NAMWATER
Namibia Water Corporation Ltd

ENVIRONMENTAL MANAGEMENT PLAN

KATJI-NA-KATJI INTERIM WATER SUPPLY PROJECT

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LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
CoC	Code of Conduct
DEA	Directorate of Environmental Affairs
EMA	Environmental Management Act
EMP	Environmental Management Plan
HIV	Human Immunodeficiency Virus
I&AP	Interested and Affected Parties
MET	Ministry of Environment and Tourism
NEM	NamWater Environmental Manager
MSDS	Material Safety Data Sheet
NWQG	Namibian Water Quality Guidelines
NWQS	Namibian Water Quality Standards
STI's	Sexually Transmitted Infections
WTW	Water Treatment Works

1. PURPOSE OF THE EMP

This Environmental Management Plan (EMP) has been compiled and updated for the management of potential environmental impacts during the operation, and decommissioning phases of the Katji-Na-Katji Interim Water Supply Project. Best practice is proposed for the generic issues during maintenance of associated scheme infrastructure as well as the on-going management and operation of the water supply scheme.

In terms of the Environmental Assessment Policy of 1994 and the Environmental Management (Act No 7 of 2007) (EMA), the activities required for the construction of the proposed project requires authorization from the Directorate of Environmental Affairs at the Ministry of Environmental, Forestry and Tourism (MEFT: DEA).

An Environmental Clearance Certificate (ECC) was originally issued in 2019 and this EMP serves as an application for the renewal of the ECC.

2. INTRODUCTION

Katji-na-Katji is a village located 90 km south of Rundu. The population of the village is estimated to be 2 756 people while the surrounding communities (excluding Murarani East) has an estimated population of 1 683 people. The location of Katji-na-Katji is illustrated in **Figure 1** below.

The increase in population within Katji-na-Katji area has caused water demand to increase. This led to inhabitants in the Katji-na-Katji area, to request for water supply from Namwater through various official offices (Mankumpi constituency and the Kavango west regional office), to attend to this water demand.

After a meeting between NamWater and the regional council, NamWater took up the emergency plea from the community, with an interim solution to increase water supply for the Katji-na-Katji community.

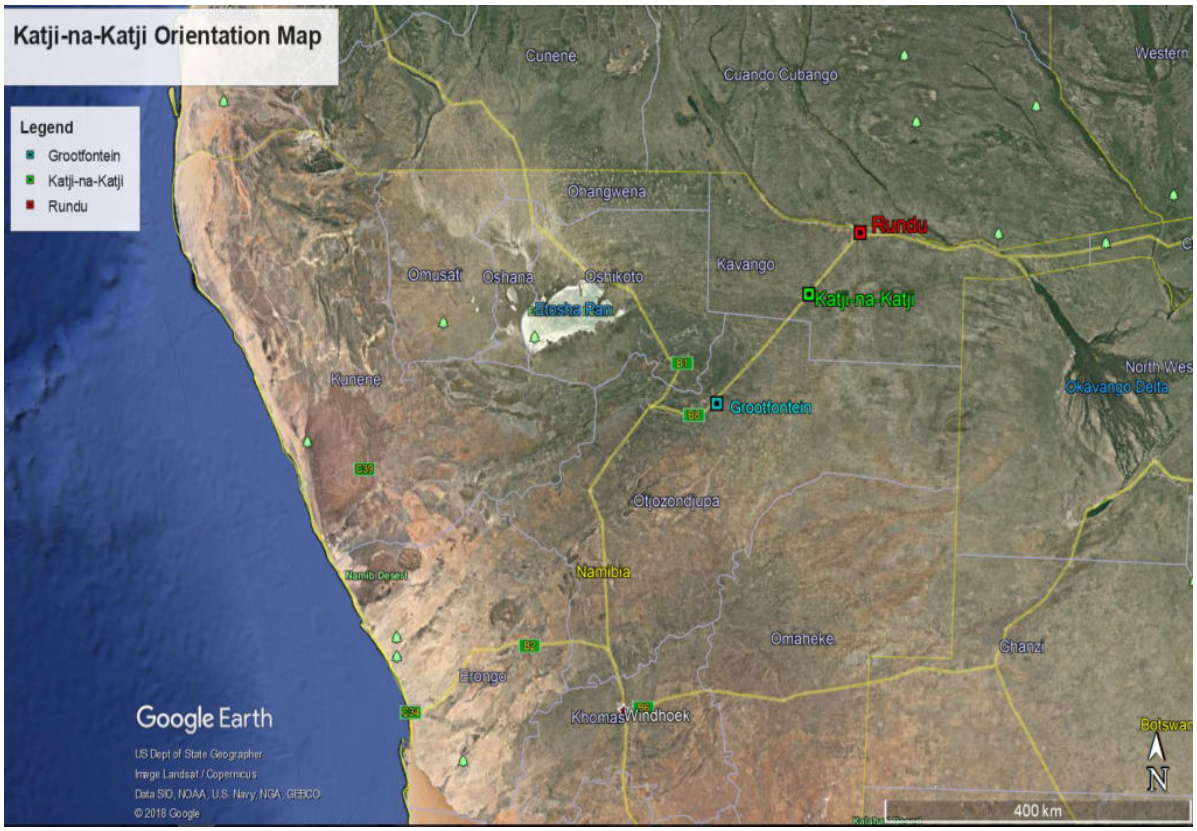

Figure 1: Katji-na-Katji Location Map

The interim solution, which NamWater proposes, is to install and connect two newly drilled boreholes to the existing scheme to increase water supply and water security to the Katji-na-Katji community.

However, there will be environmental impacts that should be mitigated and managed to ensure the least negative environmental impact and also enhancing positive impacts. The actions caused by construction will require mitigation, and in order to mitigate these impacts, an Environmental Management Plan (EMP) is required.

The EMP provides:

- Strategies and plans to manage environmental impacts identified through the application of best practices to avoid, reduce or mitigate potential adverse impacts to minimal of insignificant levels;
- Measures that could enhance positive impacts;
- Information required to ensure adherence to legal requirements;
- Strategies to maintain good community relationships;
- A method for auditing and monitoring implementation and operation of recommended measures, thereby ensure compliance with the EMP.
- Assignment of responsibilities with regard to measures to be implemented.

