

**NATIONAL WASTE MANAGEMENT STRATEGY
IMPLEMENTATION
SOUTH AFRICA**

WASTE INFORMATION SYSTEM

**GUIDELINE ON IMPLEMENTING THE
SOUTH AFRICAN WASTE
INFORMATION SYSTEM**

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Document 1: Guideline on waste collection in high density and unserved areas

Document 2: Guideline on recycling of solid waste

Document 3: Guideline on implementing the South African Waste Information System

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GUIDELINES ON IMPLEMENTING THE SOUTH AFRICAN WASTE INFORMATION SYSTEM

PURPOSE OF THIS GUIDELINE

This guideline is the third in a series by the Department of Environmental Affairs and Tourism to assist government and industry in the implementation of the National Waste Management Strategy.

The White Paper on Integrated Pollution and Waste Management identified the need to develop and maintain databases and information management systems to provide accessible information to interested and affected parties that will support effective integrated pollution and waste management.

This guideline provides local, provincial and national government, and private waste facility owners and operators with information on how to collect, capture, submit, verify and disseminate waste data and information. This is in support of the South African Waste Information System (SAWIS).



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Annexure 2: Waste Information Regulations

Annexure 3: Users' Manuals



SUPPORTING DOCUMENTATION

This guideline should be read in conjunction with the following reports, which provide background and detail to the SAWIS.

- Department of Environmental Affairs and Tourism, 2005. Waste Information System. Needs Analysis. Final Report, 29 March 2005.
- Department of Environmental Affairs and Tourism, 2005. Waste Information System. Framework Document. Final Report, 31 March 2005.
- Department of Environmental Affairs and Tourism, 2005. Waste Information System. Prioritisation of recyclables for reporting to the WIS. Final Report, 19 September 2005.
- Department of Environmental Affairs and Tourism, 2006. Waste information system. Waste Categorisation Discussion Document. Final report, June 2006.
- Department of Environmental Affairs and Tourism, 2006. Waste information system. Alternative weighing and verification methods for landfills. Final report, October 2006.

Copies of the documents are available from
<http://www.environment.gov.za>
<http://www.sawic.org.za>



1. INTRODUCTION

IN THIS SECTION FIND OUT ABOUT:

- Policy and strategy which has informed the development of the SAWIS
- The South African Waste Information System (SAWIS)
- Why government and the private sector should collect waste data



1.1. INFORMED BY POLICY AND STRATEGY

The White Paper on Integrated Pollution and Waste Management (IP&WM) (Republic of South Africa, 2000) recognised the need to develop and maintain databases and information management systems (Goal 6), so as to monitor and collect information on pollution and waste generation. According to the White Paper, information is *"crucial for the implementation of pollution and waste reduction measures. Moreover, the sharing of such information and creating awareness about the issues will enable all stakeholders, including communities, to gain a better understanding of the relation between pollution, waste management and the quality of life."*

Goal 6: Information management

"To develop and maintain databases and information management systems to provide accessible information to interested and affected parties that will support effective integrated pollution and waste management."

The National Waste Management Strategy (NWMS) (DEAT, 1999), government's strategy to translate the White Paper into action, identifies the development and implementation of a national waste information system for South Africa as a short-term, priority initiative.

1.2. THE SOUTH AFRICAN WASTE INFORMATION SYSTEM

The South African Waste Information System (SAWIS) was initiated through the National Waste Management Strategy Implementation (NWMSI) project. The project, funded by the Department of Environmental Affairs and Tourism (DEAT) and the Danish International Development Agency (Danida), ran over the period 2004 – 2006 and consisted of four immediate objectives:

- Objective 1: Improved Health Care Waste Management.
- Objective 2: Waste Information System is established and in use.
- Objective 3: Recycling of waste is increased and extended.
- Objective 4: DEAT is capacitated to take full control of NWMS.

The SAWIS development and testing was completed in 2006, with national roll-out to the provinces beginning in 2007.



1.3. WHY SHOULD WE COLLECT WASTE DATA?

There are several reasons why it is important to collect waste data. The following section highlights the importance of waste data to the three spheres of government and the waste industry.

1.3.1. National government

The national Department of Environmental Affairs and Tourism (DEAT) is the lead agent for the environment, providing leadership and guidance to "enable other national departments, provincial environmental departments and municipalities to meet their executive obligations in respect of the environment, including integrated pollution and waste management. The DEAT will take overall responsibility for integrated pollution and waste management in South Africa, and will execute its responsibilities by concentration and extension. Furthermore, it will establish guidelines, mechanisms and structures which will ensure that activities undertaken by other media and sector managers are coordinated, uniform and effective." (Republic of South Africa, 2000)

As such, data and information on waste is necessary to:

- assist government with the development of national policies and strategies on waste;
- assist with the identification of problem waste streams or waste streams that occur in large quantities, which may require the development of specific strategies to manage the waste streams and/or their impacts;
- develop capacity within government around integrated waste management;
- monitor the effectiveness of waste management policies and strategies;
- ensure the prioritisation of waste matters on the political agenda;
- support research regarding the most appropriate storage, collection, transport, treatment and disposal methods for each waste stream;
- support the diversion of waste from landfill thereby promoting waste reuse, recycling and waste exchange opportunities;
- capacitate stakeholders and communities through public access to information;
- support national and international reporting obligations of government; and
- in time, allow for all waste generated nationally to be traced to a treatment or disposal facility within the country;



1.3.2. Provincial government

The provincial environmental departments are responsible for monitoring and enforcing pollution and waste management issues within their province (Republic of South Africa, 2000). Specific functions to be carried out by Provincial Government include, amongst others, planning, compliance monitoring, development and enforcement of provincial regulations, development of guidelines, implementing and enforcing waste minimisation and recycling initiatives

As such, data and information on waste is necessary to:

- assist with the development of regional policies and strategies;
- support regional planning;
- monitor the effectiveness of provincial waste management and waste minimisation initiatives;



- support informed decision-making with respect to environmental impact assessment authorisations associated with waste related activities;
- support the implementation of national policies and guidelines e.g. Minimum Requirements (DWAF, 1998) within provinces;
- assist with the identification of provincial or regional problem waste streams or waste streams that occur in large quantities, which may need the development of specific strategies so as to manage the waste stream and/or their impacts;
- monitor the performance of treatment and disposal facilities within the province; and
- support the procurement of waste removal and disposal services for public health care institutions, by the provincial Department of Health (applicable to health care risk waste).

1.3.3. Local government

Municipalities are constitutionally responsible for the provision of waste management services, and the management of waste disposal facilities. Specific functions of local government include, amongst others, planning, waste collection, landfill management, implementing public awareness campaigns, implementing and enforcing appropriate waste minimisation and recycling initiatives.



Data and information on waste are needed by local government to:

- support local planning, in particular the development of integrated waste management plans;
- support the generation of revenue at landfill sites through waste disposal services rendered;
- support the budgeting for waste management services and facilities;
- support the effective operation of waste management facilities, e.g. landfill sites. Without an understanding of the waste deposition rate the following aspects associated with sanitary landfill practices as required under the Minimum Requirements (DWAF, 1998) cannot be determined;
 - cover material supply;
 - cell development programs;
 - the capacity of the compaction equipment;
 - the equipment needs of the landfill site;
 - landfill closure to allow for adequate future planning;
- assist with the implementation of effective waste reduction and reuse initiatives;
- assist with local, provincial and national reporting obligations;
- monitor the effectiveness of local waste management and waste minimisation initiatives; and
- capacitate local communities through providing public access to information.



1.3.4. Waste management facilities

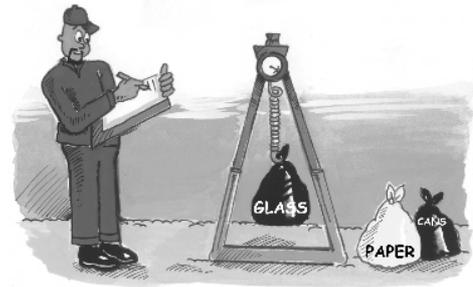
As with local government, waste management facilities tasked with the recycling, treatment and disposal of waste require data and information on waste received, to support the sustainable management of the facilities and ensure effective cost recovery of operations through the accurate billing for services.



2. ABOUT THE SAWIS

IN THIS SECTION FIND OUT ABOUT:

- The approach to the development of SAWIS
- The SAWIS data requirements



2.1. INTRODUCTION

The South African Waste Information System (SAWIS) was developed by the Department of Environmental Affairs and Tourism during the period 2004-2006. To ensure that the needs of all spheres of government and key stakeholders were considered in the design of the system, workshops were held in selected provinces in 2004 and early 2005. The background to the development of the system was captured in four departmental reports, namely:

- Department of Environmental Affairs and Tourism, 2004. *Overview of existing South African waste information systems*. Final report, 8 December 2004.
- Department of Environmental Affairs and Tourism, 2005. *Waste Information System. Needs Analysis*. Final Report, 29 March 2005.
- Department of Environmental Affairs and Tourism, 2005. *Waste Information System. Framework Document*. Final Report, 31 March 2005.
- Department of Environmental Affairs and Tourism, 2005. *Waste Information System. Prioritisation of recyclables for reporting to the WIS*. Final Report, 19 September 2005.

Copies of the Framework Document are available from
<http://www.environment.gov.za>
<http://www.sawic.org.za>

The Framework Document, approved by the Director General of the Department of Environmental Affairs and Tourism on the 2 June 2005, outlines the Department's approach to identifying the data providers to the system, the data requirements and the system design.

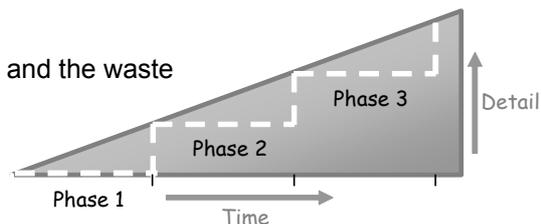


Phasing-in SAWIS

Recognising the resource challenges facing government and the waste sector, DEAT has adopted a phased approach to the development and implementation of the SAWIS.

In Phase 1 it is the intention of DEAT to:

- collect only urgently needed data (see Needs Analysis Report);
- collect data from the fewest, most relevant role players in the waste generation, transport, disposal and recycling system, where the necessary level of detail exists;
- make sure that the collected data are utilised effectively; and
- make data available to other government departments who may require it, without having to duplicate data reporting and collection.

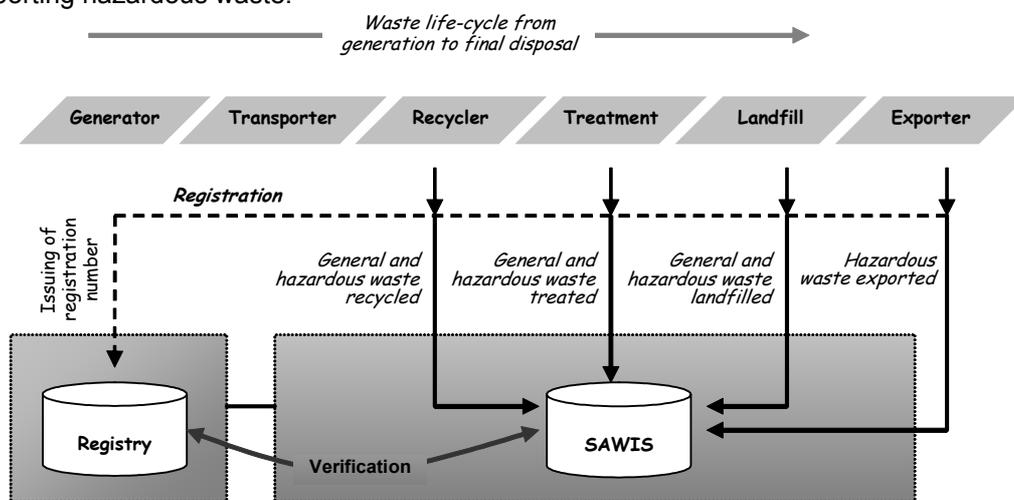


2.2. DATA REQUIREMENTS

2.2.1. Data providers

The waste management facilities responsible for providing routine, accurate data to the SAWIS during Phase 1 include anyone:

- landfilling general waste to a G:M:B or G:L:B landfill site
- landfilling hazardous waste
- consuming hazardous waste for energy recovery, e.g. cement kilns
- treating hazardous waste by means of high temperature thermal treatment, e.g. incineration
- treating health care risk waste by means of non-thermal treatment, e.g. autoclaving, ETD
- reprocessing – paper and cardboard waste
- reprocessing – plastic waste
- exporting hazardous waste.



In future (during Phases 2-4), the SAWIS will begin to collect data from additional waste management role-players, as shown below. The intention is that with time, waste data will be collected from both generators of waste and facilities receiving waste for reprocessing, treatment or disposal.

	Phase 1	Phase 2	Phase 3	Phase 4
<i>Generators</i> required to submit data	None	None	None	Major generators of hazardous waste ⁽¹⁾
<i>Landfills</i> required to submit data	G:M:B, G:L:B, H:H, H:h	G:M:B, G:L:B, H:H, H:h	G:S:B, G:M:B, G:L:B, H:H, H:h	G:C:B, G:S:B, G:M:B, G:L:B, H:H, H:h
<i>Recyclers</i> required to submit data ⁽²⁾	Paper, cardboard, plastic	Paper, cardboard, plastic, glass, tyres	Paper, plastic, glass, tyres, oil, beverage cans	Paper, plastic, glass, tyres, oil, beverage cans, e-waste, scrap metal
<i>Treatment facilities</i> required to submit data	Hazardous waste	Hazardous waste	Hazardous waste	Hazardous waste
<i>Exporters</i> required to submit data	Hazardous waste	Hazardous waste	General and Hazardous waste	General and Hazardous waste

(1) Thresholds for generators and the identification of major hazardous waste generators will be determined closer to implementation of phase 4. Thresholds may be based on waste type, waste quantity or industry sector.

(2) Priority recyclables for Phases 2-4 will be confirmed by Department of Environmental Affairs and Tourism.



The identified activities will be required to:

- register with the DEAT
- routinely provide accurate data to the SAWIS, as shown below.

2.2.2. Registration

Registration of waste management activities allows DEAT to issue a unique identification number, to be used when providing data to the SAWIS.

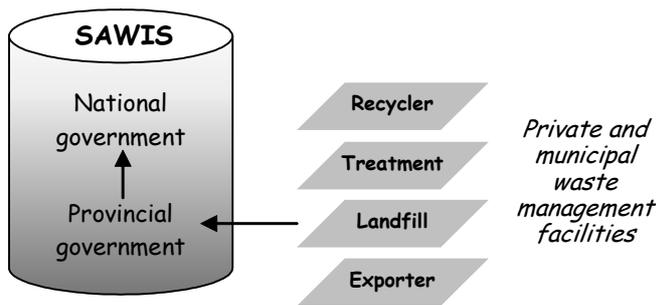
This unique ID number is used in all reporting to the SAWIS. The purpose of this unique ID is to provide the DEAT with a mechanism to 'link' data in environmental information systems within the DEAT, thereby improving the use of the data and reducing the likelihood of duplication of data reporting.

