.1.2 Topography

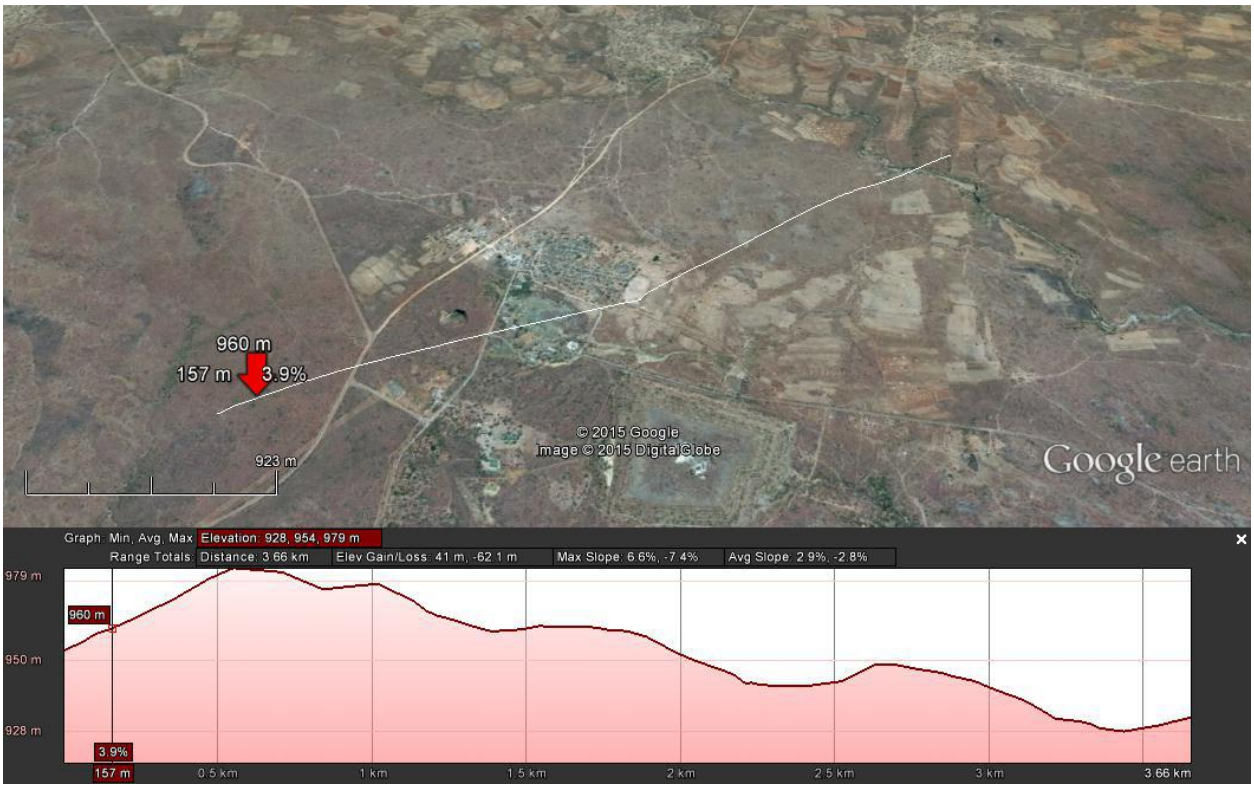


Figure 7. Madziwa Elevation Profile

The terrain around the town is characterized by rolling topography with isolated knolls and hills. Altitude ranges between 1000 and 1050 meters above sea level.

4.1.3 Soils

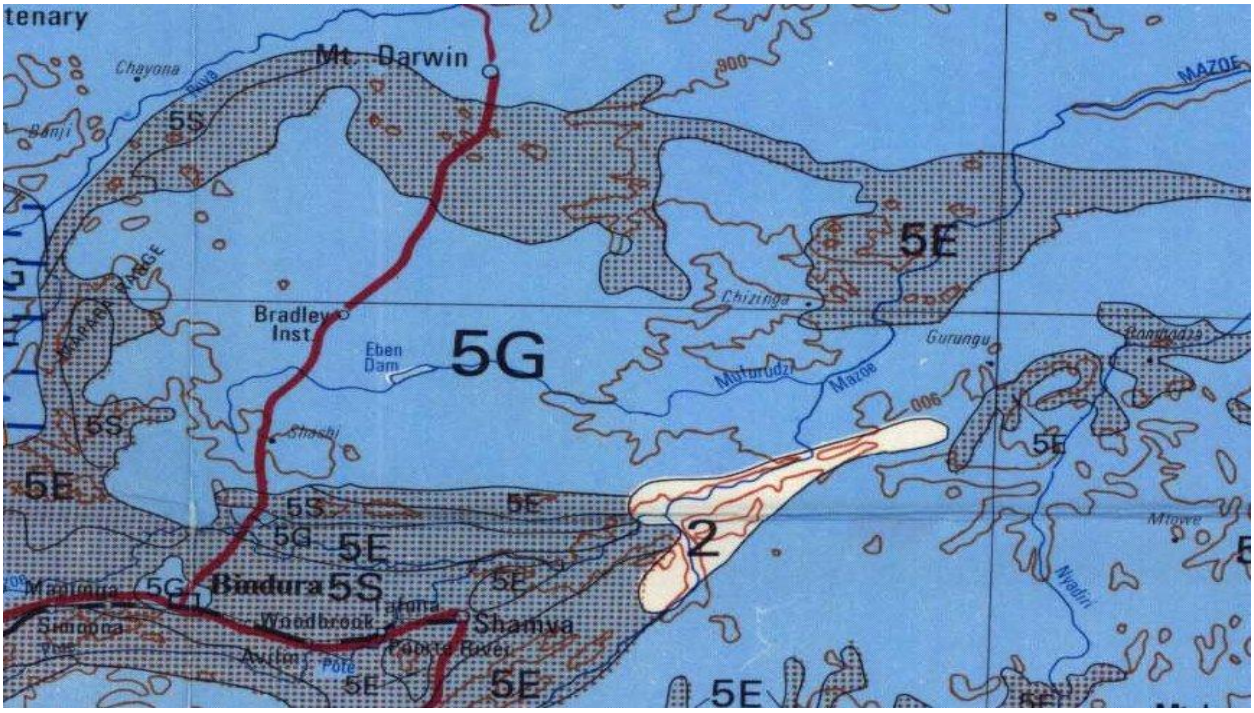


Figure 8. Madziwa Soils Map

The soils in and around Madziwa are largely derived from the greenstone rocks and are typically red clayey soils of generally high cation exchange capacity and therefore of medium to high fertility.