Mitigation of impacts is only possible if NamWater makes an effort to ensure that the EMP is put at its full use. Therefore, the purpose of this EMP report is to ensure that construction and operational activities for the water interim solution project are managed according to the EMP.

3. PROJECT BACKGROUND

The current water scheme supplies water to the Katji-na-Katji community and institutions, covering a distance of 23 km from Oukordon in the south to Mauguva village in the north, along the B8 road towards Rundu. The village comprises of a health centre (clinic), Katji-na-Katji pre-primary, primary and secondary schools (including hostel), constituency office, cuca shops, churches, village households and police station.

During the early 1980s, three boreholes were drilled to provide water to the Katji-na-Katji community. The water demand since the '80s has increased drastically due to two factors: firstly, the increase in the communities' population, secondly, livestock drinking holes have dried up thus prompting the community to use water from boreholes for their livestock.

The Mankumpi Constituency (Kavango West Region), on behalf of the Katji-na-Katji community members and surrounding villages, requested NamWater to assist with providing sufficient potable water. Reacting to this appeal NamWater consequently drilled six boreholes. However, some of the newly drilled boreholes had poor water quality due to high sodium, magnesium and chlorides concentration. The water quality of the boreholes do not meet the national water quality standards for potable water and requires treatment to make it fit for human consumption.

Fortunately, two of the boreholes have good quality water, which comply with the national standards. Based on the recommendations provided by NamWater Planning Division, water supply solution for Katji-na-Katji comes two-fold. Firstly, NamWater recognizes the urgent responsibility to increase water supply, and as such, a short-term solution is proposed by NamWater to connect and equip two newly drilled boreholes (WW100323 and WW100326 with 2.7 m^3/h and 3 m^3/h respectively). Secondly, the second long-term solution proposed by NamWater will take years to achieve, mainly for the reason that this will involve the construction of a treatment plant to treat the boreholes with bad water quality.

Pipelines will have to be constructed from the two good quality boreholes to convey water abstracted from the boreholes to the existing reservoirs at the Katji-na-Katji clinic. Water will be transported via two pumping mains. A pipeline will be constructed to increase the transfer capacity of water to important institutions, like the Katji-na-Katji school and the clinic. This short-term solution will serve as an interim measure to meet water demand in the Katji-na-Katji village.

NamWater management thus concluded that the interim solution is best for the time being.

4. EXISTING KATJI-NA-KATJI WATER SUPPLY INFRASTRUCTURE

4.1 Water Source

The current Water Supply Scheme is supplied with ground water from three boreholes, which belong to the Directorate of Water Supply and Sanitation (DWSSC) within the Ministry of Agriculture, Water and Forestry (MAWF).

The boreholes supply water to the community at three separate communal water points, namely Katji-na-Katji, Leevi and Eukordon. See areas served by the boreholes shown in **Figure 2** below**.**

Figure 2: Location of DWSSC boreholes

The three polygons around each borehole give the water supply coverage of each borehole. The overall polygon (in green) is the greater Katji-na-Katji area that is not adequately supplied with water.

During consultations between NamWater, the community members and the Mankumpi constituency, it was revealed that none of the existing water supply points have water meters. The water supply points are communal water points and managed communally. The community is obliged to pay for prepaid electricity, diesel, and repairs of water supply installations.

4.2 Water Quality and Disinfection

Currently, there is no treatment processes employed to improve the water supplied to the Katji-na-Katji WSS. However, NamWater's Electrical and Mechanical Department will include chlorination dosing systems in their designs; this system will assist in purifying the groundwater.

4.3 Pipe Work and Reservoirs

Eukordon borehole (WW37778) supplies water to 2 x 10 m^3 plastic reservoirs on a ±2.5 m stand on site and to a nearby school to the north via a ±650 m pipeline of unknown diameter and material.

Katji-na-Katji borehole (WW200188) supplies water to a 10 m^3 plastic reservoir on a ±2.5 m stand on site and to the clinic and constituency office via a ±820 m pipeline of unknown diameter and material.

Leevi borehole (WW201242) supplies water to 3 x 10 m^3 plastic reservoirs on a ±2.5 m stand on site. All three boreholes supply water to troughs for livestock watering.

The Katji-na-Katji school reservoir is supplied with water from the reservoirs at the clinic via a ±320 m pipeline of unknown diameter and material.

4.4 Power Supply and Control System

Eukordon (WW37778) and Katji-na-Katji (WW200188) boreholes have pole-mounted transformers supplying electric power. Leevi borehole (WW201242) is diesel driven and the electric power grid is within ±1 km.

4.5 Maintenance

Remedial maintenance is carried out by the operator and assistants, while the maintenance of the mechanical and electrical equipment, buildings, pipelines and installations is carried out by NamWater Staff from the Rundu office.

4.5.1 Pumps

All motors bearings should be lubricated with a high-temperature lithium-based grease after 3000 hours.

If a pump/s were out of operation for six months, lubrication is required before service commence on all motor bearings.

4.5.2 Air Valves

Monthly the valves must be opened to be descaled and cleaned to ensure effective operation. The service intervals will depend on the severity of the conditions.

4.5.3 Pressure Gauges and Transducers

Monthly the gauge cocks must be turned to bleed-off air and ensure accurate readings. Turning prevents scale accumulation which prevents the gauge cock from functioning. The operational or service intervals will depend on the severity of the conditions.

4.5.4 Reservoirs

The reservoirs should be checked for leaks and other damages on a monthly basis. If leaks are detected, it should be fixed immediately.

4.5.5 Pipe Breaks/leaks

Monthly monitor of pipes should be done to avoid wastage of water in an event a major pipe break. The pipeline corridor for maintenance work is 10 m by 5 m.

5. DESCRIPTION OF THE PROPOSED PROJECT

5.1 Interim solution objective

The primary objectives of the project is to increase potable water supply to the Katji-na-Katji community.

5.2 Scope of Work

5.2.1 Construction of the pipeline

The two boreholes will be equipped with appropriately sized pumps and connected with 63 mm diameter uPVC class 6 pipelines, with lengths of ±320 m (borehole 1) and ±2,370 m (borehole 2). The pipeline will be equipped with scour valves and air valves, and it will be below ground.

The water pipelines from the boreholes will be connected to the existing reservoirs at the Katji-na-Katji clinic and school. Please see **Figure 3** below for bearings.