Why do I need to register?

All companies required to provide data to the SAWIS will need to register on the DEAT Central Registry and be issued with a unique identification number.

2.2.3. Data collection

All waste data collected by the identified waste facilities is submitted directly into the SAWIS on a regular basis. Data submitted into the SAWIS by private facilities or local government is checked and verified by provincial government before being made available to DEAT. The responsibility to submit data to the SAWIS therefore lies with the waste facility. This is seen as a 'push' of data into the system, as opposed to a 'pull' of data by government.



DEAT will publish summary waste data from that provided into the SAWIS.

2.2.4. Data required

The data requested for SAWIS (Phase 1) has been kept to a minimum to ensure a limited burden on data providers. The following data will be required for Phase 1 of the SAWIS implementation:

Data required	Level of detail required for Phase 1
Time period	Month and Year
Waste quantity	Tonnes
Waste type	General waste, or paper/cardboard/plastic (priority recyclables), or hazardous waste or health care risk waste
Waste source	Province or country where waste originates
Waste destination	Facility ID (reprocessor, landfill or treatment facility to which waste is taken)

Example of data submitted to the SAWIS by facility (D0001-014):

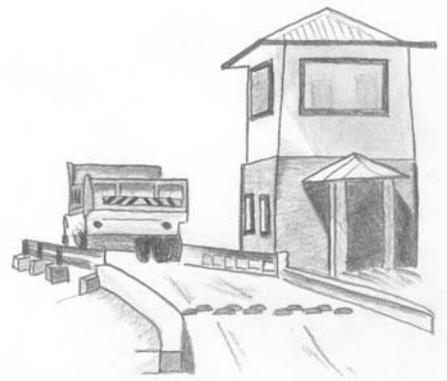
Sort	Year	Month	Source	Waste Type	Quantity (T)
Edit Delete	2005	January	City of Cape Town (Cape Town)	General	50



With each phase of implementation of the SAWIS, additional data or increased detail of current data will be required, as indicated below:

	Phase 1	Phase 2	Phase 3	Phase 4
Time period	Month & Year	Month & Year	Month & Year	Month & Year
Quantity (units)	Tonnes (weighed and estimated)	Tonnes (weighed and estimated)	Tonnes (weighed and estimated)	Tonnes (weighed)
Generator identification	Province or Country	Province or Country	Municipality or Country	Generator or Country
Transporter identification	None	None	None	None
Waste facility identification	Unique Facility ID	Unique Facility ID	Unique Facility ID	Unique Facility ID

While estimated data will be accepted for Phases 1-3, only weighed data will be accepted in Phase 4. This means that waste facilities will need to move away from providing information such as density estimations of the quantities of waste received, towards installing weighbridges to accurately record tonnages of waste received.



2.2.5. Waste Type

Waste can be defined as anything that is no longer useful and needs to be disposed of. In the waste management process, waste is any material that has been discarded and, as such, needs to be disposed of in an environmentally acceptable manner. Waste is also defined in terms of where it is produced, how dangerous it is and the main substances and materials that it is made up of.



WASTE IS CLASSIFIED INTO TWO MAIN CATEGORIES: GENERAL AND HAZARDOUS WASTE:

GENERAL WASTE

Waste which does not pose an immediate threat to people or the environment, i.e. household waste, builder’s rubble, garden waste, dry industrial and commercial waste (DWAF 1998). It may, however, with decomposition and infiltration by water, produce leachate (the brown liquid that oozes out of waste) with an unacceptable potential to pollute the environment.

HAZARDOUS WASTE

Any waste which may, by the circumstances of its use or because of its quality, concentration, physical or infectious characteristics, cause or be likely to cause, danger to health or to the environment, whether by itself or when in contact with other waste (DWAF 1998). There are different classes of hazardous waste which include substances that are explosive, corrosive, chemically reactive, poisonous, biohazardous (e.g. containing infectious disease organisms), radioactive or cancer-causing.



As with the other data required by the SAWIS, so too does the detail regarding waste type increase gradually with the implementation of the first four phases.

	Phase 1	Phase 2	Phase 3	Phase 4
General waste classification	General waste, paper, cardboard, plastic	General, + additional priority recyclables ⁽²⁾	General, + additional priority recyclables ⁽²⁾	General, + additional priority recyclables ⁽²⁾
Hazardous waste classification	Hazardous and Class 6.2 (HCRW)	9 Classes (SANS 10228)	9 classes and sub-classes (SANS 10228)	9 classes and sub-classes (SANS 10228)

While it is acknowledged that South Africa needs to move over to the Globally Harmonised System (GHS) for the classification of dangerous goods, the GHS does not currently address waste. The SANS 10228 code for dangerous goods will be retained until the GHS has been expanded to include hazardous waste.

To ensure consistency in all data provided to the SAWIS, and after consultation with stakeholders, the following categorisation has been adopted by DEAT:



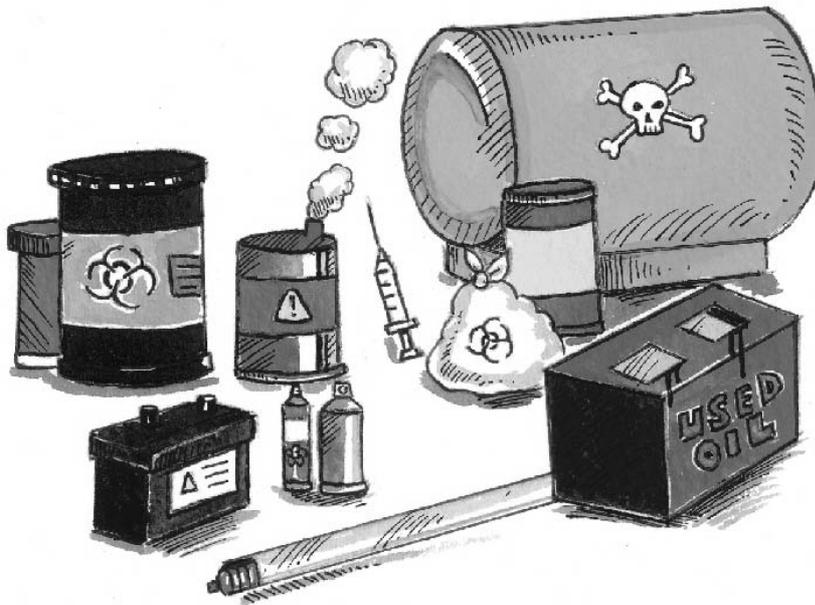
General waste categorisation for SAWIS

Waste Level			
Level 1	Level 2		Level 3
General waste	01	Municipal waste	
	10	Commercial and industrial waste	
	20	Organic waste	20.1 Garden waste 20.2 Food waste
	30	Construction and demolition waste	
	50	Paper	50.01 Newsprint and magazines 50.02 Brown grades 50.03 White grades 50.04 Mixed grades
	51	Plastic	51.01 PETE 51.02 HDPE 51.03 PVC 51.04 LDPE 51.05 PP 51.06 PS 51.07 Other plastics
	52	Glass	
	53	Metals	53.01 Ferrous 53.02 Non-ferrous
	54	Tyres	
	99	Other	



Hazardous waste categorisation for SAWIS

Waste Level		
Level 1	Level 2	Level 3
Hazardous waste	H01 Explosives	
	H02 Gases	H02.01 Flammable gases H02.02 Non-flammable, non-toxic gases H02.03 Toxic gases
	H03 Flammable liquids	
	H04 Flammable solids and substances	H04.01 Flammable solids H04.02 Substances liable to spontaneous combustion H04.03 Substances that, on contact with water, emit flammable gases
	H05 Oxidising substances and organic peroxides	H05.01 Oxidizing substances H05.02 Organic peroxides
	H06 Toxic and infectious substances	H06.01 Toxic substances H06.02 Infectious substances
	H07 Radioactive substances	
	H08 Corrosives	
	H09 Miscellaneous dangerous substances and goods	



3. ABOUT IMPLEMENTING THE SAWIS

IN THIS SECTION FIND OUT ABOUT:

- Implementing the SAWIS in your facility, municipality or province.
- Resources required to implement the SAWIS



3.1. INTRODUCTION

The South African Waste Information System (SAWIS) will be implemented by the Department of Environmental Affairs and Tourism (DEAT) in all provinces and municipalities in South Africa.

Each sphere of government will have a specific role to play and a specific responsibility to uphold in implementing the SAWIS, as indicated in the table below.

Sphere	Role	Responsibility
National DEAT	National custodian of SAWIS and waste information for South Africa	Collect data from provinces, verify, collate and disseminate national information Maintain, update & expand the SAWIS
Provincial Departments of Environment	Provincial custodian of waste information	Collect, verify and submit provincial information to DEAT.
Local Government	Providers of data to the SAWIS Support to Provincial Authorities	Provide accurate, reliable and timeous data to Provinces Assess that all reporting facilities within municipal area are registered and reporting
Private Facilities	Providers of data to the SAWIS	Provide accurate, reliable and timeous data to provinces

Waste management facilities, whether public or private, will also have specific responsibilities as indicated above and in Section 2.

3.2. ROLES AND RESPONSIBILITIES

3.2.1. National Government

National government (DEAT) is the overall custodian of the SAWIS. Its responsibility is to implement and sustain the operation of SAWIS in the provinces and municipalities, by ensuring that:

- capacity is developed continuously throughout the country;
- the SAWIS is maintained in terms of software and ICT infrastructure;
- government and identified waste facilities fulfil their responsibilities; and
- summary waste data for South Africa is disseminated to government and the general public.



3.2.2. Provincial Government

The Provincial Departments of Environment are the custodians of waste data within their provinces. All facilities identified in Section 2 will provide data to their Provincial Department by means of SAWIS. This includes local government, should they own a facility required to provide data to SAWIS.

Provincial Departments will be responsible for approving all waste facility registrations within their province, in support of SAWIS.

3.2.3. Local Government

The role of Local Government Departments in implementing the SAWIS is two-fold:

- Local Government Departments, as owners of landfill sites, are required to submit data to the SAWIS like any other waste facility in South Africa.
- Local Government play a supporting role to Provincial Government, by monitoring that all waste facilities within their area of jurisdiction have registered and are providing data to the SAWIS.

3.2.4. Waste Facilities

As discussed in Section 2, a number of different waste facility types have been identified which must provide data to the SAWIS. Each of the facilities will need to implement measures to collect, capture, verify, and submit their waste data, to ensure compliance with the requirements of the SAWIS.

Waste facilities

Every waste facility needs to put measures and systems in place to support the SAWIS.

Steps in implementing the SAWIS include:

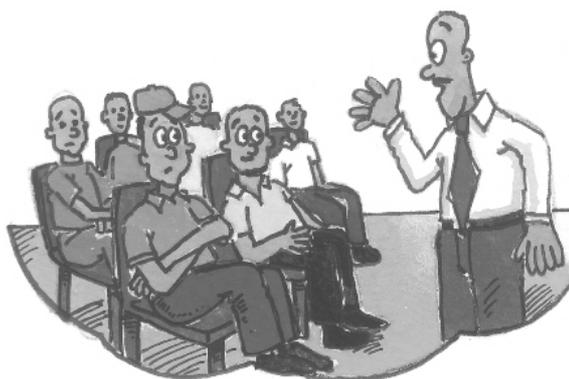
- Step 1: Register facility
- Step 2: Collect data
- Step 3: Capture data
- Step 4: Verify data
- Step 5: Submit data

3.3. RESOURCE REQUIREMENTS

During the piloting of SAWIS, it was recognised that specific human, technical and financial resources are required to successfully implement SAWIS in waste facilities, municipalities, provinces and national government.

3.3.1. Within waste facilities

To successfully implement the SAWIS at waste facilities (landfills, treatment facilities, etc.) in South Africa, senior management support, either in the municipality or the waste company is a necessity. Without this, staff tasked with specific functions, such as data collection at the landfill site, will struggle to fulfil their requirements.



The following resources are required for data collection at waste facilities (Note that this excludes the usual operational resources requirements):

The following section discusses resources required by waste facilities, and deals with:

- facilities that have operational weighbridges for data collection
- facilities without weighbridges, where data estimation methods are required.



3.3.1.1. With weighbridges

Staff requirements

A waste facility operating a weighbridge should already have procedures and resources in place for the collecting and capturing of waste data. The first step in implementing the SAWIS at the facility should therefore be to check:

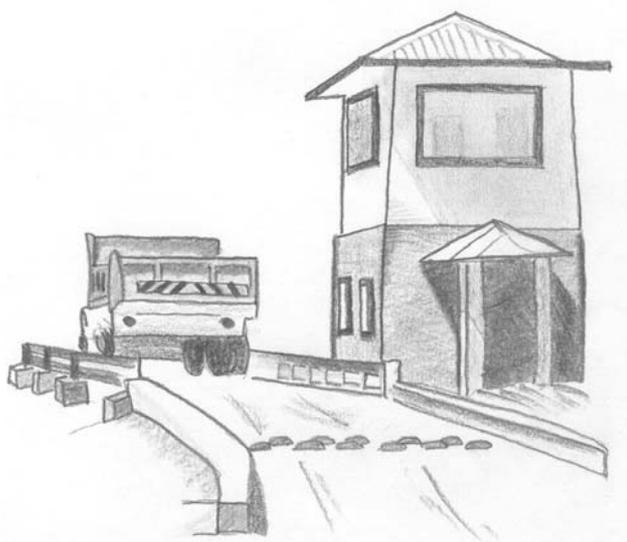
- whether sufficient resources have been allocated to this function, and
- whether the correct resources have been allocated to the collection and capturing of waste data.

The following personnel (as a minimum) should be involved in the implementation of SAWIS:

- A Waste Data Collection Officer (WDCO) (preferably with a second as backup); and
- A Waste Information Officer (WIO).

Waste Data Collection Officer (WDCO)

The WDCO's task is to record all relevant data of the vehicle and waste as it passes over the weighbridge (both into and out of the facility). The WDCO should ensure that the data has been accurately captured into the weighbridge software and that all vehicles have been recorded (no vehicles entering a waste facility carrying waste should bypass the weighbridge).



On average the time taken to record the required data is typically less than one minute per vehicle. It should be possible to reduce this time as the WDCO becomes skilled at identifying trucks and recording the required data.

Waste Information Officer (WIO)

The WIO's task is to collate all weighbridge data and capture it into a format suitable for submission to the SAWIS.

