DANIDA

Health Care Waste Pilot Project

Mbabane Government Hospital
Development Plan for Implementation of Waste Management System in Six Test Site Areas

28 March 2002

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1. BACKGROUND

This development plan outlines the new waste management system implemented into the Mbabane Government Hospital and the process that was followed in the **selection, implementation and evaluation** of the system.

1.1 National Solid Waste Management Strategy

The National Solid Waste Management Strategy (NSWMS) sets out the following vision for Swaziland:

"to develop, implement and maintain an integrated waste management system that will reduce the adverse impact of all forms of solid waste, so that social and economic development in Swaziland, the health of its people and the quality of its environment and it's resources benefit"

(Refer: National Solid Waste Management Strategy for Swaziland Fifth Draft Volume I & II)

A Needs Analysis identified the need to implement a "no Touch" Clinical Waste Management System. (*Refer Needs Analysis Report dated: 17 November 2000)*

An urgent need existed in Swaziland to agree upon the main principles for the handling, storage, collection, transport and treatment of Health Care Risk Waste.

The preferred solution of source separation and incineration of the clinical waste was identified in the Preferred Solutions Discussion Document dated 24th October 2000). The Short Term of objectives relative to this report are:

Internal source separation of Health Care Risk Waste from Health Care General Waste Investigate existing clinical waste incineration facilities in Mbabane and Manzini areas and upgrade selected facilities to a minimum standard. Implement a pilot programme in Mbabane for collection, treatment and disposal of Health Care Risk Waste Agree on the supply of non-hazardous waste containers at the points of generation to facilitate segregation of waste at source.

1.2 Pilot Project Selection

Mbabane Government Hospital was selected for the implementation of a pilot programme to meet these short-term objectives. The aim of the Pilot Project was to establish a comprehensive health care waste management system for Mbabane Hospital. The objective of the Pilot Project was therefore:

"To plan, develop and implement a technical and financially feasible Health Care Risk Waste Management System in Mbabane Hospital in line with requirements for developing countries set by the World Health Organisation taking cognisance of the

geographical, institutional and financial context in the country." *(Reference National Solid Waste Management Strategy, Project document FLK 001001, undated)*

The system implemented is to cover all aspects of waste management from cradle to grave with source separation and the supply of non-hazardous waste containers being critical criteria. The pilot project was to also including appropriate treatment of HCRW through incineration and to upgrade the facilities to a minimum standard to accept the Health Care Risk Waste.

1.3 Time Scales

The implementation phase of the Pilot project has been considerably delayed due to:

Delayed appointment of a Health Care Waste Management Specialist
Difficulties with the procurement of equipment
Construction work on storage areas and access roadways not completed
Financial constraints being influenced by timing and no budget allocation by Government Departments.
Limited In-house man power resources.
Delays in decision-making.

The revised time scales are represented in **Annexure 1(a).** In order to meet the limited time allowed, the phases are overlapped and the actual test time will be reduced to a maximum of 3 months. Limiting the areas for the testing of the system is a more realistic and practical option that will ensure that the available time is fully utilised.

1.4 Mbabane Government Hospital Background Information

Mbabane Government Hospital has a total of 500 beds with an occupancy rate of 110 %. There is a total staff complement of 611 comprising mainly of :

163 Staff Nurses
132 Orderlies
66 Nursing Assistants
36 Nursing Sisters,
20 Medical Officers
16 Laundry Staff

The hospital has 18 wards that provides a basic service to the community of Medical, Surgical, ICU, High Care, Maternity, Gynaecology, Orthopaedic, Children's and Isolation ward. There is also a Theatre, Casualty, OPD, Laboratory, X-Ray, Kitchen, Dispensary, Laundry and Physiotherapy. Staff from the Ministry of Public Works and Transport run the Biomedical Engineering Department. The kitchen is contracted out to an independent company.

The incinerator is situated some 400 metres on the hill on the south side of the hospital. The road gradient leading to the area is steep and the surface is tarred

running only on the south and east sides of the hospital. The last 200 metres up the hill is gravel and badly eroded by rain. The diesel incinerator is housed in a building towards the south end of the enclosed area.

2. THE PRESENT SITUATION AT MBABANE HOSPITAL

(as at February 2002)

A waste assessment was conducted on the hospital premises during the time from November 2001 to January 2002 by the consultant together with the Waste Management Officer. The information was gathered through a physical inspection of the premises, discussions with the Senior and line management and interviews with individual staff members. A site plan of the hospital was obtained from the Public Works Department and the layout of each individual unit was roughly drawn out on graph paper. Each unit's requirements in terms of number of bins, positions and quantities of waste were assessed. The following synopsis gives an overview of the results of the assessment.

Mbabane Hospital does not have an effective system in place to manage their waste. There are no documented standards, protocols or codes of practise for the management and control of waste and the equipment provided for containing waste is inappropriate and in some places, non-existent. The hospital staff frequently experience shortages of essential equipment such as liners and dustbins due to a lack of adequate assessment of the requirements, no documented specification for equipment and insufficient budget allocation for waste management. Theft of containers is also a problem.

The lack of management control results in a "liaise faire" type of management where the level of supervision and enforcement of the 'norms' rests with the individual unit supervisors.

There is no standard for segregation and the only attempt at segregating is with sharps that are placed into cardboard boxes, old re-used sharps containers with no lids, plastic and glass bottles. The lack of suitable containers, leads to the emptying of sharps containers for re-use. No colour coding system is used to aid segregation practices and no differentiation is made between health care risk waste and health care general waste.

A limited number of thin 110 litre black liners are made available and these are used sparingly for both risk and general waste due to cost and availability. A selection of plastic containers, black rubber dustbins and cardboard boxes are used to contain the waste. No differentiation is made for containers used for risk or general waste.

Left over food and food waste from patients, visitors and the general public is a problem in the hospital as it is frequently deposited into the wrong containers or left lying on the floor. There is an attempt to place left over food into plastic buckets that are removed from the areas in an undisciplined and random manner. No one is sure where the food goes!

The Orderlies carry out the collection routines for waste from the areas in an undisciplined way. There are no documented routines and each individual ward or area will place the waste at the collection points at times that suit their workload rather

than the most efficient collection times. This leads to problems such as the locked incinerator gates, waste left for long periods at the collection points and the indiscriminate dumping of waste.

A variety of unsuitable trolleys such as wheelchairs, cylinder trolleys and two wheeled trolleys are used for the transportation of waste within the hospital, as there is no other means for transporting. Each unit is responsible for their waste and must provide the means for the Orderlies to get the waste to the collection and treatment areas.

The waste generated from the hospital is treated in two ways – incineration on site and transport to landfill.

The incinerator is operated five days in the week. The incinerator temperature control and timer do not work as the service provider had disconnected them. This was done as the sensitive temperature and timer controls kept malfunctioning. Consequently the incineration process is compromised, as the temperatures reached do not ensure adequate destruction of the waste. Two persons operate the incinerator in shifts and although protective clothing is issued, the operators do not use it. A number of reasons can be cited for this: 1) unsuitable equipment, 2) no understanding of the need 3) lack of supervision and discipline. Ash is dumped outside the building, as there is no system in place for the collection of the ash.

The transportation of waste off the site by the Municipality is carried out three times a week. The waste is collected and placed at two collection points alongside the entrance and exit gates for easy access by the municipal trucks. An assortment of black bins, plastic bags, boxes and other containers are left in the area for collection.