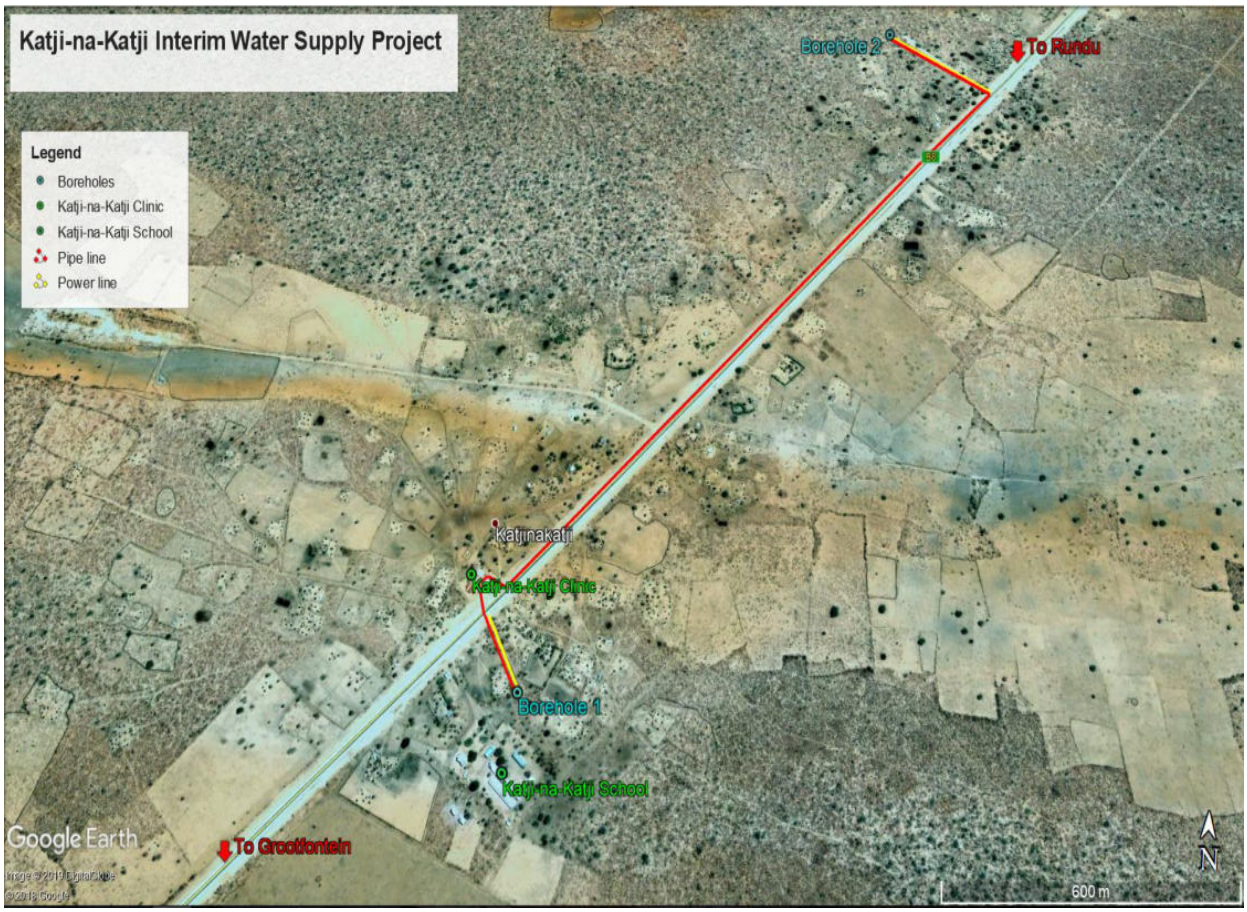

Figure 3 Katji-na-Katji water pipeline & power line proposed routes

5.2.2 Construction of power line

The proposed 11 kV power lines will be supported by wooden monopole structures, each measuring approximately 9 metres in height. The span width between the wooden monopole structures will be approximately 100 to 120 metres. A three-phase electrical system will be installed, i.e. three conductors. **Figure 4** below illustrates a typical layout of a 3 phase 11 kV power line.

The power line to the boreholes will run parallel to the proposed water pipelines and branching from the main overhead transmission line. The overhead transmission line is running parallel with the B8 highway road. The distance from the transmission line to Borehole 1 is approximately 190 metres while the distance to Borehole 2 is approximately 350 metres. See **Figure 3** for the power line routes.

Figure 4: Typical 11kV power line structure

6. BRIEF DESCRIPTION OF THE RECEIVING ENVIRONMENT

The environmental management legislation in Namibia emphasizes on certain aspects of the environment that needs specific attention during project implementation. These aspects, together with the collection of baseline information on the receiving environment, ensure that there is adequate information about the study area to make informed decisions with regard to planning, construction and operation of the proposed reservoir. This in turn warrants that the principles of ecological sustainability, social equity and economic efficiency are employed during the project implementation.

The baseline description provided below focuses on those aspects of the receiving environment that are anticipated to be affected by the project:

6.1 Climate

The Katji-Na-Katji climatic zone has warm summers and relatively mild winters, characterised with warm days and slightly chilly nights. The area has a hot semi-arid climate (Mendelsohn*, et al.,* 2009).

6.1.1 Precipitation

The average annual rainfall for Katji-Na-Katji is between 500 mm and 550 mm. Katji-Na-Katji's driest month is in June, while the maximum rainfall falls between January and February (Mendelsohn*, et al.,* 2002).

6.1.2 Temperature

The average maximum temperature for Katji-Na-Katji during the hottest months is typically between 32 °C to 34 °C. The average minimum temperature during the coldest months is between 4 °C to 6 ° respectively (Mendelsohn, *et al.,* 2002).

6.2 Geology

The regional geology comprises primarily sediments of the Kalahari Sequence, ranging in age from late Cretaceous to Quaternary. The unconsolidated to semi-consolidated clay, sand, and gravel of the Kalahari Sequence fill the Okavango Sub-basin, which deepens from the northeast towards the northwest, from 0 to > 400 m along the north-west trending basin axis. The basin axis stretches from the northwest corner of former Bushman land through the south-western Kavango Region and from there into the Ohangwena Region. Sub-outcrops of volcanic rock occur at the Okavango River near Katji-Na-Katji and between Mukwe and Bagani (Christelis *et al*., 2011).