Experience gained through the implementation of the SAWIS at pilot landfill sites indicates that the capturing of daily data collected can be achieved within 5-10 minutes per day depending on the number of vehicles visiting the site. Upload of the data to the SAWIS can be achieved within 5-10 minutes per month, depending on the speed of the internet connection. The entire process of capturing, verifying and uploading data to the SAWIS can therefore be achieved in the equivalent of 0.5-1 day per month. This procedure may therefore be a part-time responsibility of someone already employed within the organisation.

Equipment requirements

The WDCO should have access to the following equipment to undertake the task of collecting waste data at the weighbridge:

- Computer with the necessary weighbridge software
- Means of transferring this data to the WIO, e.g. computer network, e-mail etc.

The WIO should have access to the following equipment in order to capture the daily waste data and report the data to the SAWIS:

- A computer, programmed with either spreadsheet software, e.g. Microsoft Excel or customised software, e.g. weighbridge software, billing software etc; and



- Access to the Internet to facilitate the monthly upload of data. This function may be performed at any workstation, however, if the WIO has direct access the process can be made easier.

Infrastructure requirements

In addition to staff and equipment requirements, it is important for the following resources to be present at the landfill site for the WDCO:

- A small office, positioned with a clear view of the vehicle on the weighbridge;
- Gate control to restrict access to the landfill site;
- Eating and ablution facilities;
- Access to clean water;
- Uninterrupted power supply.

3.3.1.2. Without weighbridges

Waste facilities without weighbridges will need to implement some alternative means of collecting waste data (See Section 4).

Staff requirements

The first task when implementing a 'waste information estimation system' at a waste facility is to identify the relevant personnel that will be responsible for implementing the system. The implementation of a 'waste information estimation system' requires that a person be available at the waste facility to collect data (See Section 4), as well as a staff member in the municipality or waste company to capture the data generated daily (See Section 5).

The following personnel (as a minimum) should be involved in the implementation of SAWIS:

- A Waste Data Collection Officer (WDCO) (preferably with a second as backup); and
- A Waste Information Officer (WIO).

Waste Data Collection Officer (WDCO)

The WDCO's task is to record the mass and type of waste entering the facility every day. Standard forms have been developed to assist with this task (See Section 4). It is important that the WDCO has a trained "second" to ensure that the system can be maintained if the WDCO is away from his or her station for a day or longer. The specific functions of the WDCO are detailed in Annexure 1.

The average time taken to estimate and record the required data is approximately 1-2 minutes per load of waste received (e.g. a vehicle or a trolley of containers from a health care facility). It is possible to reduce this time as the WDCO becomes more skilled at identifying trucks and/or container types and documenting the required data.



The WDCO has the most important task in implementing a waste estimation system, and should be well trained to ensure that the estimates being generated are as accurate as possible. The estimated data has in some cases been used for billing purposes (e.g. in the Eastern Cape), so accuracy is important to avoid conflict.



Waste Information Officer (WIO)

The task of the WIO is to collate the daily data into weekly and monthly figures. Excel workbooks have been developed to assist with this task (See Section 5). The WIO is to ensure that forms are available for daily use and is responsible for problem solving should any problems occur. The specific functions of the WIO are detailed in Annexure 1.

On a daily basis the WIO will be required to capture the data collected at the waste facility. Templates have been developed to assist with calculating the waste tonnages once the data has been captured (See Section 5). On an annual basis it will be necessary to prepare spreadsheets for the next year (change of dates etc). This task can be achieved within half an hour per year.

Some hospitals have appointed 'Hospital Information Officers'. This post is ideally suited to capture waste data, as persons filling this post are required to capture general hospital data for statistical purposes.

Experience gained through the implementation of the pilot projects (e.g. at landfill sites) indicates that the capturing of daily data can be achieved within 10-20 minutes per day depending on the number of vehicles visiting the site. Upload of the data to the SAWIS can be achieved within 5-10 minutes per month, depending on the speed of the internet connection. The entire process of capturing, verifying and uploading data to the SAWIS can therefore be achieved in the equivalent of 1-2 days per month. This may therefore be a part-time responsibility of someone already employed within the organisation.

Equipment requirements

The WDCO should have access to the following equipment to undertake the task of implementing a waste data estimation system:

- Clipboards (a clipboard should be available for each different form used to capture data);
- A meter stick;
- Pencil or pen; and
- Access to a photocopier should the management wish the WDCO to make copies of the standard collection forms.

The WIO should have access to the following equipment in order to implement a waste estimation system and report the information to the SAWIS:

- A computer, programmed with spreadsheet software, e.g. Microsoft Excel; and
- Access to the Internet to facilitate the monthly upload of data. This function may be performed at any workstation; however, if the WIO has direct access the process can be made easier.

Infrastructure requirements

In addition to staff and equipment requirements it is important for the following resources to be present at the landfill site for the WDCO:

- A small office, positioned with a clear view of the entrance gate for protection from the elements and to provide a work surface;
- Gate control to restrict access to the landfill site;
- Eating and ablution facilities;
- Access to clean water.



Computer literacy

The Waste Information Officer (WIO), must have a minimum computer literacy.

They must be able to:

- use spreadsheets effectively
- enter and change formulas in spreadsheets
- customise spreadsheets to meet local requirements
- adapt spreadsheets for different months and years.
- have experience in using the Internet.



3.3.2. Within health care institutions

In certain health care institutions which operate their own treatment facilities, no infrastructure may be in place for accurate weighing of waste and no one may be available to collect data, e.g. at an incinerator. In such cases, an additional resource would be required:

- A Waste Collection Officer (WCO).

The WCO will have the following tasks in implementing the waste collection system:

- Collect health care risk waste (HCRW) from all generation points within the health care institution;
- Complete the waste collection form (Section 4) at each generation point.

The specific functions of the WCO are detailed In Annexure 1.

All health care institutions presently employ staff whose duty it is to collect both HCRW and domestic waste from waste generation points within the hospital. The additional task required from these staff members when implementing a waste estimation system, would merely be to count and record the number of full and half-full containers collected from each generation point. Some health care institutions require the waste officer to sign and the Health Care Professional on duty to counter-sign to verify the amounts of waste collected. This is, however, not required for the WIS.

The time taken to execute this additional task of counting and recording the waste should not be more than two minutes per generation point. Therefore for a large health care institution, e.g. a hospital with 24 generation points, the requirement to count waste and have it signed off would increase the duration of rounds by an hour at most.



3.3.3. Within municipalities

Resource requirements for municipalities have been covered under the resource requirements for waste facilities (See Section 3.3.1) . No additional resources are considered necessary for municipalities.

3.3.4. Within provinces

Provincial departments of environment will be responsible for the overall operation of the SAWIS within their province.

The following personnel (as a minimum) should be involved in the implementation of SAWIS within the province:

- A Provincial WIS Administrator (PWISA)
- A District Waste Information Officer (DWIO)

Provincial WIS Administrator (PWISA)

In general, the task of the PWISA is to:

- approve registrations of new waste activities within the province (Central Registry);
- verify data submitted to the SAWIS by data providers (Section 7);
- authorise data submitted to the SAWIS; and
- ensure compliance in terms of enforcing the Waste Information Regulations.



The specific functions of the PWISA are detailed in Annexure 1. While this may be a part-time task for an existing position (approximately 40-60% of ones time dedicated to the WIS), it is recommended that a person be appointed on a full-time basis to oversee the WIS and other environmental data (if required).

District Waste Information Officers (DWIO)

Some provinces divide themselves into a number of smaller regions, each region managed by an official from the Provincial Department. In general, the task of DWIOs is to support the facilities within their districts in terms of capacity building, compliance with the Waste Information Regulations, and the verification of data. The DWIOs will support the PWISA in managing the SAWIS within the province.

This is a part-time task for an existing position (approximately 20-40% of ones time dedicated to the WIS). It is possible to reduce this time as the DWIO becomes increasingly skilled at identifying potential flaws in the data.

Not all provinces may require a DWIO, with the PWISA fulfilling both functions (if employed full-time).

3.3.5. Within national government

The National Department of Environmental Affairs and Tourism (DEAT) is responsible for the overall operation of the SAWIS in South Africa.

The following personnel (as a minimum) should be involved in the implementation of SAWIS:

- A National WIS Administrator (NWISA)
- A Regional Waste Information Officer (RWIO)

National WIS Administrator (NWISA)

In general, the task of the NWISA is to:

- approve registrations of new sites within the country where waste activities take place;
- verify data submitted to the SAWIS by provinces (Section 7); and
- publish final annual statistics on the quantities and types of waste landfilled, treated and reprocessed in South Africa.

The NWISA is also responsible for ensuring compliance in terms of enforcing the Waste Information Regulations (Annexure 2). The specific functions of the NWISA are detailed in Annexure 1.

This position may vary between a full-time and part-time position, depending on the level of involvement of the National Administrator in the day-to-day operation of the system.

Computer literacy

The Provincial and National Administrators, and District and Regional Officers, must have a minimum computer literacy.

They must:

- be able to use spreadsheets effectively (enter and change formulas, customise spreadsheets, adapt spreadsheets for different months and years, prepare graphs and statistics).
- have experience in using the Internet.



Regional Waste Information Officers (RWIO)

Several provinces will be allocated to a RWIO. In general, the task of RWIOs is to support the provinces in their region in terms of capacity building, compliance with the Waste Information Regulations, and the verification of data. The RWIOs will support the NWISA in managing the SAWIS within the provinces. This position may vary between a full-time and part-time position, depending on the level of involvement of the Provinces in the day-to-day operation of the system.

3.4. STEPS TO IMPLEMENTATION

The successful implementation of the South African Waste Information System involves the following steps:

By the waste facility (public or private):

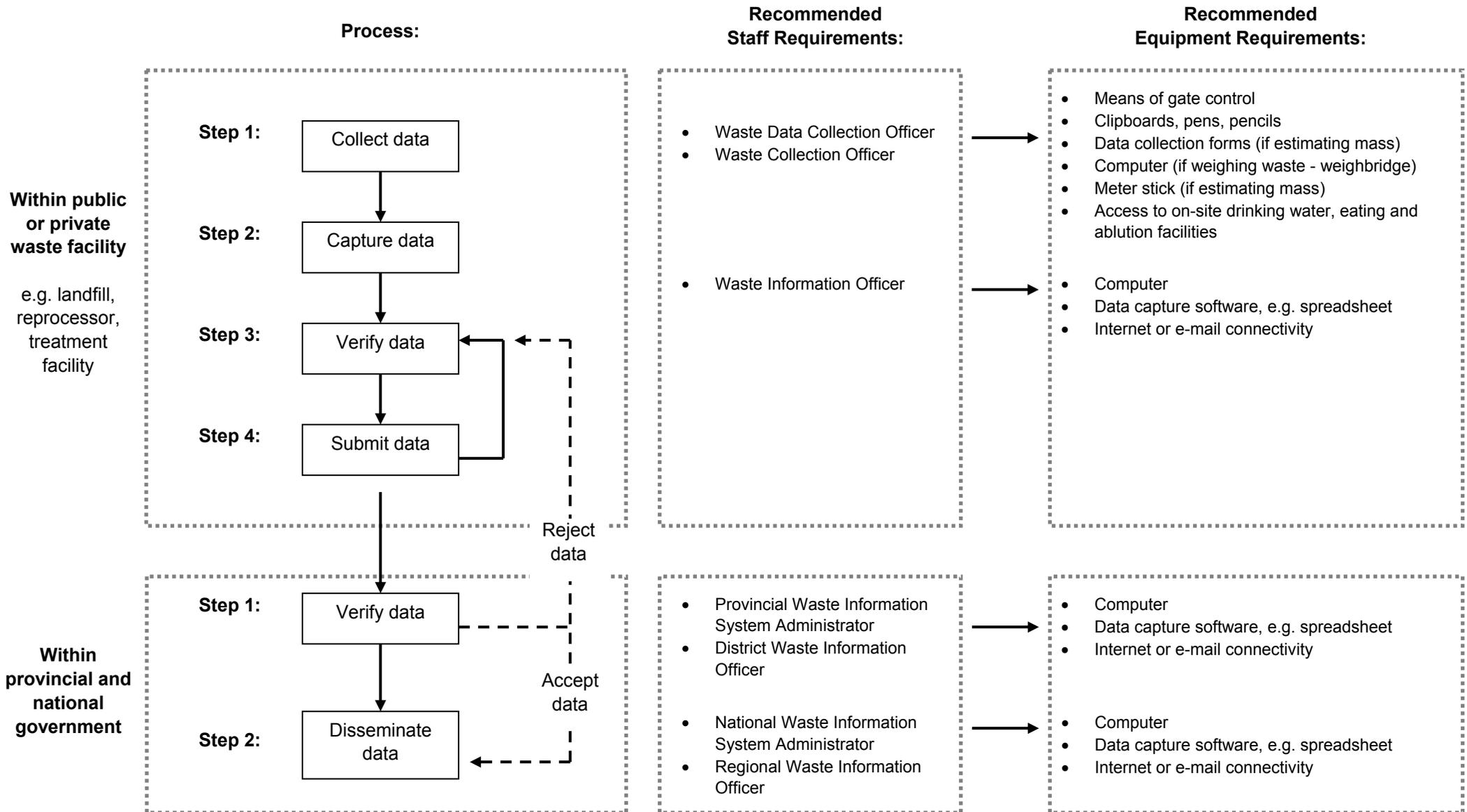
- Step 1: Data collection
- Step 2: Data capture
- Step 3: Submission of data to SAWIS
- Step 4: Verification of data

By government (provincial and national):

- Step 1: Verification of data
- Step 2: Dissemination of data

These steps are discussed in the following sections (Section 4 – 8) and depicted schematically in the figure below. The resources required in each step are also outlined.





4. ABOUT COLLECTING DATA

IN THIS SECTION FIND OUT ABOUT:

- Existing requirements regarding the collection of data
- Collecting data through formal and informal waste mass systems.



4.1. INTRODUCTION

The collection of data by waste facilities is the most critical step in the entire process surrounding the SAWIS. However, due to the difficulty often experienced in collecting accurate data, this step is considered the potential 'weak link' in the process.

In order to provide reliable data to SAWIS, weighbridge technology must be in place at waste reprocessing, treatment and disposal facilities to collect accurate waste data.

Section 4 looks at the collection of waste data at:

- landfills
- treatment facilities
- reprocessors
- exporters

4.2. LANDFILLS

The Minimum Requirements for Waste Disposal by Landfill (DWAF, 1998) requires that all general and hazardous landfill sites have 'appropriate records and data collection', regardless of the size of the landfill. This requirement is legally enforced through the landfill permit conditions, issued under Section 20(1) of the Environment Conservation Act, 1989 (Act 73 of 1989).