Both the waste taken to the incinerators and that left for collection is mixed health care risk and general waste. On the days that the municipality does not collect, all the waste is taken up to the incinerator for burning. Sharps, infectious and other hazardous waste such as fluorescent tubes, pressure cans etc. are also found mixed with the paper, cardboard and other general household waste for collection by the municipality.

Within the hospital, basic general hygiene is cause for concern. The areas in and around the waste containers are unhygienic and there are no documented routines for regular cleaning and sanitising of the area. The foam mattresses used and stored in the wards are uncovered and badly stained. General Infection Control standards are not practised. There is no infection control responsibility allocated and no documented standards in place.

Protective Equipment is issued, but is on occasion inappropriate. Latex gloves are readily available and rubber gloves are issued to the incinerator operators. Paper masks are available. The protective clothing is often not used as there is training given nor supervision and disciplined applied.

The buying of protective equipment, bins, and liners is done through the Stores Department. There are no tender specifications available for the procurement of suitable equipment for the containment of waste. There appears to be limited funds available, particularly for the supply of liners, bins and sharps containers.

There is an in-service training department at Mbabane Government Hospital. However, no training is conducted on waste management or infection control.

3. ISSUES AND PROBLEMS ADDRESS IN TEST PERIOD

Arising out of the detailed survey that was conducted, the following are the critical issues that must be addressed with the implementation of the new system.

3.1 Segregation

It is essential that segregation of waste at generation be carried out. The lack of segregation can be attributed to a number of factors as follows:

No standard in place for colour coding
Non availability of sharps and other containers
Insufficient containers
Incorrect placing of containers
Lack of monitoring and enforcement
Lack of supervision and mentoring
Lack of education and training
"Negligence" on the part of health workers

3.2 Equipment

Colour coding and labelling:
A two colour coding system for HCRW and HCGW is required to assist with the identification of the categories of waste.

Containers:
Containers provided for waste management are insufficient or of poor quality and ill suited for the task.
Sharps containers are not available in Swaziland and previous donations are regularly emptied and reused. Other issues to be addressed are:
The containers are not kept clean.
Lids not secured
Incorrect placing
Containers not secure

Liners:
The supply of liners is spasmodic and totally insufficient for the volumes of waste generated. The liners are presently not of the correct quality for the type of waste generated. Issues to be addressed:
Specifications
Sizes
Quality – strength, durability and environmental friendly burning,

Procurement of Equipment:
There are no specifications for the procurement of suitable equipment. There are problems with the supply of liners and bins and this frequently leaves the hospital

staff unable to manage their waste. Tender specifications and adequate budgeting for the needs of the hospital will need to be investigated.

3.3 Storage Areas

There are no dedicated intermediate storage areas for waste. Individual units use the bathroom, kitchen or sluice areas.

There is no dedicated central storage area. Collection points for the removal of waste by the municipality are unsuitable and unsightly. There is no control and visitors and other unauthorised persons have access to the area.

The Stores area is limited and badly managed with stacking and storage practices that are unsafe and cluttered.

3.4 Transportation

Trolleys:
There is no adequate equipment for the transporting of waste. The trolleys used to transport waste to the incinerator are ill suited for the task and are in a dilapidated state. The new system will address this need with the provision of two internal trolleys and one external trolley.

Roadway:
The roadway leading up to the incinerator is in a bad condition and will need to be graded. A non-corrosive surface will be required to prevent water erosion.

Routines:
Well defined routines for the transportation of waste to the Central Storage Areas and the Incinerator will be devised to ensure that the waste is delivered to the incinerator early enough to allow for adequate incineration time.

3.5 Treatment

The incinerator is in an unsafe condition and is in urgent need of repair. The waste is insufficiently combusted and hot ash is removed from the hearth and placed on a growing pile of ash directly outside the door of the incinerator building. *(Reference "Report ON The Incinerator at Mbabane Government Hospital dated 15th June 2002*)

The responsibilities of the incinerator operators were not clearly defined and no documentation of available on their specific duties and responsibilities.

3.6 Occupational Health and Safety

Occupational Health and Safety standards are not practiced in the hospital. It is not within the scope of this pilot project to address all the sub-standard practices. Those

standards that have a direct impact on good waste management practices will be highlighted and addressed where possible.

Wearing of Protective Clothing:
The system for the issue and use of personal protective equipment/clothing (PPE) is inadequate. No training is carried out on the use of protective equipment and there is little or no enforcement for the wearing of protective equipment.

Manual Handling Techniques:
The Orderlies are required to lift the heavy black bins full of waste and empty it either into the incinerator or into another black bin. No manual handling techniques are followed.

General Housekeeping and Hygiene Standards:
The general housekeeping and hygiene standards throughout the hospital are low and a cause for concern. The cleanliness of the waste storage areas and bins is not carried out regularly. Infectious waste is frequently found lying on the floor, collected in drains and thrown next to bins. Bins are overflowing and the wall and floor areas around are spattered with unknown liquids.

The collection of food for possible 'recycling' is unhygienic and the final destination is not known.

Reporting of Incidents:
There is no system in place for the reporting of incidents. This is of particularly importance with regard to needlestick injuries.

3.7 Infection Control

There is no infection control structure in place. The basic standard precautions for the prevention of cross contamination are not followed.

3.8 Protocols and Codes of Practice

There is no waste management policy or codes of practice in place. The procedures or routines that are presently followed are undocumented, fragmented and generally not well managed. There is no documentation of any of the following:

Roles and responsibilities
Accountability
Protocols and procedures relevant to waste management
Authority with respect to best practice
Coaching and mentoring
Monitoring and enforcement

3.9 Management Control System

There is no management control system in place. Neither senior nor line management carry out regular objective monitoring and evaluation. There is a need to redefine the basic principles of supervision and coaching and thus ensure that the protocols are enforced.

3.10 Skills and Knowledge

The draft capacity development plan dated 4th April 2002 indicated that there is more a factor of "negligence" rather than a lack of knowledge on waste matters. (Refer also to the shortages of equipment that makes it difficult for the staff to comply.)

The skills required for the waste management system are generally of a more manual nature. The introduction of the new system will require basic skills training on the specific requirements for placing, of containers, closing of bags, use of the liners etc.

The Incinerator operators not qualified to operate the incinerator and they have not received any formal training.

4. TEST AREA SELECTION

Although this is a 'pilot project' with a limited time period, there is the general perception and desire within Mbabane Government Hospital that this system will be replicated into the rest of the hospital by the hospital staff after the pilot project is complete.

Six areas have been selected within the hospital for the pilot project. The areas were selected based on two main criteria:

To address as many of the critical issues and risks as possible
To identify a sampling that would be representative of the whole

Conducting the test in this manner will maximise the chances of a successful implementation, but will have some negative impacts.

Limited accumulation of data
Inability to test the sustainability of the system beyond the test period time scales
Inability to test the system throughout the hospital which could lead of serious unforeseen problems
Insufficient training of all hospital staff
Budgetary and capacity constraints preventing the replication of the system into the whole hospital.