The Kalahari sediments can be divided into two broad groups. The first and deepest group is the thickest and consists of layers of clays, conglomerates, water-borne sands, silts, and calcretes. The second top-most and youngest group is a relatively thin layer dominated by sand deposited mainly by wind, a fact shown most vividly by the many old dunes in the region. The predominance of the Aeolian sand in these layers reflects the generally arid conditions that have persisted over many millennia, although isolated deposits of clays have been laid down by water flowing along the omiramba and in inter-dune valleys during periodic wetter cycles (Christelis *et al*., 2011).

6.3 Natural Fauna and Flora

Katji-na-Katji's landscape is dominated by tree and shrub (Biome) Savannah, the area is known to have a Northern Eastern Kalahari woodland vegetation.

Vegetation species include: Mangetti tree (*Schinziophyton rautanenii*), Silver Terminalia (*Terminalia sericea*), Variable combretum (*Combretum collinum*), Commiphora species, Camel-thorn (*Acacia erioloba*) and Black-thorn acacia (*Acacia mellifera*). Makalani palms *(Hyphaene Petersiana)*, Blue sour plum (Ximenia Americana), black-thorn *(Acacia mellifera),* devil's claw *(Harpagophytum),* Jackal berry *(Diospyros mespiliformis),* shepherd tree *(Boscia albitrunca)*, cluster leaf (Terminalia prunioides), wild syringa *(Burkea africana),* kiaat (Pterocarpus angolensis), Zambezi teak *(Baikiaea plurijuga)* and Monkey Orange (*Strychnos spinosa*) (Mendelsohn, *et al.,* (2009).

According to Mendelsohn, *et al., (*2009) Katji-na-Katji has a relatively moderate diversified wildlife population. The area is known to frequent the following wildlife species such as elephant *(Loxodonta),* kudu *(Tragelaphus strepsiceros),* leopard *(Panthera pardus),* cheetah (Acinonyx jubatus), wild dog *(Lycaon pictus*), buffalo *(Syncerus caffer)*, spotted hyena (Crocuta crocuta) *and* brown hyena (*Hyaena brunnea*). Furthermore, locals have sighted local birds such as the Stripped Kingfisher (*Halcyon chelicuti) and Meyer's parrot (Poicephalus meyeri)* (Mendelsohn, *et al.,* (2009).

7. THE LEGAL ENVIRONMENT

A legal review was done and the key laws of concern include those which protect the ecological integrity of the Katji-Na-Katji ecosystem and its water resource, including the Water Act of 1954 and the Water Resources Management Act of 2004, and applicable international treaties such as the Convention on Biological Diversity. These laws and conventions place Namibia under an obligation to conserve the ecological integrity of the Katji-Na-Katji ecosystem for the sustainable use by Namibians.

7.1 The Constitution of the Republic of Namibia

There are two clauses contained in the Namibian Constitution that are of particular relevance to sound environmental management practice, viz. articles 91(c) and 95(l). In giving effect to articles 91(c) and 95(l) of the Constitution of Namibia, general principles for sound management of the environment and natural resources in an integrated manner have been formulated. The formulation of these general principles resulted in the Namibia's Environmental Assessment Policy of 1994. To give statutory effect to this Policy, the Environmental Management Act was approved in 2007, and gazetted as the Environmental Management Act (Act No. 7 of 2007) (herein referred to as the EMA. As the organ of state responsible for management and protection of its natural resources, MET: DEA is committed to pursuing the 13 principles of environmental management that is set out by Part 2 of the Act.

To summarise, Articles 91(c) and 95(l) refer to:

- Guarding against over –utilisation of biological natural resources;
- Limiting over-exploitation of non-renewable resources;
- Ensuring ecosystem functionality
- Protecting Namibia's sense of place and character;
- Maintaining biological diversity and
- Pursuing sustainable natural resource use.

7.2 Environmental Assessment Policy (1995)

Cabinet endorsed Namibia's Environmental Assessment Policy in 1995 as the first formal effort in Namibia to regulate the application of environmental impact assessments and environmental

management. Amongst others, the Policy provides a procedure for conducting EIA's which sets out to:

- Better inform decision makers and to promote accountability of decisions taken;
- Strive for a high degree of public participation and involvement of all sectors of the Namibian community during the execution of the EIA;
- Take into account the environmental costs and benefits of projects and programmes;
- Promote sustainable development in Namibia;
- Ensure that anticipated adverse impacts are minimized and that positive impacts are maximized.

7.3 Environmental Management Act (No 7 of 2007) (EMA)

The Environmental Management Act (EMA) was promulgated in 2007 by Parliament and gives effect to the Environmental Assessment Policy. The Act specifies the environmental assessment procedures to be followed as well as the listed activities (activities that require an EIA).

Of relevance to this project are the following listed activities, as provided in Section 27 of this Act, which include:

- Water use and disposal;
- Transportation

7.4 EIA Regulations Government Notice No. 30, promulgated on 6 February 2012

The regulations, promulgated in terms of the EMA, were promulgated on 6 February 2012 and indicated certain activities that require an Environmental Clearance from MET: DEA prior to commencing.

7.5 Water Act 54 of 1956 and Water Resources Management Act 11 of 2013

The Water Resources Management Act 11 of 2013 is presently without regulations; therefore the Water Act 54 is still in force. The Act provides for the management and protection of surface and groundwater resources in terms of utilisation and pollution.

8. RESPONSIBLE PARTIES

NamWater's Environmental Manager is primarily responsible for the implementation of the EMP during the operational and maintenance phases.

8.1 NamWater

NamWater, as the implementing agency, is responsible for:

* Ensuring that the objects of the EMP are being obtained;
* Ensuring that all environmental impacts are managed according to the environmental principles of avoiding, minimizing, mitigating and rehabilitation. This will be achieved by successful implementation of the EMP;
* Ensuring that appropriate monitoring and compliance auditing are executed;
* Ensuring that the environment is rehabilitated to its natural state as far as possible.

NamWater shall ensure that all employees attend an Environmental, Awareness Training Course. This course shall be structured to ensure that attendees:

* Become familiar with the environmental controls contained in the EMP;
* Are made aware of the need to conserve water and minimise waste;
* Are made aware of NamWater's Code of Conduct;
* Are aware that a copy of the EMP is readily available at the plant and that all staff are aware of the location and have access to the document;
* Are informed that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) will be placed at prominent locations throughout the site.