4.1.4 Ecology (Fauna and Flora)

The vegetation consists of Miombo woodland (Brachystegia species) on high and well drained ground while acacia bush occupies the low lying areas Grass species occupy intervening areas. The area to the sides of the existing pipeline, is mainly Miombo and the water treatment plant, is within a designated industrial site where natural vegetation has already been cleared. The area also borders the Mupfurudzi Reserve and is a haven for large snakes such as pythons and cobras, as well as aquatic habitats such as fish. According to the Parks and Wildlife Management Authority of Zimbabwe the Mazowe River has an abundance of fish, namely, Tiger fish, Bream Species, Bottle Nose, Barble, Vundu, Labeo and is the only river system in Zimbabawe to hold Yellow fish. Mfurudzi River which flows into the Mazowe, the same species of fish can be caught in pools within the umfurudzi all year round. The existence of such species and natural habitats triggers OP4:04.

4.1.5 Climate

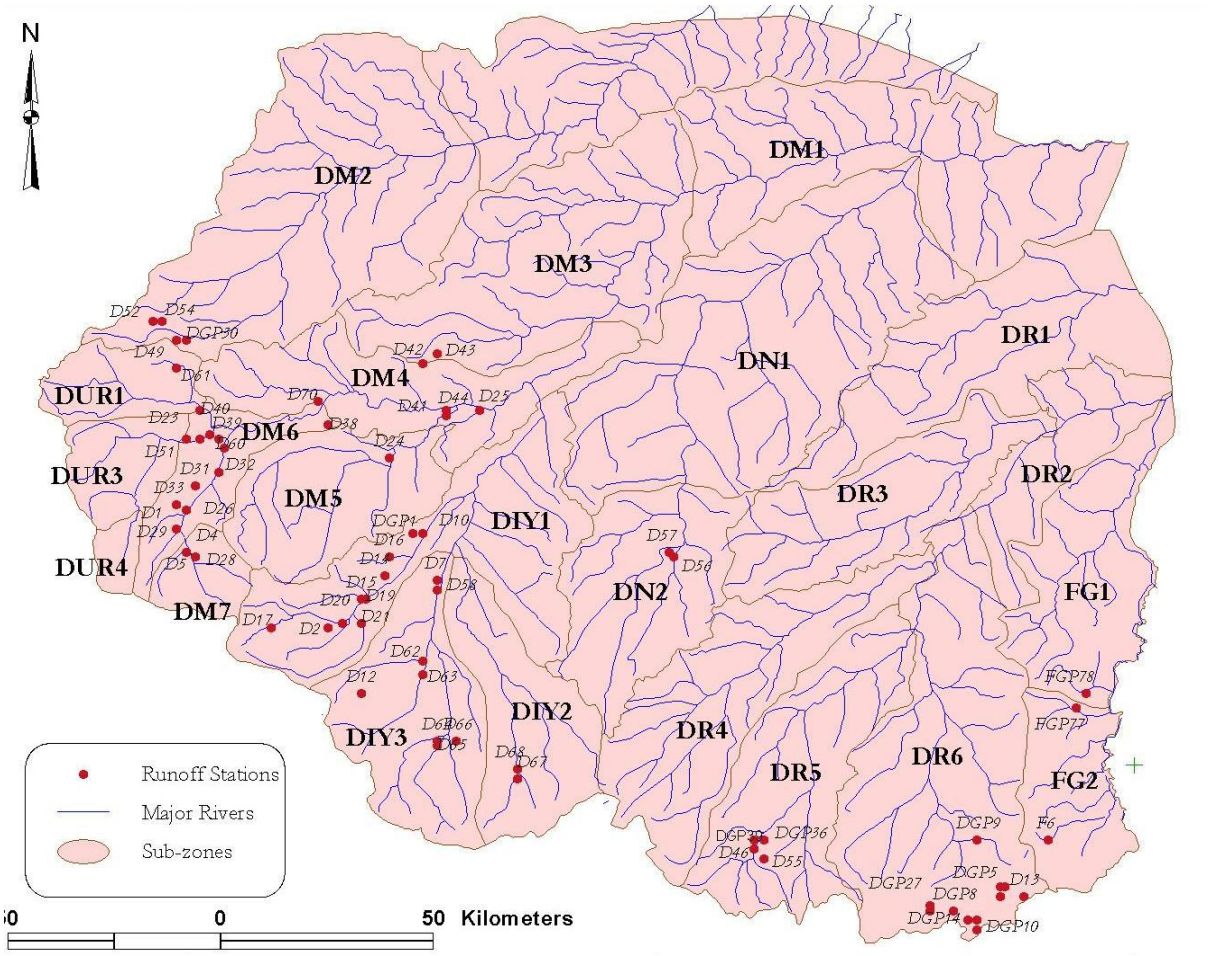
Madziwa Center is located within agro-ecological region II which is classified as humid to moderately humid, with moderate to high annual rainfall averaging between 700 to 1050 mm per annum. The typical tropical seasons are divided into winter and summer with winter temperatures ranging between 15 and 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

Water quality samples taken by water quality experts from the catchment are taken every quarter of the year. During the dry season, the raw water quality is good. During the rainy season, the raw water is highly turbid and contains high levels of silt. This means more chemicals being used at the station to purify the water to acceptable standards. However the increase in the number of small scale miners along the Mupfurudzi river continues to threaten water quality.