The table below shows the areas selected and the reason for the selection:

Area	**Reason for selection**
Theatre - 2nd floor	High risk, tissue/anatomical waste, sharps, infectious waste Intermediary storage requirements within the theatres and in the outside passage Transportation Route is from the back of theatre, past the kitchen, down the internal ramp and out in front on the conference room.
ICU – 1st Floor	High risk, sharps, higher risk of contamination (infection control aspects) Intermediate storage area in the sluice room Transportation down the internal ramp and out in front of the conference room
Ward 18 – Medical 2nd Floor	Medium risk, sharps, infected waste, food waste, general waste Congested ward that includes high level of food disposal, general waste and Nursing trolleys, Transportation Route down the internal ramp and out in front of the conference room
Maternity -	High risk, placentas, foetus, sharps, infected waste, soiled pads

Area	Reason for selection
Ground	Large department that includes patient's disposal of infected waste, nursing trolleys Transportation Route out in front of the hospital
Laboratory – Ground	High risk, cultures, stools, micro plates, blood vials, sharps Intermediate Storage area with the unit Transportation Route in front of the hospital
GOPD – General Out patient Department	Moderate risk to patients and visitors, sharps and infected waste Visitors/patients disposal into black containers New external intermediate storage area created Transportation route to join into route past the conference room

Limitations and Anticipated Problems

The selection of the 6 areas in the hospital will limit the involvement of all the staff of the Mbabane Hospital and result in only a section of the hospital being trained during the first four months. Due to the lack of available funds, the implementation will also go ahead without the construction of the storage areas and the reparation of the roadway to the incinerator to prevent any further delays. This should not impact too greatly on the flow of waste from the generation points to the storage areas, provided the new proposed central storage area and transportation routes are used.

However, problems are anticipated with some sections of the hospital operating on a different system to the rest of the hospital.

Logistical problems with the use of areas and routes prior to proper construction
Transportation problems with the departments using different systems
De-motivation of staff in the areas not included
Confusion with the collection of waste that has not been properly segregated and colour coded
Lack of awareness of the whole hospital of the changes
Perceptions of being singled out and having additional work in test site areas

5. OBJECTIVES OF THE NEW SYSTEM AND TEST CRITERIA

Objectives:
The main objective is to develop and test a new waste management system for the hospital. This will be achieved by:

Providing better equipment and facilities and test its suitability for the Swaziland circumstances
Introducing improved practices and routines used for the disposal of waste
Improving the treatment of waste through better incineration practices
Capacitating and training the staff to manage the system so that it can be sustained and replicated into the rest of the hospital

Mbabane Government Hospital requires a sound basic waste management system that will provide a foundation for further improvements.

The new waste management system will include both the health care risk waste and the general waste, but does not include the disposal of chemicals, heavy metals, expired medication or the recycling of food. Other recycling opportunities are also not addressed.

The monitoring the test sites against the above objectives will be carried out during the entire period and will consist of a combination of the following:

- Meeting minutes
- Reports
- Inspection documents
- Documented protocols and procedures
- Inspection check lists
- Incident reports
- Job descriptions
- Time schedules
- Workshop schedules, attendance registers and minutes

Test Criteria:
Details of how the system will be monitored are detailed under the section 'Evaluation of the Test Sites". Due to the shortened testing time, the criteria will be limited to the following main areas:

- Organisational structure
- System tools
- Skills development
- Inter-relations

6. THE NEW WASTE MANAGEMENT SYSTEM

6.1 Overview

As the Mbabane Government Hospital has no system in place for the effective and efficient management of their waste, the decision was taken that the system to be tested must be very basic and easily managed in the time frame allowed to provide the hospital with a workable solution that can be easily replicated into the whole hospital. This will then form a solid foundation for continuous improvement as and when additional resource capacities are made available over time.

The New Waste Management System includes both HCGW and HCRW. (See Appendix 3 - Waste Categories). Two colours will be used:

Red:	Health Care Risk waste (HCRW)
Black:	Health Care General waste (HCGW)

The following is a brief description of the new waste management system

A liner-based system is economical and easy to manage. Liners of different sizes, microns and two colours are used in a selection of standardised containers and stands. In order to provide sufficient strength, the microns will increase according to the size and type of waste to be contained.

Environmentally friendly re-usable and standardised disposable containers of various sizes and types will be used wherever possible. The number of containers provided has been reduced to the minimum to address the problem of theft. Wherever possible, stands will be fixed to the walls to reduce the threat of theft.

Segregation at generation is critical to the success of this system. The HCR waste is segregated according to the categories of sharps, infectious waste and anatomical. Disposable containers are used for sharps and standardised re-usable containers of varying sizes are placed at strategic positions to ensure that the waste is contained as soon as possible.

Intermediate storage areas will be identified and where necessary construction carried out. All intermediate storage areas in the wards will be equipped with large liners supported by custom-built holders mounted on the walls for the disposal of dry infectious waste. The smaller liners, when full, will be securely closed and placed inside the larger containers. These in turn will be closed when ¾ full and transported by trolley to the central storage areas.

A new Central Storage Area for the collection of general waste will be constructed on the west side of the hospital's main entrance. This area will be equipped with running water and shelving to ensure that the waste is kept in a hygienic manner. The infectious waste will be transported to the Incineration Area and stored there on shelves or bins for incineration.

Two trolleys will be supplied for the collection of general waste from the ward areas for transportation to the central storage area. One larger trolley will be supplied for the collection of the infectious waste and sharps to be transported to the incinerator.

The Incinerator will be upgraded to ensure that the waste is incinerated at sufficiently high temperatures to ensure complete destruction of the pathogens. The Ash will be deposited into black plastic bags of sufficient micron to ensure that the ash is safely contained for transportation to landfill.

6.2 The Principles used in the selection of the New Waste Management System

The waste produced within a hospital carries a high risk of infection and injury. Safe and reliable methods for its handling are therefore essential as inadequate handling can lead to exposure for workers, patients and the general public.

Three key principles applied are:

- The legal framework presently existing in Swaziland e.g. National Waste Management Strategy, the Environmental Management Bill, the Environmental Authority Act, the Public Health Act and the Waste Regulation 2000. This strategy requires all generators of waste to have a duty to care and be responsible for the hazardous waste generated within their areas. The concept cradle to grave is also entrenched into the legislation and includes collection at source, transportation, storage, destruction and final disposal.

- A multi disciplinary approach with interaction at all levels within the hospital. This framework used includes responsibilities, the quality and quantity of staff, the existing skills and the equipment.

- Segregation at source is a key requirement in this process. The provision of sufficient colour coded and labelled equipment will ensure that this is carried out as efficiently as possible. The minimum handling of waste will reduce the exposure of workers to infection and injury.

The key working principles used in the development of the new waste management system are:

The implementation of a management system that includes self regulation and enforcement

- Local procurement wherever possible to enable sustainability and reduce costs
- Containment of costs wherever possible
- Strict protocol for segregation using colour coding
- Reduction in manual handling were applicable
- Improved infection control and hygiene standards

Two waste streams will be included – general waste for collection by the local authority and risk waste for incineration on site

This development plan does not make provision for chemical disposal, heavy metals, expired medication or food or other recycling opportunities. This can be addressed once the basic principles for waste management have been established in the whole hospital.

6.3 Process used for Decision Making

A Waste Management steering committee was formed comprising representatives of SEA, MHSW, Local Municipality, Hospital representatives from senior and line management, biomedical department, stores and cleaning.