9. ENVIRONMENTAL MANAGEMENT PLAN

An EMP is an important tool focusing on the management actions that are required to ensure environmental compliance of a particular project.

EMP implementation is a cyclical process that converts mitigation measures into actions and through cyclical monitoring, auditing, review and corrective action, ensures conformance with stated EMP aims and objectives. Monitoring and auditing, feedback for continual improvement ensures that environmental performance has been provided and corrective action is taken for an effective EMP.

The main aim of this EMP is to ensure that the project complies with the goals of the Namibian Environmental Management Act (No. 7 of 2007); and, more specifically, to provide a framework for implementing the management actions as described in the EMP for the operational and maintenance phases of the scheme. Best practice is proposed for the operation of the scheme.

There are some environmental impacts that cannot be avoided. These environmental impacts require mitigation, and in order to mitigate against these impacts an EMP is required. The EMP aims to ensure best practises are implemented and environmental degradation is avoided through appropriate environmental protection, adherence to legal requirements and maintaining good community relationships.

MET indicated that EMP's for existing operations are sufficient.

The project activities are grouped according to the different operational processes and stages. Most of the impacts can be reduced through good housekeeping.

10. MANAGEMENT ACTIONS

10.1 Operation and Maintenance phase of the Katji-na-Katji Interim Solution Project

10.1.1 Introduction

The Operational Phase Section relates to the management and mitigation measures required to ensure that the continuation of the bulk water supply network and the maintenance of the infrastructure is operated in a manner that demonstrates responsible, precautionary environmental management.

The EMP will address specific areas of concern in terms of the long-term environmental management of the affected environment and is intended to serve as a guide to the on-going management of the water supply scheme site as well as the affected environment. The EMP will therefore aim to provide NamWater with the necessary tools to ensure that the potential impacts on the natural environment of the site during the operation of the water supply scheme are minimised. Moreover, it will aim to ensure that the infrastructure is operated and maintained according to Best Practice, in an environmentally sensitive and sustainable manner, and that the operation of the infrastructure does not result in reasonably avoidable environmental impacts.

Table 1: Operation and Maintenance Phase Management Table

Issue	Objective	Strategy	Actions	Time frame
Maintenance and emergency procedures	To ensure correct procedures are in place to avoid environmental impacts associated with maintenance activities as well as proactive intervention to avoid, and if required, to respond to emergencies	• Establish environmentally sensitive and technically sound maintenance procedures as well as reporting structures. • Compile a staff competency assessment and training programme. • Establish emergency procedures to ensure appropriate response and minimise potential risk to the biophysical and social environment.	1. Establish regular reporting procedures on maintenance 2. Undertake regular inspection and maintenance of all infrastructure to ensure in working order and to assess damaged / deficient equipment, as per the O&M Manual. 3. Review, and if necessary, revise maintenance manual. 4. Establish emergency procedures guidelines for the blockage/failure, flooding, contaminant removal and disinfection, power failure and fire of the scheme. 5. Implement the response procedures when emergency incident occurs. 6. Complete the incident report checklist in the case of emergency and keep with monitoring records for submission. 7. Undertake annual education course for all operational staff. 8. Review, and if necessary revise emergency manual.	Bi-monthly for the lifespan of infrastructure as per the maintenance manual. Bi-annually for lifespan of works. When emergency incident occurs. Emergency incident Annually for lifespan of operation. Annually for lifespan of operation Annually for lifespan of operation

10.2 Maintenance Procedures

The optimal operation and effective maintenance of all the scheme components is important in protecting the environment and ensuring that resources are not wasted and environmental incidents arising out of equipment or infrastructure failures, are avoided. Operation and Maintenance Manuals are available for the Katji-Na-Katji Interim Solution. The manuals provide a detailed guidance on the operation of all machinery and associated systems as well as related maintenance procedures, including maintenance schedules. Implementation of this manuals by NamWater will facilitate the proactive management of potential risks and thus result in impacts on the receiving environment being averted.

The maintenance procedures set out in the manuals, provides specific guidance in terms of the monitoring and maintenance of the scheme components. These procedures will specify the equipment item and specific component of each piece of equipment requiring checking, the scope and nature of the check that is to be carried out including detailed instructions related to the specific check, and the programme for conducting each check.

10.3 Facility Management and Operations

NamWater shall ensure that sufficient budget allocations and provisions are made available to ensure that the infrastructure can be adequately operated and maintained. NamWater must also attend to damage to the scheme components resulting in water loss as a matter of high priority.

10.4 Routine Maintenance and Repairs

The condition of the infrastructure shall be inspected routinely and a maintenance list compiled. Identified, preventative maintenance issues shall be undertaken as soon as possible. Any wastes arising from the repair and maintenance work must be removed and disposed-off at a designated waste deposal site as part of the operation.

10.5 Equipment maintenance and storage

All vehicles and equipment shall be kept in good working order and shall be operated by designated and competent operators. Leaking or damaged equipment shall be repaired immediately. Where emergency, *in situ,* maintenance operations are required the Scheme O shall ensure that the soil or vegetation does not become contaminated. Drip trays shall be provided in areas for stationary and parked vehicles as well as for the emergency servicing of vehicles. Drip trays shall be inspected and emptied daily, or as required. The contents of the drip trays shall be disposed of at an appropriately authorised facility.

The washing of equipment and vehicles shall make use of detergents for washing with low phosphate and nitrate containing, low foaming type detergents. Washing of equipment will only be allowed in a wash bay.

The Scheme Supervisor shall ensure that oil and lubricant containers are stored in an area where the ground has been protected. The containers shall be inspected regularly to ensure that no leakage occurs. When oil/ lubricants are dispensed, the proper dispensing equipment shall be used, and the storage container shall not be tipped in order to dispense the oil/ lubricant. The dispensing mechanism of the oil/ lubricant storage container shall be stored in a waterproof container when not in use. The Scheme Supervisor shall take all reasonable precautions to prevent accidental and incidental spillage during the use of oils.