CLASSIFICATION SYSTEM												
MINIMUM REQUIREMENTS	G General Waste								H Hazardous Waste			
	C Communal Landfill		S Small Landfill		M Medium Landfill		L Large Landfill		H:h Hazardous		H:H Hazardous	
	B-	B+	B-	B+	B-	B+	B-	B+	B-	B+	B-	B+
Responsible Person	R	R	R	R	R	R	R	R	R	R	R	R
Appropriate records and data collection	R	R	R	R	R	R	R	R	R	R	R	R
Conduct Audits	N	N	R	R	R	R	R	R	R	R	R	R
Record deposition rate	N	N	R	R	R	R	R	R	R	R	R	R
Waste stream records	N	N	R	R	R	R	R	R	R	R	R	R
Weighbridge	N	N	F	F	R	R	R	R	R	R	R	R
LEGEND:												
R	=	Requirement										
F	=	Flag: special consideration to be given by expert or departmental representative										
N	=	Not a requirement										



The Minimum Requirements (Table 10, DWAF, 1998) stipulate that all G:M:B, G:L:B, H:h and H:H facilities must operate weighbridges at the landfill for the accurate capturing of waste data. This is often not the case, with many medium and large general waste landfill sites not operating weighbridges.

In terms of the Minimum Requirements, all landfill sites should therefore already be collecting waste data. The requirements of the SAWIS should place no additional obligations onto the owners and operators of landfill sites. However, this is not a reality. At present, many landfill sites in South Africa are unpermitted and poorly managed, with little or no gate control, and no data collection or systems in place to record waste data.

4.2.1. With weighbridges

The collection of waste data at landfill sites equipped with weighbridges is relatively easy:

- All vehicles entering the site travel over the weighbridge on the way in, and again on the way out. The difference in the mass of the vehicle between the 'in' and 'out' gives the mass of the waste.
- The type of waste in the vehicle is recorded by the weighbridge operator. The price charged to the disposer is typically based on this waste type.

This data is then stored in customised software provided for weighbridge operations, and is available through software export functions or through the printing of waste reports.



Important

All waste entering a landfill site must move over the weighbridge, whether charged for or not. Certain wastes, e.g. garden waste (organics) and building rubble, are often received at landfills free of charge and are sometimes diverted around the weighbridge. This should not be allowed.



Important

Weighbridges must be routinely calibrated to ensure that data collected remains accurate.

When the weighbridge is out of order, an alternative system must be implemented to ensure that data is not lost.

Data collection at landfills

Many landfill sites in South Africa are currently unpermitted, poorly managed, with little or no gate control and limited, if any, data collection.

What are the different types of landfills?

G:C:B – general communal landfill (< 25 T/day)

G:S:B – general small landfill (25-150 T/day)

G:M:B – general medium landfill (150-500 T/day)

G:L:B – general large landfill (>500 T/day)

H:h – hazardous waste landfill that can receive wastes with a hazard rating of 3 and 4

H:H – hazardous waste landfill that can receive wastes with a hazard rating of 1 and 2

4.2.2. Without weighbridges

Through the implementation of the SAWIS in the Eastern Cape and Mpumalanga pilot projects, it was determined that reliable waste data can be obtained relatively easily by using alternative waste data collection systems using “*waste mass estimation systems*”, e.g. a volume-density estimation system.



It must be stressed that waste mass estimation systems are only temporary solutions for the collection of waste data, until a permanent weighbridge can be installed on the site.

4.2.2.1. Density-volume estimation systems

Waste mass estimation systems use a formula that requires a waste volume, waste density and waste loading to determine the mass of waste entering the landfill. The formula is detailed below:

How to estimate waste quantities

Waste quantity is usually measured by mass (kilograms or tonnes).
It can also be less accurately estimated by means of volume (cubic metres).

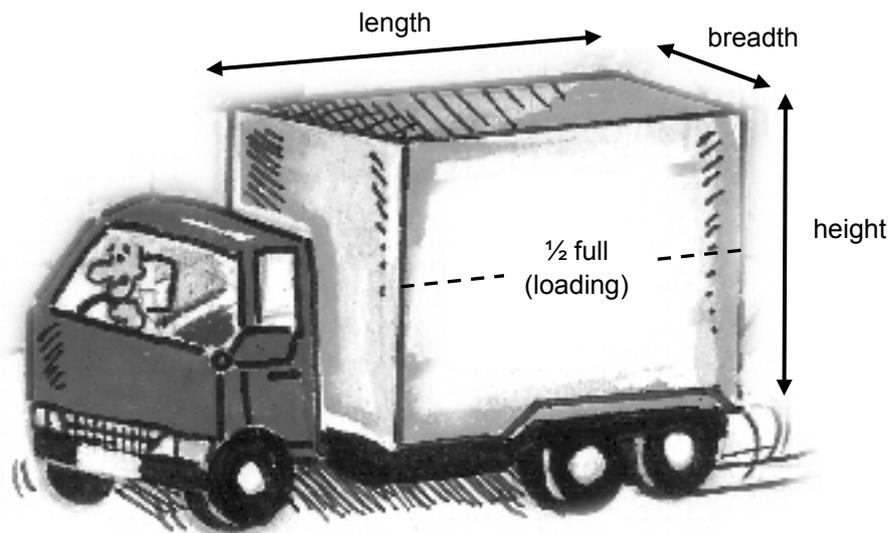
$$\text{Waste mass (kg)} = \text{Vehicle volume (m}^3\text{)} \times \text{loading factor} \times \text{waste density (kg/m}^3\text{)}$$

The estimated amount of waste will differ depending on the size of the truck, how full the truck is (loading) and the type of waste which the vehicle is carrying.

The vehicle volume may be determined in a number of ways:

- The volume of municipal vehicles may be determined from the vehicle specification (See vehicle book or contact vehicle manufacturer/supplier).
- The volumes of standard vehicles using landfill sites have been measured and recorded on a poster (See enclosed A3 poster);
- The vehicle may be measured on entry to the landfill. To determine the volume of a vehicle the following formula may be used:

$$\text{Volume (m}^3\text{)} = \text{length (m)} \times \text{breadth (m)} \times \text{height (m)}$$



- To measure the vehicle quickly, a rigid stick measuring approximately 2.5 meters in length may be marked off at 0.5m intervals. This meter stick may then be used to measure the required parameters quickly on-site.



While typical densities of waste can be found in the literature, it is recommended that these theoretical densities be adapted to local conditions. This may be done by weighing certain waste types over a weighbridge and then using the new densities as the standard. This should be done regularly to adapt to changing waste composition and associated densities.

To determine vehicle loading, the vehicle content may be inspected or the vehicle driver may be able to provide this information.



Tests performed at landfill sites in Gauteng showed that the total daily estimated mass was on average within ~5% of the total, daily weighbridge mass, with the estimated mass generally being lower than the weighbridge mass. However, the variance on individual, estimated measurements were on average within ~21% of its corresponding weighbridge mass.

Since errors in the three factors used to estimate the mass of waste can be compounded, care should be taken when using the density-volume estimation system. As shown below an error of 20% in each reading can be compounded to produce an overall error of 73% in the total mass of waste.

Example	
Correct measurement:	
$\boxed{2000 \text{ (kg)}} = \boxed{10 \text{ (m}^3\text{)}} \times \boxed{1} \times \boxed{200 \text{ (kg/m}^3\text{)}} \quad \checkmark$	
Error measurement (20% error in each measurement):	
$\boxed{3456 \text{ (kg)}} = \boxed{12 \text{ (m}^3\text{)}} \times \boxed{1.2} \times \boxed{240 \text{ (kg/m}^3\text{)}} \quad \times$	
<p>An error of 20% in each of the three factors can result in a compounded error in the waste mass of, in this case, 73%.</p>	

The section that follows describes the process of setting up a 'waste estimation system' at a landfill site. The system was developed in cooperation with a number of landfill managers through the implementation of SAWIS pilot projects in the Eastern Cape and Mpumalanga provinces.

4.2.2.2. *Templates for implementing a density-volume estimation system*

Standard forms and spreadsheets (templates) were developed and used during the SAWIS pilot projects. These forms and spreadsheets are useful to a landfill site where a density-volume estimation system is implemented. These templates may either be used as an example of a possible system, or customised and used directly at the landfill site. By using the templates developed during piloting of SAWIS, the monthly data required for upload into SAWIS will be captured in a few easy to follow steps. The templates are available from the South African Waste Information Centre (SAWIC) (www.sawic.org.za).

Two Excel spreadsheets have been created for implementing a density-volume estimation system at a landfill:

- Landfill daily data collection forms
- Landfill monthly data capture forms



The screenshot shows the SAWIC website interface. The main content area is titled 'Statistics' and contains an extract from the 1999 State of Environment Report for South Africa (DEAT, 1999). The text states that over 42 million cubic metres of general waste is generated every year across the country, with the largest proportion coming from Gauteng province (42%) (DWAF 1997). It also mentions that more than 5 million cubic metres of hazardous waste is produced every year, mostly in Mpumalanga and KwaZulu-Natal. A callout box highlights the 'Landfill templates available for downloading' section, which includes links for 'Landfill daily data collection form - 52Kb < 1min' and 'Landfill monthly data capture form - 643Kb ~ 4 min'.

Implementation of the '*Daily data collection forms*' at a landfill site' is discussed below, while the '*Monthly data capture forms*' are discussed in Section 5 (About Capturing Data). Since a minimum computer literacy is expected of users, details of how to download, modify or adapt these templates is not provided here. Users should make use of software manuals, e.g. Microsoft Excel, if necessary.

The '*Landfill daily data collection form*' spreadsheet contains several different tables, as indicated below. Not all of these forms may necessarily be relevant or required for your landfill site, and may be deleted or modified as required.

- Account holders
- Municipal large trucks
- Municipal small trucks
- Municipal parks
- Coupons

Account holders

The Account Holders table allows landfill site operators to capture data on private customers who dispose of waste at the landfill site with varying frequency (See *Form: Daily waste data collection (Landfill Account Holders)* below). This form serves two purposes:

- to capture data on the type and quantities of waste disposed of (the capacity of the vehicle (in m³), the type of waste, and whether the vehicle is half-full (0.5) or full (1));
- to capture client data for possible billing purposes (the date of disposal, the name of the client, vehicle registration number and client signature).

Data estimation

The use of estimation systems must be seen as a temporary measure until a weighbridge can be installed to record accurate data on waste received for landfilling.



Municipal large trucks

The forms for the municipal trucks are somewhat simplified, requiring only the date, number of loads and type of waste to be captured by the gate control personnel (See *Form: Daily waste data collection (Municipal Vehicles)* below). Information on the municipal vehicle number or registration number, vehicle type and vehicle capacity (in m³) should be pre-captured on the forms before use. This form assumes that the vehicle always brings the same waste type, for example, that a Rear End Loader (REL) will always bring only compacted waste to the landfill site. The gate control personnel simply count off the number of times a specific vehicle enters the site by indicating either a full load (1) or half load (0.5) in the designated column.

Municipal small trucks

A separate form for the smaller municipal vehicles may be created and used at landfills, i.e. for vehicles with less than 4m³ load capacity. Alternatively, all municipal trucks can be entered on the same form (see *Form: Daily waste data collection (Municipal Vehicles)* below).

Municipal parks

As with the Municipal trucks, vehicles from Municipal Parks can be captured on a separate form (see *Form: Daily waste data collection (Municipal Parks)* below), or alternatively captured on a single form for municipal vehicles. The data is captured on the form in the same way as that for municipal large and municipal small trucks.

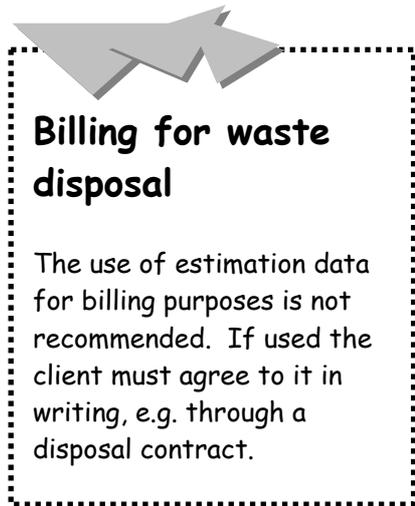
Coupons

Many landfill sites, particularly municipal landfill sites, make use of a coupon system. A person wanting to dispose of waste must first purchase a coupon from the municipal office, which varies in price depending on the quantity and type of waste being disposed of. The coupon is then handed to the gate control personnel at the landfill site as proof of payment and acceptance of entry into the landfill site. The form for coupon holders is very similar to that for account holders, the only difference being that each time a person hands in a coupon for disposal, the entry is recorded on the form. In this way, a landfill operator can add up the number of times a client has used the landfill, by adding up the number of coupons indicated against a client name (See *Form: Daily waste data collection (Landfill Coupon System)* below).

4.2.2.3. *Waste densities*

There are many varying densities for the different waste types available in the literature. Domestic waste, for example, will have different densities depending on the composition of the waste, the moisture content, the age, etc. (GDACE, 2002). As such, the density of the same waste, e.g. domestic waste, may differ from city to city, or within the same city.

The following densities (modified and adapted for local conditions) were used in the SAWIS pilot projects.