A participative process was followed with the members of the Waste Management Steering Committee. A presentation was given on the proposed new system on 7th December 2001 and three task teams were assigned to look at the three aspects of the system as follows:

(Extract from minutes dated 7th December)

No.	Activity	Champion and other suggested team Members	Outcomes
Task Team No. 1.	Decision on equipment for the test pilot sites	Matron Mbambo (Representatives from Laboratory, theatre, ICU, Maternity, doctors rooms, general wards)	• Select the sharps containers for the test areas • Select the company to provide bin liners • Select the types of reusable containers • Agree on whether wall holders will require lids • Discuss how sharps containers can be secured to a nursing trolley • Agree with Task Team 2 on the intermediate storage areas in each wards

No.	Activity	Champion and other suggested team Members	Outcomes
Task Team No. 2.	a)Transportation Routes and Organisation.	Vusie Dlamini – Biomed H. Nxumalo – Stores E. Dlamini – Sen. Orderly I. Haddoe – Maternity	• Identify weak areas in existing transportation system with orderlies. Suggest improvements • Agree on optimal routes • Set up an organisational structure. • Determine timing and schedules that give the most efficiency
	b) Designing transportation trolleys		• Discuss options with the Engineer • Agree on the preferred option
Task Team No. 3	Designing of storage areas	Biomed workshop	• Agree a design for the central storage area

The members of the teams agreed to meet to decide on the various aspects of the system as presented in the Options ***(See appendix 3a Options for Decision Making).***

The decisions are recorded in a subsequent meeting held on 5th February.

6.4 Classification of Waste

The terminologies used in this document follow the guidelines given by the World Health Organisation.

The Waste Regulation 2000 classifies waste as follows:

- Special Waste means hazardous waste and clinical waste
- Hazardous waste is listed in Part I of Schedule Three
- Clinical waste includes microbial waste such as cultures and stock of infectious waste, human blood and blood products, pathological wastes of human origin, body parts and bedding which have been exposed to infectious agents.

For ease of reference and clarity, the WHO system of categorising waste will be used in this document with reference to the regulations when significant.

Health Care Waste (HCW) is divided into two main categories viz. Health Care General Waste (HCGW) and Health Care Risk Waste (Special Waste – Regulation 2000) (HCRW)

Health Care Risk Waste (HCRW): (also included under the term Special Waste in the Swaziland Regulation 2000)

Health Care Risk Waste (HCRW) is considered to be the hazardous component of Health Care Waste (HCW) generated within the hospital. HCRW has the potential for creating a number of environmental, health and safety risks, depending on the particular type of HCRW that is handled as well as the way in which exposure takes place.

Examples of HCRW include:

Infectious Waste:	All kinds of waste that is likely to contain pathogenic Micro-organisms.
Pathological Waste: (Anatomical)	Includes parts that are sectioned from the body
Sharps:	Includes sharp and pricking objects that may cause injury
Chemical Waste:	Includes all kinds of discarded chemicals, including pharmaceuticals that pose a special risk to human health and environment
Radioactive Waste:	Includes solid, liquid and gaseous waste contaminated with radio nuclides

Health Care General Waste (HCGW):
Health Care General Waste (HCGW) is the non-hazardous component of HCW from health care facilities that includes many of the same substances as domestic waste. HCGW is generated among others during the administrative and housekeeping functions of health care facilities as well as from patients and visitors. HCGW may include a number of recyclable materials

Examples of HCGW are:

- Packaging materials e.g. cardboard boxes, plastic bags, clean packaging from needles, syringes and IV lines
- Kitchen Waste: e.g. organic waste and packaging materials
- Office Waste: Paper, cans, food wrappings, glass bottles etc.
- Patient waste: similar to household waste
- Garden Waste: organic waste from garden activities
- Building and construction waste: from construction and demolition work

(Refer also to Appendix 2 – Waste Categories at Mbabane Hospital)

6.5 Colour Coding and Labelling

The colour coding will be:

- Red for infectious waste
- Black for general waste.

Internationally recognized labelling and symbols used are shown in the table below:

Biohazard symbol for HCRW	
Recycling	
Health Care Radio-active Waste	
General Waste	

6.6 Segregation

Strict segregation of waste at source is the key to the success of the system. Although the microns for the liner-based system will be increased to provide a greater degree of protection in the case of miss-segregation, it is essential that the focus for coaching and training must be on segregation.

The categories of waste will be disposed of as follows:

<table>
<tr><th>Infectious waste placed into red liners</th><th>Sharps and Anatomical waste are placed into containers</th><th>General Waste is placed into black liners</th></tr>
<tr><td>Waste materials possibly contaminated with body fluids</td><td>Sharps containers</td><td rowspan="4">Packages, boxes, wrappings
Newspapers, magazines, disposable plates, cups, utensils, food, food packaging, drinks containers, tissues, paper towels, flowers, intravenous bottles, packs</td></tr>
<tr><td rowspan="3">Gloves, gowns, masks, gauze, dressings swabs, spatulas
sump tubes, suction canisters, disposable bowls and containers used for medical purposes
Haemodialysis tubing, intravenous IV lines, bags, Foley catheters, sanitary napkins, incontinence pads
Pre-treated highly infectious waste from medical laboratories, isolation patients, nappies, diapers, body parts</td><td>Needles, needle and syringe assemblies, lancets, scalpels, blades, scissors, sutures, specimen tables, broken glass ampoules, intravenous catheter, glass slides, cover slips</td></tr>
<tr><td>Other leak proof containers</td></tr>
<tr><td>Blood bags, blood vials, Human tissue, placenta</td></tr>
</table>

Health Care Risk Waste (Special Waste):
Health Care risk waste carries a high risk of infection and the spread of disease through contamination with body fluids. Other types also include hazardous chemicals, and pharmaceuticals. This waste is deposited into rigid disposable containers or red liners for incineration

The table below shows the category of HCRW with the disposal method and treatment:

Category	**Types of Waste**	**Disposal Method/ Containers**	**Treatment**
Human Anatomical (Pathological)	Body parts, human tissue, blood, foetuses, placentas	Containers with red liners	Incineration with final disposal of ash to incineration and then landfill
Infectious	Items contaminated with blood and other body fluids (cotton, dressings, bandages, linen that may contain pathogens Tubing, catheters, IV tubes Laboratory: human cultures, stool and sputum samples, micro biological plates, live and attenuated vaccines	Red Liners Autoclaving and disposal into containers with red liners	
Sharps	Needles, syringes, scalpels, blades, glass etc. that can cause puncture and buts. This includes both used and unused sharps.	Rigid sharps disposable container	
Hazardous Chemicals	Disinfectants, insecticides, cleaning materials x-ray chemicals solvents	Generally disposed of through the waste water stream (Better methods encouraged after initial stages of basic segregation has been applied)	Waste water stream

Other Hazardous Waste:

These wastes are hazardous, but cannot be included with the risk waste that goes for incineration and therefore must not be placed into red bags. They are included in the initial stages with the general waste stream with a recycle opportunity at a later stage.

The table below shows other hazardous waste with the disposal method and treatment:

Category	Types of Waste	Disposal Method/ Containers	Treatment
Pressurized Containers	Air freshener, spray cans, insecticide, gas canisters – full or empty	Black bins	Landfill
Heavy Metals	Batteries, blood pressure gauge thermometers, manometers, mercury, silver, lead	Recycle opportunity	

Health Care General Waste:
This is very similar to household waste, as it does not contain body fluids and other infection spreading microbes.