In the event of oil/ lubricant or other hazardous spill, the source of the spillage shall be isolated, and the spillage contained. The Scheme Supervisor shall clean up the spill by removing the contaminated soil to the hazardous waste vessel/ skip and the application of absorbent material to the affected area. Treatment and remediation of the spill area shall be undertaken to the reasonable satisfaction of NamWater's Environmental Services Division.

10.6 Environmental Awareness

Instilling a sense of environmental awareness and consideration in all employees, but especially those involved with the scheme operations is vital to the overall success of any environmental management plan. It is therefore recommended that a general environmental awareness course for the Scheme Staff Members, who may be required to carry out duties on the scheme, be undertaken.

10.7 Waste and Pollution Management

10.7.1 Waste and Pollution Prevention

To prevent the improper disposal of waste and to prevent pollution, the following management actions shall be enforced:

- All waste will be removed to an appropriate waste dump.
- No waste should be buried.
- General Waste: Includes waste paper, plastic, cardboard, harmless organic (e.g. vegetables) and domestic waste.
- No littering will be allowed. The plant area will be kept free of waste at all times.
- Provide sufficient waste bins at worksites. Make sure that all waste is removed from the worksites.
- Hazardous Substances include: sewerage, fuels, lubrication oils, hydraulic and brake fluid, solvents, paints, anti-corrosives, insecticides and pesticides, chemicals, acids etc. It should be disposed of at designated hazardous disposal sites.
- Contaminated soil should be stored in drums and taken to the nearest appropriate waste dumpsite.
- Do not change oil on uncovered ground. Drip trays will be used to catch oil when vehicles are repaired in the field.
- Used oil and hydraulic fluids will not be discarded on the soil or buried. It will be removed from site and taken back to an appropriate dump.
- In the event of a hazardous spill:
  - ✓ Immediately implement actions to stop or reduce the spill.
  - ✓ Contain the spill.
  - ✓ Arrange implementation of the necessary clean-up procedures.
  - ✓ Collect contaminated soil, water and other materials and dispose it at an appropriate waste dumpsite.
- Used solvents and grease should be stored in drums or other suitable containers. It should be sealed and recycled or disposed at an appropriate disposal site.

- Hazardous waste should not be burnt.
- Bunding, concrete slabs and/or other protective measures should be installed where hazardous materials are handled.
- Ensure that the staff are informed and have information pertaining to the management of spills or ingestion.

10.7.2 Hazardous Materials

Where hazardous materials are required for repair and maintenance work (including fuels and oils), care will be taken to ensure that a competent individual is appointed to enforce the responsible use of such materials. The operational staff or maintenance teams shall carry a copy of the relevant Material Safety Data Sheet (MSDS) whenever using such materials. The Scheme Supervisor shall ensure that persons working with hazardous materials have been trained in the handling of such substances, as well as in emergency procedures to be followed in the event of an accidental spillage or medical emergency. Maintenance teams shall also carry a spill kit containing the appropriate neutralizing chemicals, absorbent materials and other relevant equipment required to undertake a clean-up of any spill that may occur.

10.7.3 Noise Management

During maintenance operations, all silencing mechanisms on all equipment must be in a good state of repair. Except for in emergency situations, no amplified sound may be broadcast. All routine maintenance shall be restricted to daylight hours.

10.7.4 Emergency Procedures

The Scheme Supervisor shall ensure Scheme Staff Members are aware of the procedure to be followed for dealing with leaks and spills, which shall include notifying the NamWater's Environmental Services Division. The Scheme Supervisor shall ensure that the necessary materials and equipment for dealing with leaks and spills are available at all times. Treatment and remediation of spills shall be done to the satisfaction of the NamWater's Environmental Services Division.

In the event of a hydrocarbon spill, the source of the spillage shall be isolated, and the spillage contained. The affected areas shall be cordoned off and secured. The Scheme Supervisor shall ensure that there is always sufficient supply of absorbent material to absorb/ breakdown or encapsulate at least a 200ℓ liquid hydrocarbon spill. Any soil contaminated by such a spill must be removed and disposed of at an appropriately registered waste site.

Emergency equipment including spill kits and fire extinguishers shall be positioned at accessible locations near to areas or facilities where such emergencies may arise.

10.8 Health and Safety

To minimise the risk of HIV infection and the increase of STI's and the occurrence injuries the following management actions shall be enforced:

- Provide an AIDS awareness programme to all the staff.
- Make sure that all staff are equipped and know how to use safety and protective gear. This includes hard hats, goggles, hearing protectors, dusk masks, steel-toed shoes etc.
- Keep a comprehensive first aid kit at Scheme.

- Establish an emergency rescue system for evacuation of serious injured people.
- Emergency procedures for accidents should be communicated to all employees.
- Dangerous areas must be clearly marked and access to these areas controlled or restricted.
- Good driving and adherence to safety rules will result in a minimum number of road and workplace accidents.
- Fire extinguishers must be available at all refuelling sites. Staff should be trained to handle such equipment.
- Nobody is allowed to dispose a burning or smouldering object in an area where it may cause the ignition of a fire.
- Hazardous substances must be kept in adequately protected areas to avoid soil, air or water pollution.
- Work areas, such as these for the maintenance of equipment, must be on concrete slabs.
- Explosives should be stored according to the prescribed regulations.

11. SITE CLOSURE AND REHABILITATION

Rehabilitation is the process of returning the land in a given area that has been disturbed by construction and earthworks to some degree of its former state, or an otherwise determined state. Many projects, if not all, will result in the land becoming degraded to some extent. However, with proper rehabilitation most impacts associated with the reservoir construction project, could be mitigated and restored to an acceptable level. Poorly rehabilitated construction areas provide a difficult legacy issue for governments, communities and companies, and ultimately tarnish the reputation of operators as a whole.

Objectives of proper site closure and rehabilitation include the following:

- Reduction or elimination of the need for a long-term management program to control and minimise the long-term environmental impacts;
- Clean-up, treatment or restoration of contaminated areas (e.g. soils contaminated by oil or fuel spills, concrete spills, etc.). Excavation of contaminated material and disposal thereof in an acceptable manner.

Rehabilitation measures to implement:

a. A site inspection will be held quarterly by the scheme supervisor after every maintenance work during operation of the scheme. Rehabilitation will be done to the satisfaction of the ENV section and MET.

b. Frequent inspections of the scheme and effective follow-up procedures, to prevent minor defects from becoming major repair jobs.

c. Make sure all soil polluted during maintenance work is properly stored in drums and removed to an appropriate waste dump.

d. Make sure all windblown litter is removed once maintenance has seized.

e. Make sure that all potential hazards (i.e. the sewerage pit) are properly closed and left in a safe and neat position.