Water quality sampling is carried out everyday at the station. Chlorine and pH are tested by the operators on site at the station. The more complex chemical and bacteriological testing is carried out the catchment level. Quality if water is reported to be good, except during the rainy season where there are challenges to control and manage turbidity.

4.1.7 Hydrology and Hydrogeology



The Figure above shows Runoff measuring stations in Mazowe catchment there are D42&43 in DM3 Sub hydrological zone.

Madziva is located in Middle Mazowe Subcatchment and Mufpurudzi River is the major source of water, found in DM3 Sub hydrological zone the size of the sub hydrological zone catchment area is 2445km² with a mean annual rainfall of approximately 792mm/annum. The area coefficient of variance is 100%.

On the upstream of the proposed abstraction site there is Mupfurudzi Dam with a capacity of 9619ML with a 4% yield of 1571 ML and a 10% yield of 2746ML. Water will be released from Mupfurudzi Dam in times of water shortages. Records from our upstream runoff stations D42 & D43 located in Mupfurudzi River shows that water will be flowing almost throughout the year. Use of surface water for irrigation purposes is not extensive with a total commitment of 600ML per annum. The present water demand for Madziva is approximately

120ML per annum which means the available water is adequate to meet the required quantities.

Hydrogeology

Groundwater occurrence is solely controlled by the development of secondary porosity and permeability within an impervious rock mass. The type of geology ranges from Archean granitic, gneissose rocks, Greenstone belt and Mashonaland dolerites. The borehole potential yield is relatively high, ranging from 5-150 m^3/day.

Ground water recharge potential for aquifers is really extensive, even where low yields are encountered. Minor hydraulic barriers are not uncommon and mainly due to the lateral variation in permeability across the area so the yield can vary from place to place depending on the specific area geological formation.

4.1.8 Current effluent disposal system

The current source of effluent is from the backwash water containing salts such as aluminum, Iron or sulphate ions. The current disposal way is by discharging a banana garden before discharge into the environment. Although the environment has a self-purifying capacity, increased loadings can affect the aquatic environment. The current classification of discharge accorded by EMA is blue.

The rehabilitation work will therefore mitigate against the pollution loadings. 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.

4.2 Socio-Economics

Some of the socio-economic issues that the field team could gather during the field trip are summarized below:

- High rate of unemployment (this was also confirmed by the CRDC office)
- Small scale mining activities being carried out within the area by small scale miners
- Cases of vandalism of pipe infrastructure was clearly evident during the field visit. This includes damage to valves and pipework
- There are cases where some ex-mine workers still carry grievances over unfulfilled benefits given to them by the mine, and resort to vandalizing infrastructure
- There is a large game reserve about 15km away from the mine

4.2.1 Administrative arrangements

Madziwa water supply is located within the Chaminuka RDC that is administratively under the Shamva District Administrator. The DA is responsible for the Government Departments within the district while Chaminuka RDC champions development within the district with the participation of ward councilors. Chaminuka RDC is the owner of the land and responsible for waste collection, servicing of stands, monitoring of food hygiene in food outlets and even drinking water supply. The water supply system at Madziwa Teacher's College is run by ZINWA whilst the sewer is handled by the Teacher's college . In this case, ZINWA is the water service provider while the RDC is the service authority.

4.2.2 Livelihoods

Major livelihoods strategies and occupations in the growth point are formal employment in government and parastatal departments mainly Home Affairs, Education, Health, Youth and Women's Affairs and Environment, Water and Climate and ZINWA, Agritex, GMB, Mobile Phone Networks (Econet, NetOne and Telecel), Madziwa Teachers' College, TelOne, ZESA, Delta and others. Other sources of employment include General Dealer (hardware and grocery shops), light industry (welding, milling and other food processing industries as well as carpentry) and commercial entities (banks and insurance). The rest of the workforce comprises of local authorities (RDC). 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. The average income is around $120 per month. However, this income is seasonal as the surrounding population is into farming and usually gets incomes after harvests.

4.2.3 Population and demographics

The college has 796 houses broken down as follows:

- Low 35
- AMMS Village 258
- Sulphide 499
- Beverly 4

AMMS village is about 10 km away from the teacher's college and is not connected to water. There are no people staying in the village at the moment. The college has been leasing 80 households to various tenants but is in the process of terminating their leases as they require the accommodation for an anticipated increase in student intake next year as they start the ECD training programmes. Tenants have already been issued with termination of lease letters and some have already moved out. The college is able to pay around 80% of its water bill per month. Water is available on average for 8 hrs. per day.

4.2.3 Gender mainstreaming.

At Madziwa Teacher's College 81.9% of the enrolement is female, and is greatly affected by availability of water. African tradition entails women and children, especially the girl child to be responsible for all household duties including the provision of water for use. Once the project is completed it means that women and the girl child would have water at their doorsteps. The current existing water supply had its own challenges for example frequent breakdowns along the pumping main that will see women spending most of their time looking for water from other sources. This time would be used for other productive issues once the project is completed. Women are also expected to make sure that the family is well fed, enough water will enable women to embark on income generating projects such as gardening or chicken farming and this would ensure household food security as well as a balanced diet for the family.

4.2.4 Land uses

The land use is typically peasant mixed farming with a bias towards cropping. The crops grown are mainly maize with subordinate small grain (millet and sorghum). Most households rear cattle, goats and sheep. The WTW, pipelines and storage facilities lie within Chaminuka

Rural District Council. The land for the project belongs to the Rural District Council and is managed by the Madziwa Teachers College and there is no conflict of use.