The table below shows the types of HCGW with the disposal method and treatment:

Category	Types	Disposal Method/Containers	Treatment
Food	Green waste from the kitchen (bio-degradable) peels, tea bags and other natural uncooked waste Waste food from patients	Black bags Can be used for compost Black bags	Landfill
Paper	General office waste, wrappings, packaging, wrapping, cardboard, cartons, boxes	Bag holder (Recycle opportunity)	
Non Clinical Glass	Cool drink bottles, uncontaminated glass, glassware	Black bins (Recycle opportunity)	
Tins/cans	Cool drink cans	Black bins (Recycle opportunity)	

The table below shows the types of waste generated by each of the test site areas:

Theatre	Sharps, human tissue, infected waste
Maternity	Sharps, placentas, infectious waste, soiled pads, food
ICU	Sharps, infectious waste etc.
Ward 18 Medical	Sharps, infectious waste. general waste, food
Laboratory	Blood vials, stools and micro plates, infectious waste
OPD	Sharps, infectious waste general waste

6.7 Equipment

The table below describes the type of waste and the proposed method of cantainerisation in the new waste management system:

Type of Waste	**Containers**
Sharps	8 litre impenetrable, rigid rectangular sharps container with horizontal loading facility and securely fitted lid Tall sharps container for long sharps
Human Tissue	10 litre leak proof disposable container used with or without liners
Infectious Waste,	40 litre Nursing Trolley Bag holder, 12 and 20 litre pedal bins, 40 litre wall hanging bag holders, 85 litre red bins; 110 litre wall holders
Blood vials, cultures, stools	10 litre leak proof plastic disposable container
General Waste	40 litre Wall hanging bag holders, 85 litre black bins, 110 litre bag holders
Food Waste	With the general waste

6.8 Quantities of Equipment

The equipment requirements were difficult to estimate as there was no reliable information on the volumes and weights of waste generated per unit.

The table below shows the quantities estimated for per test site area for the period of 4 mths:

Area	5 lt sharps	10 lt sharps/ HT	5 lt 70 cm tall sharps	Kick about trolley	12 lt black pedal	12 lt red pedal bins	20 lt red pedal bin	20 lt black pedal bin	8 l Wall Mount Red Bins	Small Black Hang	Small Red Hang	85 lt Black GW Bin	85 lt Red Bin	Large Black Hang	Large Red Hang	Nursing T. Bag Holder	Green Food Bin	46 x 43 Red Pedal & Trolley	56 x 66 Black Hang	56 x 66 Red (N.T. & Hang)	75 x 90 Black (Bin & Hang)	75 x 90 Red (Bin & Hang)
Ward 1-4 Maternity	8	3		3		7				8		2		2	4	5		44	8	10	4	4
Ward 11 ICU	1		1	2	1	2								1	1			4	1		1	1
Ward 18 Female Medical	2									4		2	2			2			4	4	2	2
Theatre/Casualty	8	3	4	5	2					2	3	5	3		5	7		50	4	20	5	8
Out Patients & TB Clinic	12					3			10	4		4			1	3		28	8	6	4	1
Laboratory	2	1					5	4				1	1						4	5	1	1
TOTAL	33	7	5	10	3	12	5	4	10	18	3	14	6	3	11	17	0	126	29	45	17	17

The amounts were estimated on the following daily requirements

Sharps	50% replacement
Placentas	10
Nursing Trolley Liners	2/day
Kick about trolley liners	10/day
8 litre red handing and pedal bin liners	2/day
Large black and red hanging liners	1/day

The table below shows the quantities of 85 Litre Black and White bins allocated in the areas:

Area	Charge Sr/HOD	Black	White
Ward 1-4 Maternity	Sr. Abigale Shongwe	2	2
Ward 6 Female Private	Makhosazana Ndlovu/Maria Mayisela	1	
Ward 7 Isolation/Security		1	1
Ward 8 Children's	Sr. Marie Dlamini	1	1
Ward 9 Gynaecology	St Julia Ziyane/Sr Futhie Dlamini	1	
Ward 10 Female Surgical & Ortho		1	
Ward 11 ICU	St Lindiwe Dlamini/Sr Nomsa Malinga	1	1
Ward 12 Male Medical	Sr. Falatsa Zwane	1	
Ward 13 Male Private	Makhosazana Ndlovu/Maria Mayisela	1	
Ward 15 Male Surgical	Sr Elizabeth Shongwe/Albetina Shongwe	1	
Ward 16 Male Orthopaedic	Sr. Hectorine Malinga	1	
Ward 17 High Care	Sr. Monica Hlatshwayo	1	
Ward 18 Female Medical	Sr. Elizabeth Nxumalo	2	2
Theatre/Casualty	Sr. Monica Nsibande	5	2
Out Patients & TB Clinic	Sr. Ndzabandzaba	4	
Full pay Out Patient & Dental	Sr. Nomsa B Dlamini	1	
Laboratory		1	1
x-Ray	Timothy	1	1
Total		27	11

6.9 Equipment Specifications

The specifications for the equipment for HCRW are in accordance with international standards. The following principles have been applied:

- Puncture proof and leak proof rigid containers
- Polyethylene/polypropolene plastic for cleaner burning
- Linear low density virgin plastic for liners
- Sizing according to need (daily removal of infectious and anatomical waste)
- Micron in liners increases according to size
- Tensile strength to hold maximum of 20 kg.

Three sizes and two colours of liners manufactured to the following specifications

- 43 x 46 red @ 60 micron
- 56 x 66 red @ 75 micron
- 75 x 90 red @ 90 micron
- 75 x 90 black @ 60 micron
- 56 x 66 black @ 30 micron

(***Details of Equipment Specifications and Supplier's names and contact numbers are found in Appendix 4(a) and (b))***

6.10 Storage Areas

Intermediate Storage Areas:
The intermediate storage area is a temporary storage area attached to the unit. It is here that the larger bins or wall-mounted holders will be placed. The smaller liners from the various collection points are sealed and placed inside the larger liner or bin and kept in this area until it is removed to the central storage area.

The table below gives the intermediate storage areas as identified for the 6 test site areas.

Area	Intermediate storage area
Theatre	2 rooms linked to the theatres, outside Passage,
Casualty	Sluice Room for risk waste and room in passage for general waste
Maternity	Corridor area outside delivery rooms, Room opposite post natal
ICU	Sluice Room
Ward 18 Medical	Courtyard outside ward – New area to be portioned off
Laboratory	'kitchen' area
OPD	New storeroom cleaned out and demarcated as storage.

Central Storage Areas:
The central storage area is where the Orderlies take the larger, sealed liners and containers to await either collection by the local authority or destruction through incineration. Two areas have been identified. One for the storing Health Care General Waste for collection by the local authority and the other is within the incinerator building.

The Central Storage area for the Health Care General Waste is identified on the plan and lies west of the main building just below OPD. It is situated on the main access road through the hospital grounds and provides easy access for both the hospital and the Municipal collection truck. The area is roughly triangular in shape and presently has a sloping walled area to a maximum of approximately 1 metre at the back. Construction work is required to secure the area and provide sufficient drainage and protection from the elements. Public Works are preparing a plan. The completion of this work is not anticipated during the test period. The test sites will go ahead using the area as it presently stands.

Waste Equipment Storage:
A secure area is required for storing the consumable items such as liners and sharps containers etc. for distribution to the units as required. This room has

been identified as a dedicated storeroom behind the new kitchen. It has been fitted with well-constructed, strong shelving and is lockable. The Storekeeper is responsible for the stock control and security of the equipment.

6.11 Transportation

Internal Transportation Trolleys:
Three transportation trolleys are to be tested. The proposed trolleys have four sides of mesh wire with a solid base. Two trolleys have been fitted with four swivel wheels for transportation inside the hospital. One trolley has been fitted with wheelbarrow wheels and a turning front handle for transportation to the incinerator. This trolley also has an opening at the back for easier loading. Approximately 8-10 bags of 15 kg each can be loaded. The trolleys have been hot dip galvanised for protection against rust and are silver in colour. A braking mechanism has been fitted to two casters on each of the internal trolleys. No brake has been fitted to the external trolley. Two persons are required to take the external trolley to the incinerator.