Waste categorisation	Waste type	Density (kg/m ³)
Domestic waste	Domestic waste compacted in REL	500
	Domestic waste uncompacted	200
	Mix domestic/garden (more domestic than garden)	200
	Mix domestic/building rubble (more domestic than building)	250
Commercial/Industrial	Commercial/Industrial - packaging (paper & plastics)	200
	Commercial/Industrial - timber/metal	150
	Tyres	150
Inert Waste (Construction waste)	Building rubble/concrete/sand/fibreglass/bricks/ceramics	750
	Building rubble/industrial mix (more building than packaging)	350
	Building/garden mix (more building than garden)	250
Garden waste	Loose grass/small branches	200
	Large logs	400
	Garden/building mix (more garden than building)	250
Perishable waste	Food waste/animal fodder	840





Form: Daily waste data collection (Municipal Vehicles)

Name of Landfill: *Second Creek*

ID: Municipal Vehicles (large trucks)

Date: *12/01/06*

These forms can be modified to better suite the operating conditions at the waste facility

Vehicle Number	Vehicle Type	Vehicle capacity in m ³	Number of loads				Type of waste
V141	4 Ton Truck	4	1	1	1		Domestic uncompacted
V215	Load Luger	6	1	1			Domestic uncompacted
V217	Load Luger	6	0.5	0.5			Domestic uncompacted
V218	Load Luger	6	1	1			Domestic uncompacted
V219	Compactor	19	1	1	1	1	Compacted domestic
V220	Compactor	11	0.5	0.5	0.5		Compacted domestic
V221	Compactor	19	1				Compacted domestic
V222	Compactor	19	1				Compacted domestic
V223	Compactor	19	1	1	1	1	Compacted domestic
V224	Compactor	19	1	1			Compacted domestic
V225	Compactor	15	0.5	0.5			Compacted domestic
V249	Tipper Truck	15	1	1			Building rubble
V345	Tipper Truck	4	1	0.5	0.5		Building rubble





Form: Daily waste data collection (Municipal Parks Vehicles)

Name of Landfill: Second Creek
ID: Municipal Parks Vehicles
Date: 12/01/06

These forms can be modified to better suite the operating conditions at the waste facility

Vehicle Number	Vehicle Type	Vehicle capacity in m ³	Number of loads				Type of waste
V171	4 ton truck	4	1	1	1		Loose grass/small branches
V174	4 ton truck	4	1	1			Loose grass/small branches
V172	4 ton truck	4	0.5	0.5			Loose grass/small branches
V392	5 ton truck	5	1	1			Large logs
V194	5 ton truck	5	1	1	1	1	Large logs
V345	5 ton truck	5	0.5	0.5	0.5		Large logs
V435	4 ton truck	4	1				Loose grass/small branches
V347	4 ton truck	4	1				Loose grass/small branches
V157	5 ton truck	5	1	1	1	1	Large logs
V470	4 ton truck	4	1	1			Loose grass/small branches
V171	4 ton truck	4	0.5	0.5			Loose grass/small branches



4.2.2.4. *In-motion weighing systems*

Portable in-motion weighing systems are an alternative method of estimating the quantity of waste entering a landfill site. Referred to as “*low speed in motion axel scales*” or “*weigh pads*”, these systems have typically been used by long-haul trucking companies to screen vehicle loads to prevent overloading or uneven loading. The system, which uses load cell weight sensors to determine axel loads while the vehicle is in motion, has the potential to act as a ‘portable weighbridge’ at landfill sites.

Research conducted by the Department of Environmental Affairs and Tourism (DEAT, 2005) shows that these in-motion weighing systems can be accurate to within 5% of the waste mass recorded on an installed landfill weighbridge, when used under ideal operating conditions.

Data estimation

As with density-volume estimation systems, in-motion weighing systems must be seen as a temporary measure until a weighbridge can be installed to record accurate data on waste received for landfilling.

4.3. TREATMENT FACILITIES

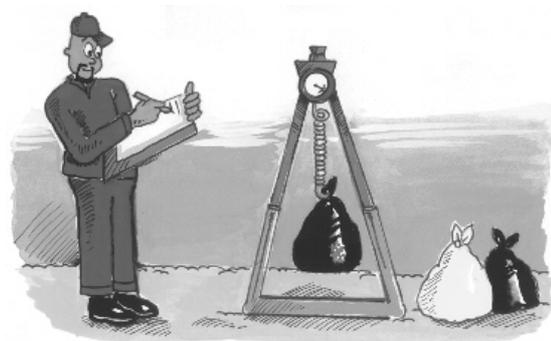
While little difference may exist between private and public treatment technologies, e.g. incinerators, the operation of private and public facilities often differs substantially. Private facilities operate as commercial enterprises, generating income through the treatment of waste. As such, private facilities tend to record and keep accurate data on the quantities and types of waste received for treatment. Public facilities, on the other hand, e.g. incinerators in public hospitals or clinics, tend to operate purely as a service to the health care institution. As a result, data on the tonnages or types of waste treated at public treatment facilities is often not kept.

For this reason, the following section looks separately at data collection in private, commercial treatment facilities and in public treatment facilities. The section on treatment facilities without weighing systems is aimed mainly at public waste treatment facilities within health care institutions.

4.3.1. With weighing systems

As with landfill sites, the collection of waste data at treatment facilities equipped with weighbridges is relatively easy. All vehicles entering the site travel over a weighbridge on the way in and again on the way out. The difference in the mass of the vehicle between the ‘in’ and ‘out’ gives the mass of the waste. This data is typically stored in customised software provided for weighbridge operations. Data captured in these systems can be made available through export functions or through the printing of waste reports.

However, treatment facilities frequently also make use of alternative weighing devices, such as scales, either in the facility or in the trucks collecting the waste. Here the weighing of waste can be facilitated through the use of systems such as transponder or barcode systems, which allow the facility to easily identify the source of the waste container (waste generator).



4.3.2. Without weighing systems

4.3.2.1. Density-volume estimation systems

The section that follows describes the process of setting up a 'waste estimation system' in a health care institution. The system was developed with hospital representatives during the implementation of pilot projects in the Eastern Cape and Mpumalanga provinces to support the development of the South African Waste Information System (SAWIS). Information was also sourced from density-estimation systems used in the implementation of the Gauteng Waste Information System (GWIS).

Waste mass estimation systems for health care risk waste use a formula which requires a waste container size, the average weight per container type and the number of containers, to determine the mass of waste entering the treatment facility. The formula is included below:

How to estimate health care risk waste quantities

Waste quantity is usually measured by mass (kilograms or tonnes).

It can also be less accurately estimated by means of volume (cubic metres).

$$\boxed{\text{Waste mass (kg)}} = \boxed{\text{Container size}} \times \boxed{\text{Average mass}} \times \boxed{\text{Number of containers}}$$

The estimated amount of waste will differ depending on the size of the container, how full the container is and the type of waste which is in the container. While average mass of container types can be found in relevant literature, it is recommended that the theoretical mass be adapted to local conditions. This may be done by weighing certain waste types on a scale or over a weighbridge and then using the new averages as the standard. This should be done regularly to adapt to changing waste composition and associated densities.

4.3.2.2. Templates for implementing a density-volume estimation system

Standard forms and spreadsheets (templates) were developed and used during the SAWIS pilot projects. These forms and spreadsheets are useful to a treatment facility where a mass estimation system is implemented. These templates may be used as an example of a possible system, or customised and used directly at the facility. By using the templates developed during piloting of SAWIS, the monthly data required for upload into SAWIS will be captured in a few easy-to-follow steps. The templates are available from the South African Waste Information Centre (SAWIC) (www.sawic.org.za).

Four Microsoft Excel spreadsheets have been created for implementing a density-volume estimation system at a landfill:

- Daily data collection forms (at treatment facility) – Options 1 and 2
- Daily data collection forms (at generator) – Options 1 and 2
- Monthly data capture forms (at treatment facility)
- Monthly data capture forms (at generator)

Implementing the '*Daily data collection forms*' (at facility and generator) is discussed below, while the '*Monthly data capture forms*' are discussed in Section 5 (About Capturing Data). Since a minimum computer literacy is expected of users, details of how to download, modify or adapt these templates is not provided here. Users should make use of software manuals, e.g. Microsoft Excel, if necessary.



There are two methods of implementing a waste estimation system at a treatment facility located within a public health care institution:

- Where data is collected at the treatment facility
- Where data is collected at the generator (wards or clinics)

(a) Where data is collected at the treatment facility

This option allows for the operator of the treatment facility within the hospital or clinic, to record the number of containers received and processed within the treatment plant on a daily basis (see *Form: Daily waste data collection (at treatment facility)*).

Option 1 makes allowance for a number of different container types and sizes, with the user simply writing down the number of containers collected under each container type. Option 2 is somewhat simplified, with data on only the number of bags and sharps containers required. Option 2 also allows the user to indicate whether the bag collected was full or half full. While these two forms provide two possible options, a combination of the forms may be created by users to better suite their local systems and procedures.

(b) Where data is collected at the generator

A suitable person may not be available every day at the treatment facility to record the number of containers processed. In this case the hospital or clinic may want to record the number of containers collected from each ward daily, in place of what is being treated at the on-site treatment facility. While this option provides valuable data for the generator of the waste, it assumes that all waste generated has been processed, and processed on the same day by the on-site treatment facility, which may not be the case (see *Form: Daily waste data collection (at generator)*).

4.3.2.3. Average health care risk waste mass

There are varying weights for the different health care risk waste container types available in the literature. Health care risk waste will have different densities, depending on the composition of the waste, the moisture content, etc. As such, the density of the health care risk waste may differ from hospital to hospital, or even ward to ward within the hospital or clinic.

The following average mass for health care risk waste containers types (modified and adapted for local conditions) were used in the SAWIS pilot projects.

Container Type	Container Size	Average mass (kg)
Box	50 L	7.5
	140 L	9.5
Sharps	4 L	5.0
	5 L	2.5
	6.6 L	5.0
	7.6 L	5.0
	10 L	4.5
	15 L	5.0
	25 L	7.5
Specican	1.5 L	5.0
	10 L	6.0
Bucket	20 L	5.0
	25 L	5.0
Drum	50 L	5.0
Bag	Large	5.0



Form: Daily waste data collection (at treatment facility) - Option 1

The list of container types can be modified to show only those used within or received by the facility.

Hospital / Facility:	Merafong Private Clinic Incinerator
Date:	12/01/2006

Waste delivered from	Box		Sharps							Specican		Bucket		Drum	Bag	Signature of driver delivering waste	Signature of waste officer receiving waste
	50 L	140 L	4 L	5 L	6.6 L	7.6 L	10 L	15 L	25 L	1.5 L	10 L	20 L	25 L	50 L	Large		
Merafong Private Clinic			5	3		1				3					21		
Klerksdorp Primary Health Care Unit	4	2	1	2		1				1		1					
Klerksdorp Hospital	16	12	8			7	5			4		3					
Total	20	14	14	5	-	9	5	-	-	8	-	4	-	-	21		




Form: Daily waste data collection (at treatment facility) - Option 2

Hospital / Facility:	Merafong Private Clinic Incinerator
Date:	12/01/2006

The list of container types can be modified to show only those used within or received by the facility.

Waste delivered from	Number of Bags		Number of sharps containers		Signature of Driver delivering waste	Signature of Waste Officer receiving waste
	Full	Half	5lt	10lt		
Merafong Private Clinic	17	5	3			
Klerksdorp Primary Health Care Unit	3	5	1	4		
Klerksdorp Hospital	11	7	4	6		
Total	31	17	8	10		




Form: Daily waste data collection (at health care generator) - Option 1

Hospital:	Merafong Private Clinic
Date:	12/01/2006
Round:	1 (6:15 am)

The list of container types can be modified to show only those used within or received by the facility.

Waste collected from	Box		Sharps							Specican		Bucket		Drum	Bag	Signature of Waste Officer	Signature of Unit Manager
	50 L	140 L	4 L	5 L	6.6 L	7.6 L	10 L	15 L	25 L	1.5 L	10 L	20 L	25 L	50 L	Large		
Ward 1			1												2		
Ward 2															2		
Ward 3			1												1		
Ward 4															3		
Ward 5															1		
Children's Ward 1															1		
Children's Ward 2																	
Children's Ward 3																	
Maternity				1						1					2		
Ante-Natal Care Ward																	
Labour Ward				1											1		
Operating Theatre						1				2					2		
Casualty			2												3		
Out Patients Department															1		
ICU			1	1											2		
Total			5	3		1				3					21		




Form: Daily waste data collection (at health care generator) - Option 2

Hospital:	Merafong Private Clinic
Date:	12/01/2006
Round:	1 (6:15 am)

The list of container types can be modified to show only those used within or received by the facility.

Waste collected from	Number of Bags		Number of sharps containers		Number of births or deliveries	Signature of Waste Officer	Signature of Unit Manager
	Full	Half	5lt	10lt			
Ward 1	3	2					
Ward 2	1	4	1				
Ward 3	1						
Ward 4	2	1					
Ward 5			1				
Children's Ward 1			2				
Children's Ward 2			1				
Children's Ward 3	1						
Maternity		1		1			
Ante-Natal Care Ward			3				
Labour Ward	1	3		3	4		
Operating Theatre			2	1			
Casualty			2				
Out Patients Department			1				
ICU				4			
Total	9	11	13	9	4		



4.4. REPROCESSORS

Reprocessors of waste, e.g. paper or plastic reprocessors, typically run commercial ventures. All waste received is usually weighed and recorded, since a company or person delivering waste to a reprocessing facility may request payment for the waste.



If a reprocessor is not currently keeping records of the waste reprocessed, collection of data on the sources, quantities and types of waste should begin.

4.5. EXPORTERS

Exporters of waste, particularly exporters of hazardous waste, must notify the Department of Environmental Affairs and Tourism in writing of their intent to export waste. This is a legal requirement under the Basel Convention. A '*Transboundary Movement of Waste – Notification Form*' and a '*Transboundary Movement of Waste – Movement Document*' must be completed and submitted to government for approval prior to the importation and/or exportation of waste.

The quantity of waste being exported must be determined accurately by the exporter, by weighing the waste prior to exportation, as information required on the Basel Convention forms includes, among other things:

- Actual quantity (kg)
- Details of the waste type

This information is relevant to data required for the SAWIS.



5. ABOUT CAPTURING DATA

IN THIS SECTION FIND OUT ABOUT:

- The capturing of data into ICT systems
- Possible templates that may be modified and used to capture waste data, particularly when data estimation systems have been implemented at facilities.



5.1. INTRODUCTION

Once data has been collected (e.g. at the landfill site) it must be captured into a 'system'. This system may be:

- customised software for your company, e.g. adapted billing software;
- software provided with the weighbridge; or
- a standard spreadsheet, e.g. Microsoft Excel.

It is recommended that data be captured electronically to allow the user to:

- easily access the data again in the future;
- work the data into the required format for SAWIS; and
- produce further statistics and information which may be relevant to the operation of the facility.

5.2. LANDFILLS

5.2.1. With data capture systems

Due to the widely varying range of off-the-shelf Information and Communication Technology (ICT) systems available for data capture, e.g. financial systems, weighbridge software, administrative systems etc., no further information is provided here for the capturing of waste data collected at facilities. User Manuals provided with the software should be consulted.

It is important to note that any ICT system used by a company to capture waste data should be customised to allow for the easy capture and export of this data in the required format for upload into the SAWIS.

5.2.2. Without data capture systems

The following section explains how to capture collected waste data where customised software is not available, e.g. where the user makes use of a spreadsheet. This section is particularly relevant to facilities that have collected data through a waste mass estimation system, where no weighbridge was in place.

5.2.2.1. Templates for capturing data at landfills

Standard templates (spreadsheets) were developed and used during the SAWIS pilot projects. These spreadsheets may be useful to a landfill site that does not have customised software to capture collected waste data. These templates may be used either as an example of a possible system, or customised and used directly at the landfill. By using these templates, the monthly data required for

Data capture

Data will only be reused by a waste facility if it is:

- useful,
- accessible,
- available in a format which is useable.

To support the intentions of the SAWIS, the collected data should be captured electronically to facilitate further data use.



upload into SAWIS will be captured in a few easy-to-follow steps. The templates are available from the South African Waste Information Centre (SAWIC) at <http://www.sawic.org.za>.