4.2.5Sanitation Facilities

Madziwa water supply station does not have ablution facilities, Currently there is an open pit which is an uncompleted toilet project

Madziwa has a dedicated and currently adequate sewage treatment facility. After project implementation, and the expected increase in student enrolment, it may become necessary for the center to upgrade its sewage treatment facility as well as connect all the residents to the main sewer system. This will in turn however, have negative consequences of increased malaria due to the new breeding grounds for mosquitoes as well as increased volumes of waste water needing more energy and water treatment chemicals.

4.2.6 Public Health

Shamva North is a new constituency born out of the old Shamva constituency. It consists of Madziva, Kasimba, Goora, Chindunduma and Bradley Institute among others. The closed Madziwa Mine which was converted to a teachers' college, is located in this constituency. The people in the constituency survive on subsistence farming and illegal gold panning. (Zimbabwe Election Support Network report, 2008). Madziwa area is therefore prone to STIs and HIV/AIDS incidences and exposure.

Madziwa Teacher’s College is situated at a former mine site, hence there is high risk of consuming cyanide and chemical contaminated water from boreholes near decommissioned tailings dams

4.2.7 Occupational health status

All staff have safety boots and overalls. All facilities visited were clean and tidy. A First aid kit with adequate contents is in place for use by workers in case of minor injuries. No occupational health and safety trainings have been done so far this year. However, at project implementation stage there will be increased occupational hazards such as working on raised platforms, handling

of chemicals, handling dust and digging with sharp implements. This can be mitigated by purchasing the necessary personal protective equipment to all workers during the whole project cycle.

Chapter 5

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

- Questionnaire was administered to government departments.
- A public notice was placed in the Herald 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 at Madziwa Teacher's College and Chaminkua RDC

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

5.6 SUMMARY OF STAKEHOLDER INPUTS

5.6.1 GOVERNMENT DEPARTMENTS

A meeting was held at Chaminuka RDC to consult Government Departments and Local community Leaders

Stakeholder Consultation meeting

Stakeholders consulted for Madziwa included interviewing Chaminuka RDC Chief executive Officer, Mr. Chiwara, the District Administrator – Ms Dube, Madziwa, Councillor Sadza,

residents and commercial enterprises at Madziwa Business Centre. The Madziwa Teachers College was also consulted through the principal, Mrs Mbofana. The RDC provided crucial insights into current water problems and projected growth of the centre. Residents were interviewed to get information on where they were currently getting water, how many hours per day water was available, their willingness to pay for water and perceptions on the impacts of an improved water supply or getting a connection with running water.

RDC Responses

The RDC, through the CEO and the DA indicated that the Teachers Training College is the largest and only tertiary institute in the district and province as a whole. They indicated that the problem of water had affected developments in Shamva town. Existing developments also have challenges whereby the water pipes are old and there are frequent pipe bursts. Planned expansion had been negatively affected by the very erratic supply of water to the town. Whilst ZINWA was supplying water to the town, it was not enough for the existing developments as there were periods during the day when water was not available. Planned commercial and residential developments could not take off without water. Currently there are over 200 houses that are not connected in Shamva alone. There are also some houses and businesses not connected at Madziwa Business Centre.

Consultative meeting at Madziwa Teachers College

An interview was conducted with the college principal Mrs Mbofana. She indicated that the college took over infrastructure from Madziwa Mine and opened in 2005 as a facility for training primary school teachers. The main issues raised with regard to water supply at the college included:

- Inconsistent water supply due to pipe bursts and other challenges experienced by ZINWA. Water is generally available for about 8 hours per day.
- College is able to pay about 80% of its monthly water bill. The monthly water bill is around $10 000.
- The water challenges have limited the size and number of intakes. College could have a maximum of 5 intakes per year but is only limited to 2 at the moment due to the challenge of water.
- As an affiliate of the University of Zimbabwe, they are not allowed to increase intake until the water situation improves.
- College has been renting out part of its houses to outsiders but now needs the accommodation for students. This has been necessitated by a new intake for ECD training which will commence next year. Termination of lease letters have already been issued to tenants to vacate by end of September.
- Improved water supply will have the following benefits: college will start income generating projects like piggery, horticulture and expansion of poultry project. This could result in reduction of food bills for the college. It will also result in greening of the environment and improve leisure activities like swimming and golf.

MADZIWA TEACHERS COLLEGE

STUDENT STATISTICS AS AT 9 JUNE 2015

INTAKE	ENROLLMENT	FEMALE	MALE
10	130	77	53
11	150	98	52
12	476	297	179
TOTALS	756	472	284

Enrolement figures (Madziwa Teacher's College)

Madziwa Primary School

An interview was conducted with the primary school acting head, Mr. Chikomo. He indicated that the school the school was facing serious challenges as a result of the water challenges. These included the following:

- High turn-over of staff as they moved to schools with better water facilities
- School children were drinking contaminated water from the nearby Gwambisa River. The river was contaminated by mining activities.
- School children have to bring their own water and sometimes they don't.
- Teachers rely on water brought in by truck from the college. This is not adequate. Truck brings in 100litres per trip and twice per week.
- Most teachers have resorted to renting accommodation from the teachers college where water availability is better.

The head indicated that an improvement of the water supply to the school would have the following positive impacts;

- Improved staff retention. Turnover of staff would not be as high as it is now.
- Improved health and hygiene for both pupils and staff. Children would not have to consume contaminated water whilst teachers would have adequate water for their household chores
- School and teachers could start income generating projects based on horticulture and poultry.

Business Community

Interviews were also held with some members of the Madziwa business community. Interviews were conducted with a restaurant owner and another with a general dealer. They saw the improvement of water supplies to Madziwa as having a positive impact on their businesses, particularly from the point of view of increased student intakes.

- Incomes would increase with increased intakes. Presently their daily takings increase by about 40-60% when students are around.

- It could also speed up construction for those who are constructing at the centre.