Transportation Routes:
The transportation routes are also indicated on a site plan on the hospital.
The table below shows the proposed transportation routes for the six test site areas:

Area	Proposed transportation route
Theatre/Casualty	From the back passage, past the kitchen, down the ramp and out in front of the conference room.
Maternity	From both passages, around the building on the east side and out in front of the hospital.
ICU	From the sluice room, down the ramp and out in front of the conference room
Ward 18 Medical	From the Courtyard, through the ward, down the passage to the ramp and out in front of the conference room
Laboratory	Carried from the sluice room to the trolley outside, along the front of the hospital
OPD	From the proposed storage room, to join the route on the west side of the hospital.

6.12 Treatment

Incinerator Reparation:
For the development of an effective and sustainable waste management system, the incinerator has been upgraded to have an additional burner installed and the replacement of the control panel. The chimney cannot at this stage be repaired due to

budgetary constraints. Operating tools and a new wheelbarrow are however supplied.

The additional burner will result in more diesel being consumed, especially initially until better segregation practices are introduced throughout the hospital. The unsafe conditions around the storage of diesel will need to be addressed through the suppliers. The possibility of an additional tank is also being investigated. (*refer to "Report on the Incinerator at Mbabane Government Hospital dated 15 June 2002)*

Additional lighter plastic bins have been provided to improve the storage practices and address to some extent the manual handling problems.

No plan has yet been made to address the lack of toilet and wash up facilities.

Removal of Ash:
The Local Authority has removed the accumulation of ash from outside the incinerator. The ash from the burner process is in future to be scraped out every morning and placed into a plastic bag for removal by the local authority.

Training of Incinerator Operators:
Two incinerator operators have received training on the operation of the incinerator.

Responsibilities and job description:
New responsibilities and the duties with a detailed job description for the incinerator operators have been drawn up. *(Refer to Report on Incinerator at Mbabane Government Hospital dated 15 June 2002)*

6.13 Occupational Health and Safety

Issue and Wearing of Protective Clothing:
Protective clothing such as long asbestos gloves, apron and visor will be supplied to the incinerator operators. A protocol will be drawn up for the issue and use of protective clothing. Coaching, supervision and enforcement will be required to ensure that all personnel wear the protective clothing.

Manual Handling Techniques:
Where possible the size of the containers and liners will be limited to a maximum of 12 kgs. Overloading of the trolleys will need to be controlled, particularly with the risk waste trolley that is taken up to the incinerator. Two persons must always use this trolley. Lifting techniques will need to be coached and protocols written for the correct lifting techniques and use of the trolleys.

General Housekeeping and Hygiene Standards:
Protocols for the hygiene standards will be drawn up. Coaching, supervision and enforcement will be required to ensure that better housekeeping and hygiene standards are adhered to. The collection of food for re-distribution will be stopped and waste food will be included with the general waste stream for removal by the local authority

Reporting of Incidents:
A protocol for the reporting and investigation of incidents, as well as the management of exposure to blood-borne pathogens will be drawn up. Coaching, supervision and enforcement will be required to ensure that the standard is adhered to.

6.14 Infection Control

The hospital has recently established an Infection Control committee to address the infection control standards and protocols. This committee comprises hospital members and doctors.

6.15 Organisation and Responsibilities for the Test Period

Waste Management Officer WMO

The management of the new waste management system during the test phase requires a dedicated person to champion the changes on a daily basis. This person has been provided on a full time basis from the Department of Health Education for the period of the project. His duties are to:

- Oversee the implementation of the new waste management system on a daily basis
- Convene meetings of the Task Teams
- Assist with knowledge and skills training
- Ensure the correct quantities, placing and application of the equipment is provided
- Assist with monitoring and evaluation of the system
- Give on-going advice and coaching on the new system
- Assist with the planning for the replication of the system into the hospital

Hospital Management:
The responsibility for the implementation of the new waste management system rests with the senior management of the hospital. During the Test Phase, these responsibilities will be managed through the formation of two task teams, viz. Test Task Team and Training Task Team. These task teams will comprise of Senior Management and Line management from the selected areas who will be accountable for the outcome of the project. Representation is also required from the Orderlies, Incineration, in-service training, engineering and stores.

Test Task Team:
The Test Task Team is accountable for the outcome of the implementation process. They will play a major role in the implementation into the selected test areas and for the roll out into the rest of the hospital. They will be responsible for the implementation plan. In general their duties include:

- Devise a plan for the implementation that will include target dates

- Define the individual responsibilities for Nurses, Orderlies, Doctors and Management.
- Ensure equipment and containers are readily available and in place
- Make staff available for education and training.
- Identify problems and actively seek solutions
- Monitor the progress of the process
- Assessing and evaluating the success of the system

The table below shows the individual responsibilities for the different disciplines:

Discipline	Responsibilities
Nursing	Estimation of size, quantity and placing of containers Estimation of numbers of liners Training/Coaching in standards Monitoring and Evaluation of segregation, collection and transportation within their units Enforcement of standards
Engineer	Procurement of trolleys and bag holders Fixing bag holders to walls Maintenance of holders and trolleys
Stores	Procurement of containers, liners and other equipment Storage and control of stocks Daily distribution of containers and liners Procurement of protective equipment Distribution of protective equipment
Senior Orderly	Scheduling of orderlies including incineration staff Allocation of duties and job descriptions Training and Coaching in the standards Enforcement of the collection standards Monitoring of transportation routes Monitoring of transportation times and schedules Evaluation of the transportation system and training
In-Service Training	Training and Coaching in the standards Evaluation of the training and application of the standards

The Team members are as follows:

Matron G.T. Mbambo	Nursing
K. Simelane	In-Service Training
Sr. A. Shongwe	Maternity
Sr. Nsibandze	Theatre
Sr. Nxumalo	Ward 18
Sr. Lindiwe Dlamini	ICU
Sr. Ndzabandzaba	General OPD
Ms. Makhosazana Tsha-balala	Laboratory Stores
Mr. H. Nxumalo	Cleaning Department - Orderly
Ms. D. Dlamini	Biomedical Engineering

Training Task Team:
This training task team will form the basis for the sustainability of the project and will give stability to the process. It will form the nucleus for communication and on-going training throughout the year. The Training Task Team comprises of In-service Training Department, Senior Nursing Personnel, Senior Orderly, Waste Management Officer, and Health Education Department.

Training Task Team Responsibilities in general include:

- Interact with the Test Task Team during the implementation
- Identify the categories of staff to be trained
- Devise the training material to ensure maximum effect for the cadres of staff
- Plan the most effective way to communicate the message
- Monitor the progress of the implementation and the on-going monitoring of the system

The Training Task Team members are as follows:

Sr. Matron Mbambo	Nursing
Sr. K. Simelane	In-Service Training
Mr. B. Sgundla	Waste Management Officer
Mr. D. Mamba	Health Education
Mrs. D. Dlamini	Senior Orderly

6.16 Capacity Building and Training Programme for the Test Period

Identification of Performance Gaps:
A detailed capacity building survey has been carried out to establish the performance gaps. *(Refer to: Draft Capacity Development Plan dated 04.04.2002)* The following areas were identified

- Knowledge
- Skills
- Changing attitudes and behaviour
- Inter-relations
- Technology Gaps

Within the time scales of the project, the capacity development programme will address the knowledge, skills and technology gaps for the implementation of the waste management system. Where possible, the inter-relations, attitudes and behaviour will be covered as it applies to the waste system. This focussed approach will be directed only at the personnel within the test sites during the testing phase.