Two standard templates have been created in Microsoft Excel for the capturing of data collected at the landfill:

- Landfill monthly data capture form
- Landfill annual data summary form

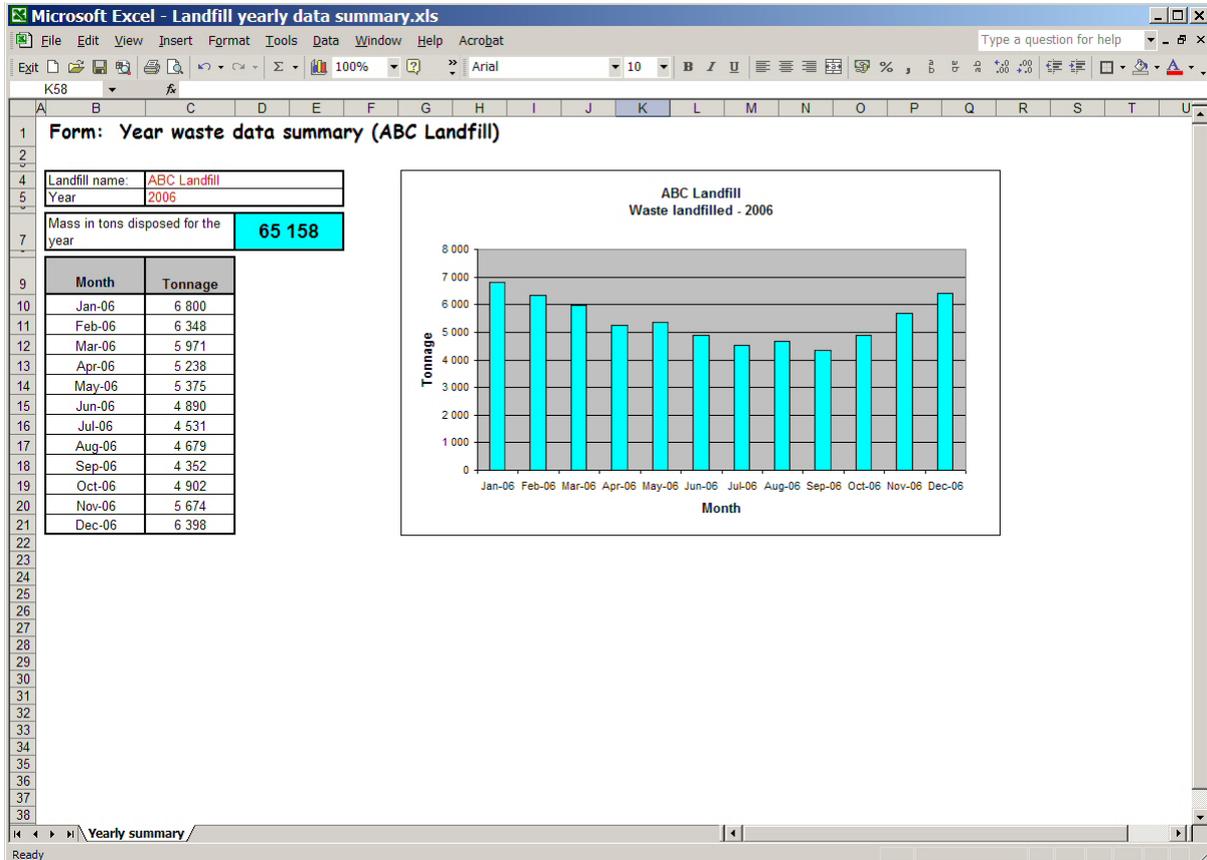
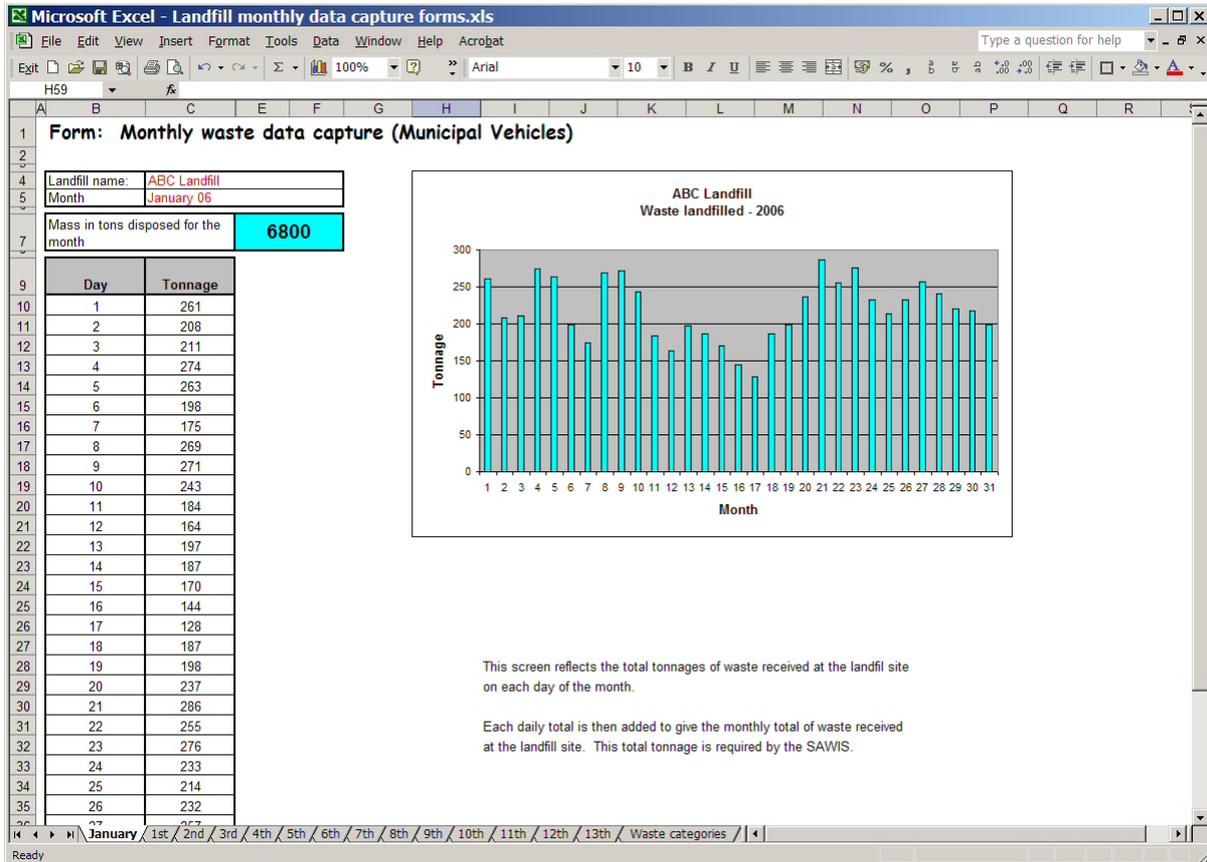
Once data has been collected, e.g. using the 'daily waste data collection form', it should be entered into the landfill 'monthly data capture form'. The 'monthly data capture form' has been developed to transfer handwritten data collected at the landfill into a spreadsheet, from where the monthly tonnages of waste can be calculated. The 'monthly data capture form', developed as a Microsoft Excel spreadsheet, is divided into different worksheets, as indicated in the figure below. Each worksheet represents a day of the month.

Vehicle Number	Vehicle Type	Cubic meters of vehicle (A)	Number of Loads												Loading full=1 half=0.5	Total (B)	Type of waste	Density kg/m ³ (C)	Mass in tons = A*B*C/1000		
V141	4 Ton Truck	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	Domestic uncompacted	200	4.0
V215	Load Luger	6	0.5	1	1	1	0.5	1	1									5	Domestic uncompacted	200	6.0
V217	Load Luger	6	1	1														2	Domestic uncompacted	200	2.4
V218	Load Luger	6	1															1	Domestic uncompacted	200	1.2
V219	Compactor	19	0.5	0.5	1	1	1	1	1	1	1	1	1	1	1	1	1	7	Domestic waste compacted in REL	500	66.5
V220	Compactor	11	1	1	1	1												3	Domestic waste compacted in REL	500	16.5
V221	Compactor	19	1	1	1	1												4	Domestic waste compacted in REL	500	38.0
V222	Compactor	19	1	1	1	1												3	Domestic waste compacted in REL	500	28.5
V223	Compactor	19	1															0	Domestic waste compacted in REL	500	0.0
V224	Compactor	19	1	1														2	Domestic waste compacted in REL	500	19.0
V225	Compactor	15	1															1	Domestic waste compacted in REL	500	7.5
V226	Compactor	19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	Domestic waste compacted in REL	500	66.5
V97	Bakkie	1	1	1														2	Building rubble/concrete/sand/fiber glass/bricks/ceramics	750	1.5
V388	Bakkie	1	1	1														1	Building rubble/concrete/sand/fiber glass/bricks/ceramics	750	0.8
V433	Bakkie	1	1	1														1	Building rubble/concrete/sand/fiber glass/bricks/ceramics	750	0.8
V436	Bakkie	1	1	1	1													2	Building rubble/concrete/sand/fiber glass/bricks/ceramics	750	1.5
V443	Bakkie	1	1															1	Loose grass/small branches	200	0.2
V448	Bakkie	1	1															1	Loose grass/small branches	200	0.2
V477	Bakkie	1																0			0.0
V590	Bakkie	1																0			0.0
V591	Bakkie	1																0			0.0
V592	Bakkie	1																0			0.0
V641	Bakkie	1																0			0.0
V642	Bakkie	1																0			0.0
V680	Bakkie	1																0			0.0
D040	Bakkie	1																0			0.0
V584	4 ton truck	4																0			0.0
V141	4 ton truck	4																0			0.0
V186	4 ton truck	4																0			0.0
V302	4 ton truck	4																0			0.0
V383	4 ton tipper truck	4																0			0.0
V422	4 ton truck	4																0			0.0
V612	4 ton truck	4																0			0.0
V613	4 ton truck	4																0			0.0
V614	4 ton truck	4																0			0.0
V615	4 ton truck	4																0			0.0
V616	4 ton truck	4																0			0.0

Before use, the spreadsheet should be customised to reflect the format in which the data has been collected, i.e. the *landfill daily waste data collection form*. The spreadsheet has been set up with formulas to assist the user with the calculation of daily and monthly tonnages. The 'Total waste for the day' which is reflected in Cell S4 (blue cell at the top right), indicates the total tonnage of waste received at the landfill site on that day.

Each daily worksheet in the spreadsheet is linked to a summary worksheet for the selected month, as shown in the figure below. The total waste for the day from each worksheet is automatically added to the daily total in the summary worksheet to provide a total monthly tonnage of waste received at the landfill site.





The data collected and captured may have been based on estimations. If so, it is advisable to weigh the received waste from time to time to ensure that the estimations are within an acceptable error factor. The waste estimation system has now been implemented. It is important to review the system regularly to determine if it is possible to save time or improve on the forms in any other way.

Using the above templates, all data required for SAWIS may be collected. Although the annual total tonnage of waste disposed at the landfill site is not required for SAWIS purposes, it may be useful information to the facility. In addition to the tables, useful graphs (as shown above) can be included to represent the results from the month and/or year.

5.3. TREATMENT FACILITIES

5.3.1. With data capture systems

Due to the widely varying range of off-the-shelf ICT systems available for data capture, e.g. financial systems, weighbridge software, administrative systems etc., no further information is provided here for the capturing of waste data collected at facilities. User Manuals provided with the software should be consulted.

It is important to note that any ICT system used by a company to capture waste data should be customised to allow for the easy capture and export of this data, in the required format, for upload into the SAWIS.

5.3.2. Without data capture systems

The following section explains how to capture collected waste data where customised software is not available, e.g. where the user makes use of a spreadsheet. This section is particularly relevant to facilities that have collected data through an estimation system, where no weighbridge is in place.

5.3.2.1. Templates for capturing data at treatment facilities

Standard templates (spreadsheets) were developed and used during the SAWIS pilot projects. These spreadsheets may be useful to a treatment facility that does not have customised software to capture collected waste data. These templates may be used either as an example of a possible system, or customised and used directly at the facility. By using these templates, the monthly data required for upload into SAWIS will be captured in a few easy-to-follow steps. The templates are available from the South African Waste Information Centre (SAWIC) at <http://www.sawic.org.za>.

Three standard templates have been created in Microsoft Excel for the capturing of data collected at the treatment facility:

- Treatment facility daily-monthly data capture form (Option 1)
- Treatment facility weekly-monthly data capture form (Option 2)
- Treatment facility annual data summary form

Once data has been collected, e.g. using the '*daily waste data collection form*', it should be entered into the '*treatment facility monthly data capture form*'. The '*monthly data capture form*' has been developed to transfer handwritten data captured at the treatment facility into a spreadsheet from where the monthly tonnages of waste can be calculated. The '*monthly data capture form*', developed as a Microsoft Excel spreadsheet, is divided into different worksheets, as indicated in the figure below. Two different monthly spreadsheets were developed during piloting, a day-month spreadsheet (Option 1), which allows for data to be captured daily, and a week-month spreadsheet (Option 2), which allows for data to be captured weekly.