Rehabilitation will be completed when the above have be achieved.

12. NAMWATER ENVIRONMENTAL CODE OF CONDUCT

What is an Environmental Code of Conduct?

It is a set of rules that everybody has to follow in order to minimise damage to the environment.

What is the ENVIRONMENT?

The ENVIRONMENT means the surroundings within which people live. The ENVIRONMENT is made up of the **soil, water, plants,** and **animals** and those characteristics of the soil, water, air, and plant and animal life that influence **human health and well-being**. **People** and **all human activities** are also part of the environment and have to be considered during the operation of the Scheme.

Do these ENVIRONMENTAL RULES apply to me?

YES, The Environmental Rules apply to EVERYBODY. This includes all permanent, contract, or temporary workers as well as any other person who visits the Scheme. Every person will be required to adhere to the Environmental Code of Conduct.

ALL PERSONNEL must study and keep to the Environmental Code of Conduct

The SCHEME SUPERVISOR will issue warnings and will discipline ANY PERSON who breaks any of the Environmental Rules. Repeated and continued breaking of the Rules will result in a disciplinary enquiry and which may result in that person being asked to leave the Scheme permanently.

What if I do not understand the ENVIRONMENTAL RULES?

ASK FOR ADVICE, if any member of the WORKFORCE does not understand, or does not know how to keep any of the Environmental Rules, that person must seek advice from the SCHEME SUPERVISOR. The PERSON that does not understand must keep asking until he/she is able to keep to all the Environmental Rules.

Safety and Security

1. Only enter and exit roadways and construction areas at demarcated entrances.
2. Wear protective clothing and equipment as per signboards at the Scheme and according to instructions from your SCHEME SUPERVISOR.
3. Report to your SCHEME SUPERVISOR if you see a stranger or unauthorised person in the construction area.

4. Never enter any area that is out of bounds or that is demarcated as dangerous without permission of your SCHEME SUPERVISOR.
5. Never climb over any fence or enter private property without permission of the landowner or your SCHEME SUPERVISOR.
6. Do not remove any vehicle, machinery, equipment, or any other object from the construction site without the permission of your SCHEME SUPERVISOR.
7. Keep clear of blasting sites. Follow the instructions of your SCHEME SUPERVISOR.
8. Never enter or work in the Scheme while under the influence of alcohol or other intoxicating substances.
9. All staff should know the emergency procedures in case of accidents.

Waste Disposal

10. Learn the difference between different types of waste, namely:
    - general waste, and
    - hazardous waste.

Containers will be provided for different types of wastes.

<u>General Waste</u> includes waste paper, plastic, cardboard, harmless organic (e.g. Vegetables) and domestic waste

<u>Hazardous Waste</u> includes objects, liquids or gases that are potentially dangerous or harmful to any person or the environment. Sewage, fuel, tyres, diesel, oils, hydraulic and brake fluid, paints, solvents, acids, soaps and detergents, resins, old batteries, etc. are all potentially hazardous.

11. Learn how to identify the containers for the different types of wastes. Only throw general waste into containers, bins or drums provided for general waste.
12. Recycle drums, pallets and other containers.
13. Never bury or burn any waste on site, all waste is to be disposed in allocated refuse disposal containers, bins or bags.
14. Never overfill any waste container. Inform your SCHEME SUPERVISOR if you notice a container that is nearly full.
15. Do not litter.
16. Do not bury litter or rubbish in the backfill trench.

Plants and Animals

21. **Do not ever pick any plants, or catch any animal.** People caught with plants or animals in their possession will be handed to the authorities for prosecution.
22. Never feed, tease, play with, or set devices to trap any animal or livestock. Wild animals are not to be domesticated.
23. Keep off the rock outcrops unless given specific permission by the SCHEME SUPERVISOR to be there.
24. Never cut down any tree or branches for firewood.
25. Never leave rubbish or food scraps or bones where it will attract animals, birds, or insects.
26. Rubbish must be thrown into allocated waste disposal bins/bags.
27. Always close the gates behind you.

Preventing Pollution

28. Only work with hazardous materials in bunded areas.
29. Never discard any hazardous substances such as fuel, oil, paint, solvent, etc. into stream channels or onto the ground. Never allow any hazardous substances to soak into the soil.
30. Clean up spills immediately.
31. Immediately report to your SCHEME SUPERVISOR when you spill, or notice any hazardous substance overflow, leak or drip or spill on site, into the streambeds or along the road.
32. Immediately report to your SCHEME SUPERVISOR when you notice any container, which holds hazardous substances overflow, leak or drip. Spillage must be prevented.
33. Only wash vehicles, equipment and machinery, containers and other surfaces at work site areas designated by your SCHEME SUPERVISOR.
34. Do not change oil on uncovered surfaces.
35. If you are not sure how to transport, store, use, or get rid of any hazardous substances ask your SCHEME SUPERVISOR for advice.

Health

36. Drink lots of clean water every day.
37. Use toilets that have been provided.
38. Take the necessary precautions to avoid contracting HIV / AIDS. Condoms are available at most Clinics.
39. Inform your SCHEME SUPERVISOR when you are sick.
40. Do not work with any machinery when you are sick.
41. If you are working in malaria areas, you must take the necessary precautions.

Dust Control

42. Do not make any new roads or clear any vegetation unless instructed to do so by your SCHEME SUPERVISOR.
43. Keep to established tracks and pathways.
44. Keep within demarcated work areas.

Saving Water

47. Always use as little water as possible. Reduce, re-use and recycle water.
48. Never leave taps or hose pipes running. Close all taps after use.
49. Report any dripping or leaking taps and pipes to your SCHEME SUPERVISOR.

Working Hours

50. You may only work on weekends and after hours with the consent of the SCHEME SUPERVISOR.

Archaeological and Cultural Objects

52. If you find any archaeological, cultural, historical or pre-historical object on the construction site you must immediately notify your SCHEME SUPERVISOR.
53. Never remove, destroy, or disturb any cultural, historical, or pre- historical object on site.

<u>Cultural and Historical</u> Objects include old buildings, graves or burial sites, milestones, old coins, beads, pottery and military objects.