The pilot project cannot be responsible for initiating a paradigm shift in how the hospital is managed. There is too little time available for instruction and application of basic supervisory and coaching skills required and the hospital management will need to budget and plan for this to take place.

The following charts detail the performance gaps identified in the knowledge and skills categories:

Staff Category	Performance Gap	Documents Required	Delivery Methods
Management and Admin Supervisory Staff and Stores (1)	Health care risk waste management Occupational health and safety General and personal Hygiene Colour Coding and Segregation General knowledge about the new waste management system and rules for its well functioning General knowledge about the codes of practice related to waste management General Knowledge on the hazards of waste General Hygiene and Infection control standards Procurement Procedures, stock control and budgeting Supervision and coaching methods Monitoring and Evaluation Techniques Inspections, reporting of incidents, auditing General Knowledge of Contingency planning	Manual, Overheads, Visual aids, pamphlets, flyers,	Formal presentations at Departmental Meetings Display of different aspects of the waste management system e.g. *Generation/Segregation - nursing* *Containerisation – stores* *Storage, Central and Intermediate – Senior Orderlies* *Transportation - Orderlies* *Incineration – Incineration Operators*
Doctors, Allied, Nurses, Orderlies, Incinerator Operator	Health care risk waste management Colour Coding and Segregation Occupational health and safety General and personal Hygiene General knowledge about the new waste management system and the rules for its well functioning General knowledge about the codes of practice related to waste management General Knowledge on the hazards of waste	Manual, Overheads, Visual aids, pamphlets, flyers,	Formal presentations at Departmental Meetings Display of different aspects of the waste management system e.g. *Generation/Segregation - nursing* *Containerisation – stores* *Storage, Central and Intermediate – Senior Orderlies* *Transportation - Orderlies* *Incineration – Incineration Operators*
General Public and Patients	Occupational health and safety Hygiene	Visual aids, flyers	Admission discussion, coaching

Skills

Staff Category	Performance Gap	Documents Required	Delivery Method
Management and Admin Supervisors (1)	Contingency planning for strikes and absenteeism Supervisory and coaching skills Capping sharps container by stores officers Incident Reporting planning Monitoring systems	Policy/Procedure, flyers, cards Manual Visual Aid Policy/Procedure Check lists	Discussion groups Formal workshop Demonstration, orientation Flyers, flow charts discussion Coaching, discussion groups
Doctors	Using new sharps containers Proper sharps disposal method Proper use of the new equipment (fitting liners, tying up bags etc.) Proper use of different types and colours of plastic bags Supervisory and coaching skills Capping and sealing of sharps containers	Visual aids and pamphlets Manual	Demonstration, orientation Formal Workshop Demonstration, orientation
Allied	Using new sharps containers new cleaning routines Proper sharps disposal method Proper use of the new equipment (fitting liners, tying up of bags etc.) Proper use of different types and colours of plastic bags Capping and sealing of sharps containers How to handle emergency situations	Visual aids and pamphlets Policy/Procedure	Demonstration and orientation Cards, coaching, orientation
Nurses	Using sharps containers Proper sharps disposal method Capping and sealing sharps containers Proper use of different types and colours of plastic bags Using the Nursing Trolley Bag Holder Proper use of the new equipment (fitting liners, tying up of bags etc.) Using Protective Equipment Cleaning and upkeep of equipment Washing Hands How to handle emergency situations New Incident reporting procedures	Visual aids and pamphlets Policy/Procedure	Demonstration, Orientation
Nurses	Supervisory Staff Supervisory and coaching skills for Unit Sisters and Senior Nurses	Manuals Policy/Procedure, flyer.	Formal Workshop Discussion groups, coaching

Staff Category	Performance Gap	Documents Required	Delivery Method
	Equipment ordering and securing of stock New Incident reporting procedures New Monitoring systems	Flow charts Policy/Procedure, Checklists, Manuals	Discussion groups, coaching
Orderlies	Trolley operation -loading and lifting routines Capping and Sealing of sharps containers Proper use of different types and colours of plastic bags Proper use of the new equipment (e.g.fitting liners) Recording and weighing of waste New cleaning routines Cleaning of intermediate storage rooms Cleaning and upkeep of equipment Washing Hands and personal hygiene Using protective clothing How to handle emergency situations Incident Reporting Proper management of the central storage areas	Visual aid, pamphlets Policy/Procedure,	Demonstration, coaching, discussion groups
Incineration Operator	Proper use of different types and colours of plastic bags Capping and sealing sharps Containers Incinerator operation Incinerator loading Incinerator maintenance Incinerator area upkeep Cleaning and upkeep of equipment Trolley operation and loading and lifting routines New collection routines Weighing and Recording Routines Using protective clothing How to handle emergency situations Incident reporting Proper management of Storage area	Visual aid, pamphlets Operation Manual Procedures Pamphlet Charts, Flyer	Demonstration Formal training Discussion groups Demonstration, coaching

Training Plan:

The training plan comprises of five phases:

- Orientation Phase One
- Orientation Phase Two
- Orientation Phase Three
- Knowledge Training
- Skills Training

a) <u>Orientation Phase One:</u>

The objective of phase one is to:

1. inform decision makers and stake holders of the waste management system
2. highlight the importance of following protocols and the monitoring against the codes
3. discuss and agree on time schedules for tainting

The Orientation Phase One is the first stage in the training programme and should be completed first

b. Orientation Phase Two:

The objective of phase two is to:

- inform Heads of Departments and the staff of the test site areas of the waste Management system
- highlights the importance of following protocols and the importance of good management control.
- discuss and agree on time schedules for training

The Orientation Phase Two is facilitated by Hospital Senior Management and thereby re-enforces their understanding and demonstrates their commitment to the process

c. Orientation Phase Three:

The objective of phase three is to:

- To sensitise the whole hospital of the elements of a good waste management system
- Re-enforcing the knowledge and skills training conducted within the test site areas.
- To prepare the hospital for the roll out into the rest of the hospital

Orientation Phase Three should be completed **after the knowledge and skills training** have been conducted in the test site area. The demonstrations are carried out by members of staff from the test site areas and thereby re-enforce the training.

d. Knowledge:

The objective of the Knowledge Training is to:

- inform all the staff directly involved in the test site areas on the principles of good waste management and general knowledge on the new waste management system
- inform all the staff directly involved in the test site areas on their roles and responsibilities with regard to good codes of practice in waste management

The knowledge training should be conducted **before the Skills training** and can be facilitated by an experienced training who has a general understanding of the waste management system

e. <u>Skills:</u>

The objective of the Skills Training is to:

- equip the staff in the test site areas to use the system effectively

The skills training should be conducted **after the knowledge training**. It is an intensive individual practical tuition that will capacitate the staff to use the equipment properly and should be facilitated by a person knowledgeable in the waste management system.

*(Details of the Plan are found in **Appendix 5 – The Training Plan)***

6.17 Implementation of new procedures and codes of practice

A forum of senior managers, unit managers from the test sites, in-service training and the WMO will write and approve the protocols for the new waste management system. This will be done through a series of workshops.

Policies, Protocols and Procedures written will cover all aspects of waste management and will include a monitoring and evaluation process with defined responsibilities and accountabilities.