Residents Comments

Residents were interviewed using the guide in appendix 2.

i. Water availability

Residents indicated that water is generally available 6-8 hours per day. Residents indicated that 90% of times water is available at least for 8 hours per day. The few hours that water is not available were associated with power cuts. However, there are times when water has not been available due pump breakdowns at the treatment works. These down times are experienced at least once every two months.

ii. Time/Distances to water sources

About 10% of unconnected households from have made some arrangements with those who have connections from near their houses. They pay about $5 per month for getting about 60liters of water per day. Under this arrangement, distances travelled are not very long. Households spend on average 30-40 minutes to and from fetching water per trip. 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. The majority of people 50-60% fetch water from boreholes. The distances to the boreholes vary depending on location. However, on average households walk for 40-60 minutes to and from boreholes.

iii. Costs of water

Those renting from the college pay a fixed monthly charge of $3 to cover the costs of water. For this amount, they have unlimited quantities of water. Average bills for the business community for water range between $25-40 per month depending on consumption.

iv. Hygiene issues

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 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 and bathing.

v. Staff Retention

Households also pointed out that the primary school in Madziwa faces a serious problem of retaining staff because of the precarious water situation. Teachers interviewed indicated that if they were to vacate their college rental accommodation where water is available, they would move to other schools where facilities are better. Almost 80% of the primary school teaching staff is renting accommodation from the college instead of using the free accommodation at the primary school. Staff turnover has been very high. At the moment those renting houses form the college have been advised to vacate by end of September. The availability a good source of portable water at the primary school will result in staff not leaving in high numbers.

vi. Local economic development

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.

CHAPTER 6

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

ASSESSMENT CRITERIA	RATING	INTERPRETATION OF RATING
		or alternative action may be required. In the case of beneficial impacts, other means of achieving this benefit are equal in time, 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

ASSESSMENT CRITERIA	RATING	INTERPRETATION OF RATING
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 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

1.1 Main Impacts and Mitigation for Madziwa

The impacts for Madziwa were analysed using the criteria outlined in above. This current section highlights the major impacts from Madziwa only whilst section five summarises impacts from all the seven projects. The impacts are very similar.

1.2 Planning Phase

Activities are of very low visibility. Most of the activities are taking place in already converted environments e.g. the construction of clear water tanks at the treatment works and upgrading of raw water abstraction. The reticulation for the school already exists as they used to use a borehole which was deemed to be contaminated by mining activities. The impacts from this phase are therefore very limited and of very little significance.

1.3 Biophysical

1.3.1 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 the pipeline to the primary school will be dug and main pipe rehabilitation for raw water where careful planning is required as there may be a bit of vegetation clearing and introduction of secondary vegetation. Once the pipeline is established there must not be trees within 1m radius from the pipeline to protect the pipeline and this means that there will be shorter and seasonal vegetation along the pipeline.

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.

Mitigation

Avoid disturbing or cutting trees in areas where there is still some vegetation. Surveyors and peggers will only utilize small areas and this is not a significant impact.

1.3.2 Wildlife

In the area affected by the project, there is very limited wildlife particularly along the pipeline route to the primary school. This will basically follow the road.

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
Significance before	Low

mitigation	
Significance after mitigation	Low

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

1.3.3 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 and localized.

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.

1.3.4 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.

Siting of the pump house close to the Mupfurudzi River could potentially result in impacts on water quality. However these are short duration activities which can be completed within a day.

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.

1.4 Construction Phase

This phase will involve the construction of pump house close to the Mupfurudzi River, trenching and laying of water reticulation pipes to the school and some commercial users and the upgrading and rehabilitation of water pipes and construction of new storage tanks.

1.4.1 Soil Disturbance

The trenching for the laying of the water reticulation pipes to the primary school and the rehabilitation of the existing main pipeline to the water tanks will result in the disturbance of the soil. The digging of foundations for new storage tanks will also require earth movement. Trenches will be dug to lay pipes to the primary school and reticulation to businesses. 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.

1.4.2 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.

1.4.3 Disturbance of Forests and Biodiversity

Most of the area for this project has already been transformed into built up areas. There is very little vegetation and wildlife except along the pipeline to the primary school. As a result, the impact of the project on vegetation and wildlife will be very limited. The construction site for storage tanks has already been cleared since they are going to be erected on positions of existing

tanks. However minimal bush clearing will be required for the erection of the 1000m3 raw water holding tank on approximately 600m2.

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
Significance before mitigation	Low
Significance after mitigation	Low

The best mitigation is to follow the road when laying the pipeline to the primary school. This way, the route will avoid passing through wooded areas. It will also be easy to maintain the pipeline if it is along side the road.

1.5 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.

Assessment for impacts during operation 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

1.6 Social Impacts

1.7 Planning Phase

The planning phase is a continuation of the activities that have already taken place, among them, 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.

1.8 Positive Impacts

Employment is a positive impact during this phase. This impact is of low significance, which again is a reflection of the low numbers and short duration of the pre-construction phase of the project.

Assessment for employment creation during planning 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.

It is recommended that locals from Madziwa be given first priority, particularly for jobs not requiring any particular skills. 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.

1.9 Construction Phase

1.10 Negative Impacts

1.10.1 Health and Promiscuity

The negative impacts arising from these 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.

MITIGATION

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. Making all workers contract workers for a set period will make it easy to get rid of undesirable elements in the workforce.

1.10.2 Safety

Issues of safety – both for workers and particularly school children 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. Children at the primary school 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.

Mitigation

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 school children and other residents, it has already been highlighted that the soils will need to be backfilled as quickly as possible. The trenches should be barricaded until backfilled in the school yard. They should be backfilled immediately after installation of equipment. This will forestall the possibility of injuries resulting from people falling into the trenches or injuries to children playing on soil mounds.

1.10.3 Waste Generation

Solid waste in the form of off-cuts of pipes and wrapping materials will be produced and will need to be disposed off. 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.

Mitigation

It is recommended that 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.

1.10.4 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 site 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.

1.10.1 Disturbance of cultural resources

From interviews, no areas of cultural resources are in the project area. This was a mine area and the project will largely be taking in areas that have largely been disturbed. It is therefore not anticipated that the project will impact on any cultural resources.