Microsoft Excel - Treatment facility monthly data capture forms (at generator).xls

Form: Monthly waste data capture form (at generator)

Hospital: XYZ Hospital
 Date: 01-Jan-06
 Round: 8:15 am (Round 1)

Total waste for the day: 0.8915

Waste collected from	Box		Sharps						Specican		Bucket		Drum	Bag	Estimated tonnes
	50L	140L	4L	5L	6.6L	7.6L	10L	15L	25L	1.5L	10L	20L	25L	50L	
Ward 1	3		7											2	0.0675
Ward 2			1											2	0.0150
Ward 3	5		5											1	0.0675
Ward 4	6													3	0.0600
Ward 5	1			3										1	0.0200
Ward 6	1			3			3								0.0285
Ward 7	7														0.0525
Ward 8	3			2											0.0275
Ward 9	8														0.0600
Ward 10															
Children's Ward 1	3			3										1	0.0350
Children's Ward 2															
Children's Ward 3															
Maternity	1			5					1					2	0.0350
Ante-Natal Care Ward		4													0.0380
Labour Ward		3		4										1	0.0435
Operating Theatre	4					1			2					2	0.0550
CSSD		7													0.0665
Casualty	2		2											3	0.0400
Out Patients Department		7												1	0.0715
ICU	1		1	1										2	0.0250
Dental Clinic		5													0.0475
X-Ray	1														0.0075
Bambanani Clinic		3													0.0285
Total	46	29	16	21		1	3		3					21	0.8915

Average containers weights:

Container	Weight	Unit
Box	50 L	7.5 kg
	140 L	9.5 kg
Sharps	4 L	5.0 kg
	5 L	2.5 kg
	6.6 L	5.0 kg
	7.6 L	5.0 kg
	10 L	4.5 kg
	15 L	5.0 kg
	25 L	7.5 kg
Specican	1.5 L	5.0 kg
	10 L	6.0 kg
Bucket	20 L	5.0 kg
	25 L	5.0 kg
Drum	50 L	5.0 kg
Bag	Large	5.0 kg

* Although typical containers weights are given here in kilograms, the mass of waste in the neighbouring spreadsheet is converted into

Microsoft Excel - Treatment facility monthly data capture forms (at generator) Option 2.xls

Form: Monthly waste data capture form (at generator)

Hospital: Themba Hospital
 Week: Seventeen (23-04-06 to 29-04-06)

Total waste for the week: 0.623

Waste Source	No of Bags for week		Total no of bags	Mass in tons @ 4kg/bag	No of deliveries	Mass of placentas @ 0.6 kg per placenta	Estimated kg of human tissue	Mass in tons of human tissue	Sharps				Mass of sharps in tons	Total mass of waste per ward
	Full	Half							20lt	5kg/20lt	5lt	1.25kg/5lt		
Ward 1	1	5	3.5	0.014		0.000	0	0	1	0.005		0.0000	0.0050	0.019
Ward 2	2		2	0.008		0.000	0	0	4	0.02	4	0.0050	0.0250	0.033
Ward 3			0	0.000		0.000	0	0	2	0.01		0.0000	0.0100	0.010
Ward 4	3		3	0.012		0.000	0	0				0.0000	0.0000	0.012
Ward 5	6	3	7.5	0.030		0.000	0	0			2	0.0025	0.0025	0.033
Ward 6	1	1	1.5	0.006		0.000	0	0			1	0.0013	0.0013	0.007
Ward 7	5		5	0.020		0.000	0	0			1	0.0013	0.0013	0.021
Ward 8	1	1	1.5	0.006		0.000	0	0	2	0.01		0.0000	0.0100	0.016
Ward 9	4		4	0.016		0.000	0	0	2	0.01		0.0000	0.0100	0.026
Ward 10	11		11	0.044		0.000	0	0			4	0.0050	0.0050	0.049
Children's Ward 1	2		2	0.008		0.000	0	0	3	0.015		0.0000	0.0150	0.023
Children's Ward 2	2	3	3.5	0.014		0.000	0	0	3	0.015		0.0000	0.0150	0.029
Children's Ward 3	4		4	0.016		0.000	0	0			1	0.0013	0.0013	0.017
Maternity	1		1	0.004	3	0.000	0	0			2	0.0025	0.0025	0.007
Ante-Natal Care Ward	2	5	4.5	0.018		0.000	0	0			5	0.0063	0.0063	0.024
Labour Ward	4		4	0.016	6	0.000	0	0	5	0.025	3	0.0038	0.0288	0.045
Operating Theatre	6		6	0.024		0.000	0	0	3	0.015		0.0000	0.0150	0.039
CSSD	8	3	9.5	0.038		0.000	0	0			1	0.0013	0.0013	0.039
Casualty	9		9	0.036		0.000	0	0	6	0.03	1	0.0013	0.0313	0.067
Out Patients Department	3		3	0.012		0.000	0	0	3	0.015		0.0000	0.0150	0.027
ICU	6	2	7	0.028		0.000	0	0				0.0000	0.0000	0.028
Dental Clinic	2	2	3	0.012		0.000	0	0				0.0000	0.0000	0.012
X-Ray	2	7	5.5	0.022		0.000	0	0				0.0000	0.0000	0.022
Bambanani Clinic	4	1	4.5	0.018		0.000	0	0				0.0000	0.0000	0.018
Total Mass														0.623



Before use, the spreadsheet should be customised to reflect the format in which the data has been collected, i.e. the 'treatment facility daily waste data collection form'. The spreadsheet has been set up with formulas to assist the user with the calculation of daily/weekly and monthly tonnages. The 'Total Daily Tonnage' (Option 1) or the 'Total Weekly Tonnage' (Option 2), indicates the total tonnage of waste received at the treatment facility for processing.

Each worksheet in the spreadsheet is linked to a summary worksheet for the selected month, as shown in the figure below. The total waste for the day/week from each worksheet is automatically added to the total in the summary worksheet to provide a total monthly tonnage of waste received at the landfill site.

Form: Monthly waste data capture form (at generator)

Hospital: XYZ Hospital
 Month: January 2006

Total waste for the month: 1.3165

Estimated average mass of container and waste, per container type.

Waste collected from	Box		Sharps							Specican		Bucket		Drum	Bag		Estimated tonnes
	50L	140L	4L	5L	6.6L	7.6L	10L	15L	25L	1.5L	10L	20L	25L	50L	Large		
Ward 1	3		11												8	0.1175	
Ward 2			1												4	0.0250	
Ward 3	5		9												3	0.0975	
Ward 4	6														6	0.0750	
Ward 5	1			3											2	0.0250	
Ward 6	1			3			3									0.0285	
Ward 7	7															0.0525	
Ward 8	3			2												0.0275	
Ward 9	8															0.0600	
Ward 10																	
Children's Ward 1	3			3											10	0.0800	
Children's Ward 2																	
Children's Ward 3																	
Maternity	1			8						6					7	0.0925	
Ante-Natal Care Ward		4														0.0380	
Labour Ward		3		9											6	0.0810	
Operating Theatre	4					3				13					12	0.1700	
CSSD		7														0.0665	
Casualty	2		4												7	0.0700	
Out Patients Department		7													2	0.0765	
ICU	1		2	5											4	0.0500	
Dental Clinic		5														0.0475	
X-Ray	1															0.0075	
Bambanani Clinic		3														0.0285	
Total	46	29	27	33		3	3			19				71	1.3165		

Average containers weights:

Box	50 L	7.5	kg
	140 L	9.5	kg
	4 L	5.0	kg
	5 L	2.5	kg
	6.6 L	5.0	kg
Sharps	7.6 L	5.0	kg
	10 L	4.5	kg
	15 L	5.0	kg
	25 L	7.5	kg
Specican	1.5 L	5.0	kg
	10 L	6.0	kg
Bucket	20 L	5.0	kg
	25 L	5.0	kg
Drum	50 L	5.0	kg
Bag	Large	5.0	kg

* This table provides the total monthly data for the waste generated within the identified hospital or clinic (a surrogate for what has been treated at the associated public health care waste treatment facility)
 * A worksheet for each day of the month (31 worksheets) must be created and linked to this Monthly Total worksheet

The data collected and captured may have been based on estimations. If so, it is advisable to weigh the received waste from time to time to ensure that the estimations are within an acceptable error factor. The waste estimation system has now been implemented. It is important to review the system regularly to determine if it is possible to save time or improve on the forms in any other way.

Using the above templates, all data required for SAWIS may be collected. Although the annual total tonnage of waste disposed at the treatment facility is not required for SAWIS purposes, it may be useful information to the facility. In addition to the tables, useful graphs (as shown below) can be included to represent the results from the month and/or year.

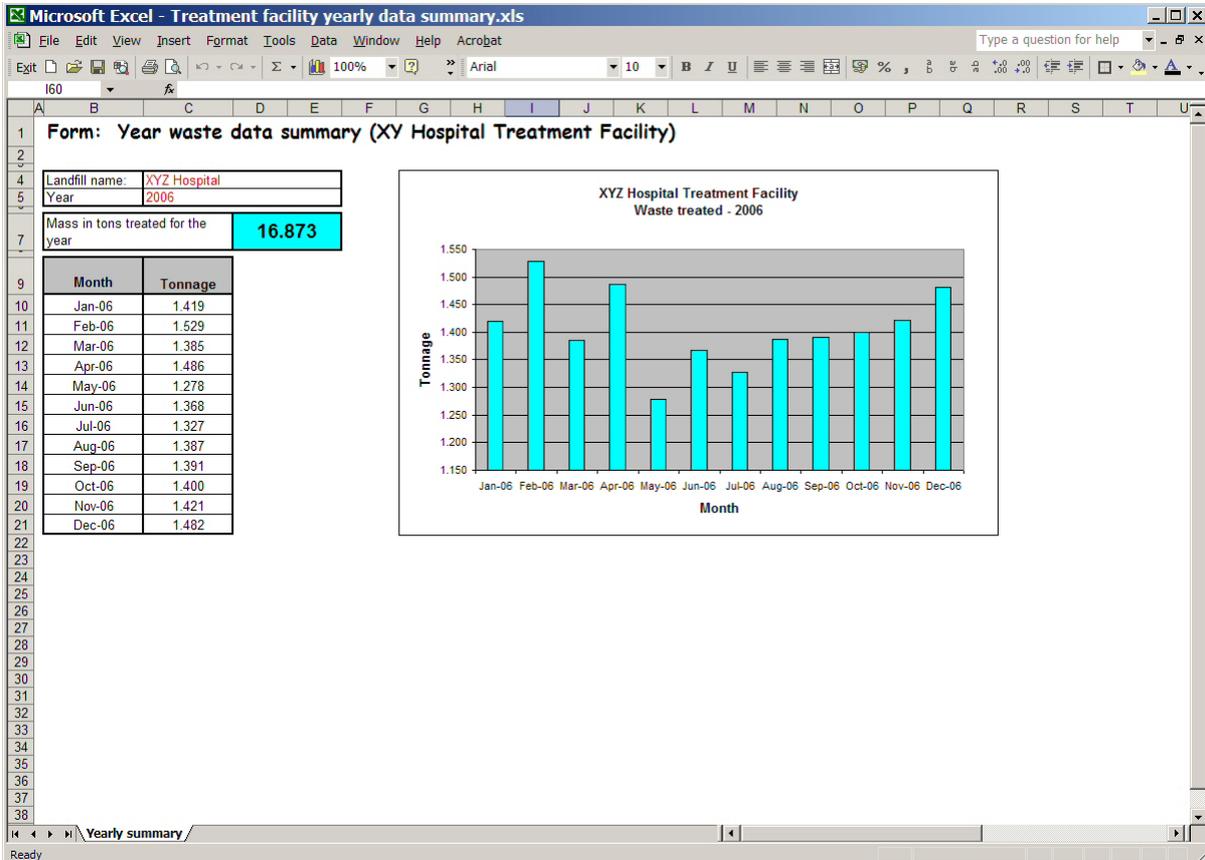


Microsoft Excel - Treatment facility monthly data capture forms (at generator) Option 2.xls

Form: Monthly waste data capture form (at generator)

Hospital: Themba Hospital
Month: April 2006

Waste Source	Mass in tonnes per week of waste for incineration					Total per Ward
	26-03-06 to 01-04-06 Week 13	02-04-06 to 08-04-06 Week 14	09-04-06 to 15-04-06 Week 15	16-04-06 to 22-04-06 Week 16	23-04-06 to 29-04-06 Week 17	
Ward 1	0.012	0.005	0.000	0.000	0.019	0.036
Ward 2	0.025	0.015	0.000	0.000	0.033	0.073
Ward 3	0.012	0.013	0.000	0.000	0.010	0.035
Ward 4	0.004	0.009	0.000	0.000	0.012	0.025
Ward 5	0.011	0.004	0.000	0.000	0.033	0.048
Ward 6	0.030	0.008	0.000	0.000	0.007	0.046
Ward 7	0.030	0.075	0.000	0.000	0.021	0.126
Ward 8	0.005	0.000	0.000	0.000	0.016	0.021
Ward 9	0.023	0.036	0.000	0.000	0.026	0.085
Ward 10	0.008	0.000	0.000	0.000	0.049	0.057
Children's Ward 1	0.020	0.032	0.000	0.000	0.023	0.075
Children's Ward 2	0.014	0.005	0.000	0.000	0.029	0.048
Children's Ward 3	0.016	0.006	0.000	0.000	0.017	0.039
Maternity	0.039	0.009	0.000	0.000	0.007	0.054
Ante-Natal Care Ward	0.024	0.006	0.000	0.000	0.024	0.054
Labour Ward	0.005	0.009	0.000	0.000	0.045	0.059
Operating Theatre	0.040	0.033	0.000	0.000	0.039	0.112
CSSD	0.004	0.012	0.000	0.000	0.039	0.055
Casualty	0.056	0.036	0.000	0.000	0.067	0.159
Out Patients Department	0.000	0.022	0.000	0.000	0.027	0.049
ICU	0.004	0.044	0.000	0.000	0.028	0.076
Dental Clinic	0.006	0.037	0.000	0.000	0.012	0.055
X-Ray	0.004	0.010	0.000	0.000	0.022	0.036
Bambanani Clinic	0.006	0.040	0.000	0.000	0.018	0.064
Total Mass for incineration for April 2006						1.486



5.4. REPROCESSORS

While no specific templates for reprocessors were developed during the piloting of the SAWIS, a similar approach to that adopted in preparing the templates shown in the previous sections may be used for any waste facility type.

Templates were not required in the pilot for reprocessors, as most reprocessors had their own existing systems for capturing waste data.



5.5. EXPORTERS

While no specific templates were developed for waste exporters during the piloting of the SAWIS, a similar approach to that adopted in preparing the templates shown in the previous sections may be used for any waste facility type.

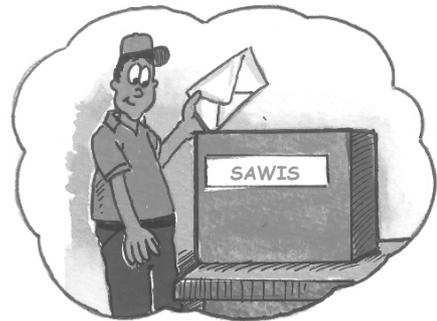
Templates were not required in the pilot for waste exporters, as most exporters had their own existing systems for capturing waste data.



6. ABOUT SUBMITTING DATA

IN THIS SECTION FIND OUT ABOUT:

- Submitting your data to the SAWIS
- Supporting system users' manuals.



6.1. INTRODUCTION

Data is ready to submit to the SAWIS once it has been:

1. collected on site;
2. collated into the required format and captured into, e.g. a spreadsheet;
3. verified as correct by the owner of that data.

The required waste data can be submitted in one of two ways:

- directly into the SAWIS via the Internet (www.sawic.org.za); or
- manually to the Provincial Department of Environment, e.g. as a printout of data or a file saved on a disk

A users' manual (See Annexure 3) have been created to assist data providers with firstly registering on the system and secondly entering data into the SAWIS. These are the:

- Central Registry Users' Manual; and
- Waste Information System Users' Manual

Users' manuals have also been created to assist provincial and national administrators of the system with reviewing and approving registrations and data. These are the:

- Provincial Administrators' Central Registry and Waste Information System Users' Manual
- National Administrators' Central Registry and Waste Information System Users' Manual

The Users' Manual (with the exception of the Administrator Manuals) can be downloaded from the South African Waste Information Centre (SAWIC) at <http://www.sawic.org.za>.