The table below describes the protocols to be written against the area of responsibility:

Area of responsibility	**Protocol**
General – Nursing	Segregation – Colour Coding & labelling Waste Disposal – anatomical, chemical, sharps, food etc. Sharps Cleaning up of d bio-hazardous spills Incident Reporting and Investigation Needlestick injury management COID reporting and management Issue and use of Protective Equipment Lifting techniques Cleaning of bins and Trolleys Collection routines and transportation Emergency Preparedness
Stores	Safe Storage of waste Safe storage of equipment Procurement of Equipment Distribution of Equipment
Monitoring	Conducting Inspections/audits Task Observations Medical examinations
Training	Induction of new personnel Training Awareness

6.18 Waste Management Control System

There is no documented management control system or quality system operational in the hospital. This makes the task of introducing a waste management control system difficult, as there is no existing structure to tie into.

The following are the suggested requirements for an effective management control system that includes monitoring and evaluation. Only the critical elements directly related to waste management can be addressed in the short period of the pilot test. The sustainability of the new waste management system is dependant on a good management control system being introduced over a longer time period

Elements of a good waste management control system include:

Develop the Waste Management Control System

- Develop Management Frameworks
- Report Incidents
- Manage Hospital Premises
- Manage Housekeeping and Hygiene
- Ensure Personnel Protection
- Maintain Equipment
- Emergency Preparedness and Security.

Measure the Waste Management System

- Investigate all waste related Incidents
- Analyse Waste Statistics
- Carry out Monthly Inspections.
- Do Task Observations
- Conduct Management Self Audits
- Carry out Medical Examinations
- Do Environmental Monitoring
- Do a Systems Review

7. BUDGET ESTIMATES

The funding of the pilot project will be jointly provided by the donor funds, The Swaziland Environmental Office and the Hospital. Funds have been allocated as follows:

- Provision of equipment into 6 test site areas for four months — Donor funds
- Provision of posters, pamphlets and t-shirts — Donor funds
- Reparation of the Incinerator: — Donor funds
- Repair of Roadway — SEA funds
- Construction of New Storage areas: — SEA funds
- Provision of equipment after first four months: — Joint SEA and hospital
- Provision of equipment into the rest of the hospital: — Joint SEA and hospital

(See Appendix 6(a) for Notes of Meeting held in Administrator's office on 8th February 2002).

The budget for the 6 test site areas for an approximate period of 4 months is detailed in Appendix 6 (b). A draft budget for the provision of equipment into the whole hospital is based on the estimations made in the early stages of the pilot project. These are detailed in Appendix 6(c). The assumptions made during the development of these budget figures are given in Appendix 6(d).

The table below shows the summary of the budget for the provision of equipment for the test period:

Estimated Fixed Costs		
Reusable Containers	10,195	
Equipment	16,892	
Incinerator Repair	37,324	
Total for Fixed Costs		**64 352**

Estimated Recurring Costs		
Disposable Containers	14,795	
Liners	27,463	
Protective Equipment	4080	
Total for Recurring Costs		**42,258**
Total Cost for the Test Period		**106,610**

The table below gives the summary of the budget for the provision of training material, posters and pamphlets etc.:

Promotional material, posters, pamphlets and training modules		
Knowledge training manual		
Skills training manual		
Posters		
Pamphlets		
Promotional material (t-shirts)		
Total Cost for the Test Period		

The success of the project will depend on the availability of the budgeted funds

8. PROCUREMENT OF EQUIPMENT

DANCED has funded the procurement of equipment for the test areas for four months. Wherever possible, local suppliers were used. It was not possible to obtain the sharps and tissue containers locally. The quality pedal bins and other re-usable containers were bought from South Africa. The three trolleys were also purchased from South Africa as the local suppliers could not meet the time specifications required.

- The disposable containers (sharps and tissue) were obtained from ClineX in South Africa
- The reusable 8 l container, the pedal bins, and sharps holders were obtained from ClineX in South Africa
- Large 85 litre black and white bins were bought from Carters Mall, Swaziland
- The hanging wall holders were manufactured by New Dawn Engineering in Swaziland
- The liners were manufactured by Swaziland Plastics Company

9. ASSUMPTIONS

In developing this implementation plan the following assumptions have been made:

- The funds for the equipment, construction work will be made available
- The funds for the roll out into the rest of the hospital will be made available
- Liners are made available when required.
- Disposable containers are replaced
- Secure facilities are made available for the safe storage of the stocks
- Theft of equipment is eliminated
- Training resources are made available

10. EVALUATION OF THE TEST SITES

A workshop was conducted with the Senior Management of the hospital in July. The following was agreed:

The purpose of the evaluation process will be:

- To assess the Mbabane Waste Management System in the 6 test site areas in terms of effectiveness, efficiency, impact and sustainability and evaluate the viability of the system for the whole of Mbabane Government Hospital.

*The specific objectives for the evaluation process/programme are: (*as agreed during the workshop)

- To assess whether the waste is disposed of safely and in an environmentally friendly manner.
- To assess the viability of the new system for the whole of the Mbabane Government Hospital in terms of human resources and equipment.
- To assess the costs related to waste and the benefit to the hospital
- To assess the quality of the system and give recommendations for improvement
- To assess the level of commitment and awareness

The reduced time period will limit the amount of monitoring that can effectively take place and the results will depend on the level of input given. This is particularly true with regard to the sustainability of the system. This can only be measured over an extended period of time and should be included in the evaluation of the system when introduced into the whole hospital. It is therefore proposed to carry out the monitoring of the test against the following criteria:

Organisation, Systems Tools, Knowledge/Skills, Inter-relations

The Hospital Senior Management and the 6 Test Site Unit Supervisors will carry out the evaluation of the implementation of the new waste management system into the test site areas. The Waste Management Officer and the Consultant will also assist.

The following table shows the agreed process for monitoring:

Senior Management Hospital Manager and Administrator, Matrons	**Line Management** Unit Supervisors, Heads of departments
Approximately 7 hrs weekly 1. Conduct **weekly** inspections in six test sites with WMO of all areas in the test	• Conduct **3 inspections weekly** using the Performance Inspection Check list
2. Evaluate **daily** the stock requirements from the units	• Weigh the waste **daily** and record results
3. Collect the weekly inspection reports from the 6 test sites and evaluate	• Collect all incident reports and suggestions and report **weekly.**
4. Check on stock levels **weekly**	• Write a **weekly** report
5. Carry out remedial action on issues arising out of inspection reports arising out of weekly evaluation	• Take action on outstanding issues identified in inspections and reports as soon as possible

Test Task Team Members	**Employees**
• Conduct inspections **weekly** using the Test Criteria Inspection checklist	• Report all incidents
• Collect all reports from the six test sites on incident or suggestions received.	• Make suggestions for improvements
• Evaluate findings and report back to management	
• WMO to conduct weekly inspections in the six test sites	

The Responsibilities of Mbabane Management in the Evaluation Process are as follows:

Senior Management	Line Management
• Oversee the Inspection and evaluating process by : Conducting Inspections Evaluating weekly reports Carrying out remedial action • Ensure adequate control over the issue of stock • Oversee the security of the equipment in the store	• Evaluate needs and order the equipment requirements regularly • Weigh the waste daily before transportation • Monitor the performance of the unit by conducting regular inspections and reporting results • Monitor the suitability of the system by conducting inspections using the test criteria check list • Coach and mentor staff (knowledge and skills training modules) • Take actions on incident reports and suggestions received

11. IMPLEMENTATION ACTIVITY PLAN

The implementation of the new waste management plan began in April with the development of training material and the commencement of the Awareness Phases in July 2002. Distribution of equipment was planned shortly thereafter in August and the test was to run for the months August – November 2002.
(Refer to Appendix 1(b) Pilot Project Implementation Plan)

A detailed implementation plan can be found in Appendix 8

12. REFERENCES

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