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

1.10.2 Disturbance to other services

As 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.

1.11 Socio-economic impacts: Operation Phase

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

1.12 Positive Impacts

The activities that will generate positive impacts include:

- Employment creation in provision, operations and maintenance. ZINWA/RDC 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
- Improvement in hygiene and health
- Income generating activities at household level
- Retention of good quality staff by organizations

1.12.1 Employment creation

The operation of the new water system will require one or two more to be employed. In the business centre, the improvement could also result in increased volumes of sales through increased student intakes. This may necessitate hiring more people.

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

1.12.2 Improvement in Hygiene

Hygiene and health of households will generally improve with more water being available for domestic use. Teachers and school children at the primary school 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.

1.12.3 Change of Tenants

The teachers training college at Madziwa has been leasing about 80 houses to various tenants. Due to low student intakes, the college was not using all the houses it inherited from Anglo when the mine closed. The college is currently in the process of reclaiming its housing from tenants even before the project is embarked on. The housing is not needed as a result of the expansion directly related to water improvement. This accommodation is needed to accommodate students. The college will have a new intake for ECD teacher training in addition to its current intake. This was already planned hence the termination lease notices. However the water improvement project will hasten the need for student accommodation as the college strives for its maximum

intakes. It has to be pointed out that all the tenants already work and can afford other forms of accommodation.

It has to be highlighted that those who are tenants are not on indigenous land but have been renting accommodation from the college. In one of the more desperate cases, a household has remained renting a house from the college even after getting a retrenchment package from the mine. Others who got retrenchment packages have bought themselves houses elsewhere.

Eviction notices had gone out before the project. All the tenants interviewed indicated that they had either secured alternative accommodation or were in the process of doing so. The largest group to be affected is the teachers from the primary school. These will go back to their accommodation at their school. The school will also benefit from the project hence there will be no reason for them to look for accommodation where water is readily available.

Assessment for displacement of households during operation phase

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

This is potentially a significant impact as it impacts on the Bank's policy on Involuntary Resettlement. It however has to be emphasized that the termination of leases and subsequent

change of tenants has nothing to do with the current project. Those who were supposed to vacate to make way have the new tenants have already done so.

1.12.4 Income Generating Activities

The teachers college in Madziwa 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. Even the primary school indicated a similar desire. However, this is difficult without water close by. The introduction of reticulated water will enable them to engage in these activities. This will also result in savings on their current food bills.

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.

1.12.5 Expanded Market

The increased intakes at the teachers college will offer an expanded market for shops and vendors at the business centre. Businesses indicated that daily takings increase by over 50% when students are around. With increased intakes, daily takings are bound to further increase

as student population will be spread around the year. This will be a boon for the businesses and vendors.

Assessment for markets during operation phase

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

1.12.6 Staff Retention

The primary school in Madziwa faces a serious problem of retaining staff because of the precarious water supply situation. They move out once they get the next best opportunity to a place with adequate water supplies. In Madziwa, almost 80% of the teaching staff is renting accommodation from the college instead of using the free accommodation at the primary school. Staff turnover has been very high. At the moment those renting houses from the college have been advised to vacate by end of September. The availability a good source of portable water at the primary school will result in staff not leaving in high numbers.

Assessment for staff retention 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 moderate significant positive impact which can only be encouraged.

1.13 ENVIRONMENT AND SOCIAL MANAGEMENT PLAN FOR MADZIWA

Table 4.1: 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	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
Disturbance	Cutting down	• Avoid	Contractor,	Mark trees to left standing	As above	Negligib

IMPACT STATEMENT	PROCESS/ACTIVITY RESPONSIBLE FOR IMPACT	PROPOSED MITIGATION OF IMPACT	MONITORING AND MANAGEMENT AGENCIES	MANAGEMENT AND MONITORING ACTIVITIES	TIME FRAME	BUDGET (US$)
of vegetation	trees along trace lines and pegging sites	cutting down trees • Where trees are cut, replace with species as close as possible to the ones cut, more than those cut.	ZINWA	and check for new trees planted		le
Alteration of soil compaction properties and exposure to erosion	Digging of trenches	Backfill all trenches and sprinkle water on loose soil mounds	EMA, RDC, ZINWA	Backfilling should be carried out immediately after the laying of water pipes	Continuous	1 000
Extermination of indigenous species,	Cutting down of trees and other	• There is virtually no indigenous	Community, EMA, RDC	Check routing of pipes to ensure it	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$)
appearance of new species which could be dangerous	vegetation during trenching	vegetation in the areas. • Avoid the little natural vegetation in the area		does not pass through any remaining vegetated areas		
Dust generation	Trenching and backfilling	Sprinkle water on soil and backfill trenches immediately	ZINWA, RDC, Contractor	Ensure that all possible dust generating areas are watered to avoid dust.	Construction phase	Negligible
Water contamination	Backwashing activities	Filter integrity to be maintained and a dedicated backwash mains and lined	ZINWA, RDC,	Regular blowing of the filters and replacement after design	Throughout operation phase	Routine. Construction of backwash water pond system

IMPACT STATEMENT	PROCESS/ACTIVITY RESPONSIBLE FOR IMPACT	PROPOSED MITIGATION OF IMPACT	MONITORING AND MANAGEMENT AGENCIES	MANAGEMENT AND MONITORING ACTIVITIES	TIME FRAME	BUDGET (US$)
		backwash ponds		period		

Table 4.2: Water Supply Project Environmental Management Plan: Socio-economic Impacts