<u>Pre-Historical objects</u> include fossils and old bones, old human skeletal remains, pieces of pottery and old tools and implements.

Sensible Driving

54. Tracks and roads should be kept to a minimum. Where possible follow existing roads.
55. No off-road driving is allowed.
56. Never drive any vehicle without a valid licence for that vehicle class and do not drive any vehicle that is not road-worthy.
57. Never drive any vehicle when under the influence of alcohol.
58. **Always** keep your headlights on when driving on dusty roads.
59. Keep to the roads as specified by your SCHEME SUPERVISOR. Vehicles may only be driven on demarcated construction roads. Drivers should always use three point turns, “u-turns” are not allowed. Do not cut corners.
60. Do not drive on rocky outcrops.

Noise

61. Keep noise levels as low as possible.
62. Do not operate noisy equipment outside normal working hours.

Fire Control

63. Do not make open fires, use a drum or tin and do not collect any vegetation to burn.
64. Do not smoke or make fires near refuelling depots or any other area where fuel, oil, solvents, or paints are used or stored. Fireplaces should be at a safe distance from fuel and explosive storage sites as well as vehicle parking sites.
65. Cigarette butts should always be thrown in allocated refuse bins. Make sure that the cigarette butt is out before throwing it into the bin.
66. Immediately notify your SCHEME SUPERVISOR if you see an unsupervised fire at the campsite or construction site.

Dealing with Environmental Complaints

67. If you have any complaint about dangerous working conditions or potential pollution to the environment, talk to your SCHEME SUPERVISOR.
68. If any person complains to you about noise, lights, littering, pollution, or any harmful or dangerous condition, immediately report this to your SCHEME SUPERVISOR.

69. For any enquiries or grievances, please call

Jolanda Kamburona

Tell: 061-71 2105

Cell: 081 144 1528

OR

Fillemon Aupokolo

Tell: 061-71 2105

Cell: 081 325 3301

13. REFERENCES

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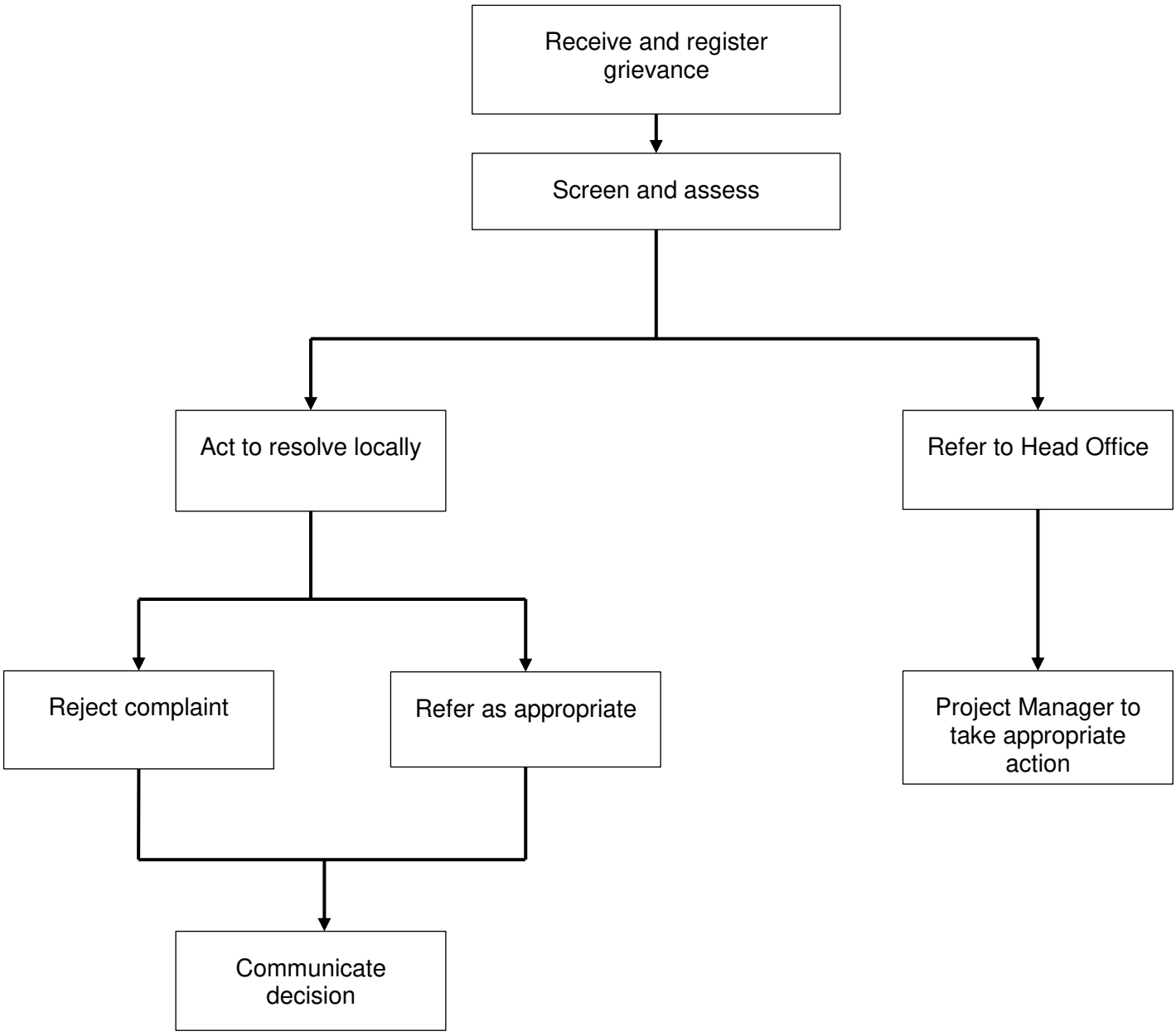
ANNEXURE 1: GRIEVANCE PROCEDURE AND REGISTRATION FORM



Grievance Registration

Grievance Registration	
Case No:	Date:
Name of complainant:	Cell no:
	Email address:
Details of grievance: (Date, location, persons involved, frequency of occurrence, effects of ensuing situation, etc)	
Name of person recording grievance:	Cell number:
Proposed date of response:	
Signature of recording person:	Signature of complainant:
Date of redress:	
Decision and action:	