IMPACT STATEMENT	PROCESS/ ACTIVITY RESPONSIBLE FOR IMPACT	PROPOSED MITIGATION OF NEGATIVE IMPACT (OR ENHENCEMENT OF POSITIVE IMPACT)	MONITORING AND MANAGEMENT AGENCIES	MANAGEMENT AND MONITORING ACTIVITIES	TIME FRAME	BUDGET (US$)
PLANNING PHASE						
Employment	Laborers to assist	Employ local	Local leadership,	Insist in contractual	Planning	-

creation	surveyors and peggers	youths	ZINWA, Contractor	documents for the employment of locals	Phase	
CONSTRUCTION PHASE						
Creation of employment	Laborers for digging trenches and working with builders	Employ locals	Contractor	Number of locals youths engaged as labourers	Continuous	–
Increased traffic and pressure on roads	Introduction of construction vehicles in the project area	Enforce speed limits; Maintain local roads	ZINWA, RDC 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 school children and others	Falling into open trenches	Backfill trenches immediately	Contractor, ZINWA	Open trenches must be barricaded	Construction	1 000

				with barrier tapes until they are backfilled.		
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 and trenching	Avoid areas of cultural value	ZINWA, Contractor, Local leadership	Mark all areas of cultural value if any Report findings to National Museums and Monuments	Construction Phase	200

				and take their advice before restarting work.		
OPERATION PHASE						
Income generating projects	Availability of water will enable college and primary school to embark on poultry and gardening projects	Encourage households to set up projects	RDC, Local leadership,	Number of income generating projects set up	Operation phase	500
Expanded Market	Increased business from increased intakes		ZINWA, RDC	Volumes of sales per day	Operation phase	
Improvement in hygiene and health for school	The availability of clean water at primary school will mean of flush toilets, clean drinking	Ensure water is available for a minimum of 8 hours every day during school time	ZINWA, RDC,	Check down times for water pumping and quantities against demand	Operation phase	2 000

	water					
Change of tenants	Need for accommodation for students and possible land for centre expansion	Tenants have already secured alternative accommodation	RDC, Teachers College, ZINWA	All tenants from teachers college have secured alternative accommodation	Operation phase	500
Staff retention	Staff turnover reduced as water is available nearby	Primary school should have at least 8 hours of water supply	ZINWA, Institutions	Water should be available at least a minimum of 8 hours per day	Operation phase	As in improvement of hygiene

Environmental Rules for contractor

(i) Ensure service maps are available to prevent disturbances and disruption of buried services such as ZESA or PTC cables or sewer pipes.
(ii) Mark all areas of cultural value if any.
(iii)Give first preference to locals when employing unskilled labour such as assisting surveyors, pegging, trenching, working with builders thereby eliminating need for conflicts.
(iv)Retain as much vegetation around temporary camps as possible and re-vegetate areas not required after construction.
(v) Ensure soil is stockpiled for future use and used to re-profile and rehabilitate closed affected areas.
(vi)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.
(vii) Barricade all open trenches until they are backfilled as they will pose a potentially serious safety hazard to the school children and local population (especially at night) or provide proper demarcation and (where needed) fencing of work sites and display warning signs..
(viii) Use dust suppression measures such as sprinkling water on soil in working sites and access roads.
(ix)Ensure all vehicles are regularly maintained to minimize noise and air pollution arising from construction vehicles and reduce the likelihood of accidental spills of oils and lubricants during construction. Accidental spills of oils and lubricants should be cleaned up using appropriate methods to avoid contamination of the environment
(x) Ensure that refuelling to be conducted at designated areas fitted with impermeable surfacing and oil traps.
(xi)Place speed limits insignia in the vicinity of projects as there will be increased traffic and pressure on roads.
(xii) Maintain local roads and follow a strict road maintenance schedule.
(xiii) Ensure that vehicle washing and machinery maintenance is done only in authorised areas (away from waterways).
(xiv) Provide safety equipment and adequate protective clothing and awareness to all construction workers to prevent or reduce injuries from work related activities.
(xv) 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.
(xvi) Use only approved sites for sand abstraction pits and solid waste disposal.
(xvii) Seek approval for transportation, use, storage of hazardous chemicals.
(xviii) Handle and store all hazardous materials in line with their corresponding Materials Safety Data Sheets.

(xix) Prepare a Code of conduct for all contractors and construction personnel that include no hunting, fishing, unauthorized waste disposal or inappropriate interactions with local people**.**

(xx) Ensure that in the event that any physical items of cultural interest (archaeological relics, fossils, human remains, etc) happen to be uncovered during construction works are referred to the National Museums and Monument of Zimbabwe (NMMZ) for advice. Upon discovery works should cease in the area while the NMMZ provide their advice on how to proceed

(xxi) Ensure regular patrols during the night by security to prevent or minimize theft of items such as diesel, construction materials and hardware that are on demand in Zimbabwe.

(xxii) Ensure portable sanitation devices are used and human waste removed to an appropriate facility with the correct approvals for the treatment of human waste.

(xxiii) Define working period that should be communicated to local people and must be adhered to.

(xxiv) Consider reuse of waste materials in order to reduce quantities that may require disposal.

APPENDICES

APPENDIX 1. TECHNICAL DRAWINGS

APPENDIX 2 STAKEHOLDER CONSULTATION QUESTIONNAIRES

APPENDIX 3 STAKEHOLDER CONSULTATION MINUTES

Minutes of the Stakeholder Consultation meeting for Beneficiaries – Madziwa Teacher's College Water Supply Rehabilitation.

Held at Madziwa Tr's College on the 9th of June 2015

Members Present

See attached attendants register

Opening remarks

Ms M.A. Moyo the Principal for the Teacher Training College welcomed everyone to the meeting and Mr Chivanga was asked to chair the meeting. Ms Moyo gave an opening prayer. The Chairperson gave opening remarks and highlighted that the purpose of the meeting was to get an understanding of how the beneficiaries views the Madziwa water supply project to be implemented by ZINWA with funding from the World Bank. He invited free discussion on the implementation of the above project. Students especially females were asked to attend the meeting.

Project Overview

Mr Chivanga gave a brief overview of the project and the project components including the project expectations. He further indicated that the project had provided for the supply of water to Madziwa Primary School.

Overview of the EIA process.

Mr Chivanga informed the house that Castelia a Consultant firm working on behalf of the World Bank carried out assessments in August 2014 on Madziwa Teachers Water Supply Project. The assessment came up with priority projects. And Madziwa was one of the priority projects which was being implemented under the World Bank funded projects. He highlighted the overview of the EIA process and highlighted the approach to leading to the stakeholder consultation.

Discussions on Impacts identification and Management

The following issues were discussed, corresponding answers to questions and recommendations were given and agreed on;

1. **Project acceptance**. The Principal was thankful to the World Bank for extending funding for the rehabilitation of the water supply system. She expressed hope that the intervention would render the inconsistence water supply services a thing of the past. The meeting heard that when there was no water, female students bore the brunt of ferrying water buckets on their heads, an act which is nothing short of demeaning in society.
2. **Beneficiaries.** The Cllr asked the College if they would still continue to allow the community to host major functions at the college after the project is completed. It was explained that the college had no problems with assisting the community where prior notification and arrangements would have been done.
3. **Raw Water**. The college asked if they could be allowed to connect to the raw water for watering the grounds. It was explained that ZINWA would put in place provisions for raw water take off along the pumping main. However, the tariff for the water would be

different from the prevailing national blend price for raw water as the cost has to include the cost of pumping the raw water.

4. **Construction phase.** The meeting agreed that the contractors should not have direct interface with the college and the employees should be readily identifiable.
5. The meeting also heard that the project would not extend to replacement of worn out plumbing materials within the institution buildings. However, it was explained that ZINWA as part of its customer care initiatives would assist the institution to attend to breakdowns within the reticulation beyond the meter. However, the college should provide materials for the repairs.

Closing remarks

The Chair gave the concluding remarks and expressed hope that the project would take off soon. The meeting ended at 1515hr.

Minutes Verification;

Ward 16 Cllr: Cllr Sadza (Signature) ..... Stamp ..... DATE ..... SIGN .....

CHAMINUKA RURAL DISTRICT COUNCIL
WARD SIXTEEN (16)
COUNCILLOR

Madziwa Tr's College: Ms Moyo (Signature)..... Stamp.....

MINISTRY OF HIGHER & TERTIARY EDUCATION, SCIENCE & TECHNOLOGY DEVELOPMENT
A TEACHERS COLLEGE
16 JUN 2015
PRINCIPAL
P. O. BOX 140 SHAMVA
Email: principal@madziwatc.ac.zw
Cell: +263 782 794 588

ZINWA: (Signature).....

Minutes of the Stakeholder Consultation meeting for Chaminuka RDC – Madziwa Teacher's College Water Supply Rehabilitation.

Members Present

See attached attendants register

Opening remarks

Councilor Sadza (Ward 16) welcomed everyone to the meeting and Mr Chari gave an opening prayer. The Chairperson gave opening remarks and highlighted that the purpose of the meeting was to discuss the Madziwa water supply project to be implemented by ZINWA with funding from the World Bank. He invited free discussion on the implementation of the above project and encouraged the house to bring out concerns from the local community to guide better planning.

Project Overview

Mr Chivanga gave a brief overview of the project and the project components including the project expectations. He explained that the existing connections would be the beneficiaries of the project. He further indicated that the project had provided for the supply of water to Madziwa Primary School.

Overview of the EIA process.

Mr Chivanga informed the house that Castelia a Consultant firm working on behalf of the World Bank carried out assessments in August 2014 on Madziwa Tr's Water Supply Project. The assessment came up with priority projects. And Madziwa was one of the priority projects which was being implemented under the World Bank funded projects. He highlighted the overview of the EIA process and highlighted the approach to leading to the stakeholder consultation.

Discussions on Impacts identification and Management

The following issues were discussed, corresponding answers to questions and recommendations were given and agreed on;

4. Project acceptance. The CEO for Chaminuka highlighted that they had no objections to the implementation of the project and he emphasised the need to include all stakeholders during both the planning and implementation stages.
5. Beneficiaries. Cllr Sadza sought clarity on the beneficiaries. It was explained that for clear water the beneficiaries would be the current customers who are connected and any new clients who would want to receive and pay for the treated water. Madziwa Primary would be reticulated. In addition to the primary beneficiaries it was agreed that the project would also benefit the local community through employment as general laboures. And everyone fe(male) would stand equal opportunity to be employed.
6. Raw Water. The Assistant DA and Cllr Sadza also sought clarity on how the project would treat raw water users along the pumping main. It was explained that the issues of raw water was a problem with the current pumping main which is, apart from old pipes, was being subjected to vandalism by the community around the pipeline. It was explained that ZINWA views the act of vandalism though anti-development as a potential market and would put in place provisions for raw water take off for farmers who would want to buy the commodity.

4. Citizen engagement and feedback. The meeting agreed that the current engagement platforms, ZINWA, Public Relations department, Full Council Meetings, Ward Development Committees, Village Development Committees, project implementation and progress meetings and Sub Catchment Councils would be used. In addition the house was informed of the existence of the Institute of Young women Development and these shall be incorporated in the list of stakeholders as part of gender mainstreaming.

Closing remarks

The Chair gave the concluding remarks and expressed hope that the project would take off soon. The meeting ended at 1205hr.

Minutes Verification;

Ward 16 Cllr: Cllr Sadza (Signature) ..... Stamp.....

CHAMINUKA RURAL DISTRICT COUNCIL
WARD SIXTEEN (16)
COUNCILLOR
DATE 16/8/17 SIGN

Chaminuka RDC: Mr Chiwara (Signature).....Stamp.....

CHAMINUKA RURAL DISTRICT COUNCIL
CHIEF EXECUTIVE OFFICER
16 JUN 2015
P BAG 2022, CHAKOMA
TEL: 0271-221-222

ZINWA: (Signature).....

MADZIWA TEACHERS COLLEGE

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