6.2. USERS' MANUAL

The SAWIS Users' Manual provides users with information on the following topics:

- 1 Quick Start
- 2 Overview
- 3 Data requirements
- 4 Users
 - Activity User
 - Municipal User
 - Provincial Administrator
 - National Administrator
 - Public User
- 5 Functions
 - Login
 - Waste data
 - Reports



- Extract data
- Logout

6 Frequently Asked Questions (FAQs)

The Users' Manual is a step-by-step guide on how to get your data in the SAWIS. Alternatively, if you have problems getting your data into SAWIS, you can contact your provincial or national administrator who will be able to provide further help.

It is also the intention of government to hold regular workshops and training sessions on the SAWIS to ensure that the system users are fully capacitated to use the SAWIS.

6.3. ADMINISTRATORS' MANUAL

The Administrators' Manuals are designed for Provincial and National Administrators of the Central Registry and SAWIS. The manuals provide system administrators with information on the following topics:

- System overview
- Login
- Authorising waste data
- Reporting
- Linking activities
- Changing passwords
- Waste Data
- Help

The Administrators' Manuals can be obtained directly from DEAT.



7. ABOUT VERIFYING DATA

IN THIS SECTION FIND OUT ABOUT:

- The importance of verifying data before submitting it to the SAWIS
- Ways of verifying your data



7.1. INTRODUCTION

After data has been entered into SAWIS by the data provider, the verification of data is the next most important step in the process. To ensure that data in SAWIS can be used for all its intended purposes (see Section 1), the data must be accurate and reliable. Decisions based on inaccurate or unreliable data can impact the decision-making process negatively.

7.2. APPROACH

A five-phased data verification process for SAWIS is recommended:

By data provider:

1. Pre-data entry (i.e. before submitting data to SAWIS) verification of data by data provider:
 - Data is re-checked against source information, e.g. weighbridge slips
 - Calculations are checked, e.g. spreadsheet templates with automatic summation
2. Post-data entry (i.e. after submitting data to SAWIS) verification of data by data provider:
 - Data is checked for obvious inaccuracies, e.g. typing mistakes
 - Data consistency checks are employed, e.g. check against previous months' data

By Provincial Administrator (for all data in province):

3. Preliminary verification of data by provincial administrator
 - Data is checked for obvious inaccuracies, e.g. order of magnitude, facility capacity checks
 - Data consistency checks are employed, e.g. check against previous months/years data
4. Verification of data by provincial administrator
 - Audits may be conducted at selected facilities so as to:
 - Check calculations used in original data capture
 - Check data submitted against original source information, e.g. weighbridge slips

By National Administrator (for all data in South Africa):

5. Final verification of data by national administrator (for all data in South Africa)
 - Data is checked for obvious inaccuracies, e.g. order of magnitude, facility capacity checks
 - Data consistency checks are employed, e.g. check against previous months/years data

Definition

Data verification is defined as "*Assessing data accuracy, completeness, consistency, availability and internal control practices that serve to determine the overall reliability of the data collected.*"



Upon collating data received from all provinces, the National Administrator may request that provinces revisit their data to clarify any inconsistencies or to check the accuracy of data submitted to SAWIS. Provinces may then further request that waste facilities revisit their data to clarify any inconsistencies.



8. ABOUT DISSEMINATING DATA

IN THIS SECTION FIND OUT ABOUT:

- The importance of disseminating data and statistics
- Ways of disseminating waste data



8.1. INTRODUCTION

The SAWIS is not only about getting data into a system, but also about collating data so as to make it available for reuse by government, the waste sector and the general public (See Section 1.3). Once all data for a year has been entered into SAWIS and verified, this data may be used to produce:

- statistics
- summary reports, e.g. an annual State of Waste Report for South Africa.

8.2. ON-LINE REPORTS

Automatically generated, on-line, summary waste reports are available at the end of a reporting year via the South African Waste Information System (SAWIC). Reports can be accessed via the following Internet address: <http://www/sawic.org.za>. A number of different queries can be generated via the on-line reports.

Data will only be made available at the end of the reporting year, to ensure that all data released through the on-line reports has been verified by government as a true reflection of the state of waste in South Africa.

Data in = Data out

SAWIS is not only about collecting data. More importantly it is about making data available to government, industry and the public.

8.3. ANNUAL STATE OF WASTE REPORT

An Annual State of Waste Report for South Africa provides a formal mechanism for government to publish the waste figures from the preceding year. The Department of Environmental Affairs and Tourism and Department of Water Affairs and Forestry (DWAF) are doing something comparable with the State of Rivers Report for South Africa.

8.4. STATE OF ENVIRONMENT REPORT

The Department of Environmental Affairs and Tourism publishes a national State of Environment Report for South Africa approximately every 5 years. Data from the SAWIS will provide valuable input into this report.

Provincial State of Environment Reports for South Africa are also produced, to which the SAWIS data will also contribute valuably.

state of the
environment
South Africa 1999
-an overview



9. REFERENCES

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- Republic of South Africa, 2000. White Paper on Integrated Pollution and Waste Management for South Africa. A policy on pollution prevention, waste minimisation, impact management and remediation. Government Gazette Vol. 417, No.20978, 17 March 2000. General Notice 227 of 2000.
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10. GLOSSARY AND ACRONYMS

Capacitate	To render fit or make qualified; capable; enable, through e.g. training
Compound error	
Cost recovery	To recover all of the costs associated with a system, programme or service to ensure long-term sustainability.
DWIO	District waste information officer (See Annexure 1)
Diversion	The act or an instance of diverting or turning aside; deviation
General waste	See legal definition for general waste in South Africa
G:M:B	General waste landfill site with a maximum deposition rate of < 500 tons per day
G:L:B	General waste landfill site with a maximum deposition rate of > 500 tons per day
GHS	Globally Harmonised System – the United Nations system for the classification and labeling of chemicals
Hazardous waste	See legal definition for hazardous waste in South Africa
Health care risk waste	See legal definition for health care risk waste in South Africa
HCI	Health Care Institution
HCRW	Health Care Risk Waste
Ideal operating conditions	
Loading factor	
NWISA	National waste information system administrator (See Annexure 1)
PWISA	Provincial waste information system administrator (See Annexure 1)
RWIO	Regional waste information officer (See Annexure 1)
Reprocessors	
SAWIC	South African Waste Information Centre
SAWIS	South African Waste Information System
Spotter	a person employed at a landfill site to monitor waste entering the site and to direct a waste disposal vehicle to the current and preferred tip face suitable for that vehicle
Sustainable	
Variance	
Waste deposition rate	The weight of waste deposited to landfill in a given unit of time.



WCO	Waste Collection Officer (See Annexure 1)
WDCO	Waste Data Collection Officer (See Annexure 1)
WIO	Waste Information Officer (See Annexure 1)



Annexures



Annexure 1 Job Descriptions

Facilities personnel:

- Waste Data Collection Officer (WDCO)
- Waste Collection Officer (WCO)
- Waste Information Officer (WIO)

Government personnel:

- Provincial Waste Information System Administrator (PWISA)
- District waste information officer (DWIO)
- National Waste Information System Administrator (NWISA)
- Regional waste information officer (RWIO)



Position:	Waste Data Collection Officer	Position Type:	Full-time
Location:	At landfill gate	Duties:	Recording waste data from all vehicles entering landfill site.

The Waste Data Collection Officer (WDCO) (See Section 3) will have the following tasks in collecting data at the landfill site (or waste facility):

1. Record relevant data (quantity of waste, type of waste, source of waste) on all vehicles entering and disposing of waste at the landfill site on a daily basis (See Section 4). This may be done by means of:
 - a computer system at the weighbridge, or
 - a paper form.

In terms of the Minimum Requirements for Waste Disposal by Landfill (DWAf, 1998), all G:M:B and G:L:B landfill sites should have a Spotter present at the access to the site to inspect waste types entering the site. This Spotter would be ideally suited to collect data on waste entering the site. Where a 'waste data estimation system' is being used at the landfill, the responsibilities of the WDCO may be more difficult and onerous to implement. Care should be taken by the WDCO when estimating the tonnage of waste entering a landfill site.

The WDCO will need to implement the following 6 steps in estimating the tonnage of waste entering the landfill:

- Step 1:** Relevant data on all vehicles entering the landfill site on a daily basis must be recorded.
- Step 2:** Estimate and record (on the form) the volume of the vehicle. The volume of the vehicles can be determined in a number of different ways (See Section 4).
- Step 3:** Once the volume has been determined the vehicle should be inspected to determine the loading, i.e. is the vehicle full or half-full. This should be recorded.
- Step 4:** Determine the type of waste being disposed of. Different waste types have different densities and therefore have different weights. For example a load of sand will weigh more than a load of loose grass clippings. A number of different waste types have been identified as well as common mixes of waste. These different waste types as well as their associated densities have been recorded and included in Section 4.
- Step 5:** At the end of each day the completed forms are to be submitted to the WIO; and
- Step 6:** Should new forms be required, the WDCO should inform the WIO of this in good time to ensure that no delays are experienced.

Inherent requirements of the job – Competency Profile

1. Knowledge	In order to fill the post efficiently and effectively, the incumbent must have a general knowledge of: <ul style="list-style-type: none"> ○ Waste type ○ Vehicle identification ○ Vehicle access control 		
2. Skills	<ul style="list-style-type: none"> ○ Basic literacy and numerous ○ Basic problem solving skills 	<ul style="list-style-type: none"> ○ Communication (verbal and written) 	<ul style="list-style-type: none"> ○ Basic planning and organisation
3. Learning indicator	<ul style="list-style-type: none"> ○ In-service training 		
4. Personal attributes	<ul style="list-style-type: none"> ○ Ability to gather data and information ○ Attention to detail ○ Ability to work under pressure ○ Ability to ask for assistance ○ Self motivating 	<ul style="list-style-type: none"> ○ Ability to work with "difficult" clients ○ Ability to communicate effectively ○ Ethical ○ Integrity 	



Position:	Waste Collection Officer	Position Type:	Full-time
Location:	Within health care institution	Duties:	Record waste data on waste collected from the wards.

The WCO will have the following tasks in implementing the waste collection system:

1. Collect health care risk waste (HCRW) from all generation points within the health care institution;
2. Complete the waste collection form (See Section 4) at each generation point.

The WCO will need to implement the following 7 steps in estimating the tonnage of waste collected from each ward or theatre within the health care institution:

- Step 1:** At each generation point, count and record on the form provided (Section 4) the number of full and half-full waste containers removed. The number should be written in the column associated with the size of the container, e.g. 5L or 10L sharps containers;
- Step 2:** At the maternity section the WCO is to enquire from the Health Care Professional on duty the number of deliveries/births (placentas) recorded for the day and record the number on the form provided (if waste is collected more than once a day this figure should only be recorded once, either on the last or first shift of the day);
- Step 3:** The form provided allows for the information recorded at each generation point to be verified by the Health Care Professional on duty;
- Step 4:** When waste is received for treatment from other institutions for example clinics in the area, or other hospitals, this waste is also to be recorded. A form has been provided for this purpose (Section 4). The number of full and half-full waste containers should be counted and recorded on the form;
- Step 5:** The nurse on duty may wish to countersign as a confirmation of the waste tonnages removed from the generation point, but this is not necessary if it will delay the normal functioning of waste collection. Many institutions have requested the countersigning option as verification for management purposes. The template prepared includes the countersigning option;
- Step 6:** At the end of each day the completed forms are to be submitted to the WIO; and
- Step 7:** Should new forms be required the WCO should inform the WIO of this in good time to ensure that no delays are experienced.

Inherent requirements of the job – Competency Profile

1. Knowledge	In order to fill the post efficiently and effectively, the incumbent must have a general knowledge of: <ul style="list-style-type: none"> ○ Waste type ○ Container identification ○ Layout and access within institution (logistics of premises) and responsible persons in sections ○ Collection schedules 		
2. Skills	<ul style="list-style-type: none"> ○ Basic literacy and numerousy ○ Basic problem solving skills 	<ul style="list-style-type: none"> ○ Basic planning and organisation ○ Communication (verbal and written) 	<ul style="list-style-type: none"> ○ Basic analytical thinking ○ Basic maintenance skills
3. Learning indicator	<ul style="list-style-type: none"> ○ In-service training 		
4. Personal attributes	<ul style="list-style-type: none"> ○ Ability to gather data and information ○ Attention to detail. ○ Self motivating ○ Service orientated 	<ul style="list-style-type: none"> ○ Ability to systematically complete tasks ○ Ability to communicate effectively ○ Ethical ○ Integrity 	

The Waste Collection Officer should have a general understanding of why they are collecting data.



Position:	Waste Information Officer	Position Type:	Part-time
Location:	At office	Duties:	Capture waste data submitted to office by WDCO or WCO.

The Waste Information Officer (WIO) (See Section 3) will have the following tasks in capturing data from a landfill site

1. Collate all data collected by means of weighbridge software
2. Collate all completed paper forms (data collected by WDCO)

Where a 'waste data estimation system' has been implemented at the landfill, the responsibilities of the WIO may be more difficult and onerous to implement. Care should be taken by the WIO when capturing the hand-written data into a computer system, to ensure no typing errors occur.

The WIO will need to implement the following 7 steps in capturing the tonnage of waste entering the landfill (See Section 5):

- Step 1:** Manage the availability of waste data collection forms for the WDCO at the landfill site;
- Step 2:** Receive the completed data collection forms from the WDCO at the end of each day or week (as agreed to between WIO and WDCO);
- Step 3:** Capture the daily waste data into e.g. a spreadsheet such as the 'Landfill monthly data capture form' (See Section 5);
- Step 4:** Verify that all data captured into the computer is accurate and reflects the data captured at the landfill site (See Section 7).
- Step 5:** Upload the monthly data onto the SAWIS. A manual is available to assist with this process (See Section 6) which can be downloaded from SAWIC at <http://www.sawic.org.za>
- Step 6:** Solve problems in terms of waste data collection and capturing, as and when required; and
- Step 7:** Keep the management staff informed of the tonnages of waste disposed of monthly.

Inherent requirements of the job – Competency Profile

1. Knowledge	In order to fill the post efficiently and effectively, the incumbent must have a general knowledge of: <ul style="list-style-type: none"> ○ Waste management ○ Systems (& procedures) ○ Data capturing and formatting (e.g. spreadsheets) ○ Internet (preferable)
2. Skills	<ul style="list-style-type: none"> ○ Computer literacy (medium) ○ Problem solving ○ Communication (verbal and written) ○ Analytical thinking
3. Learning indicator	<ul style="list-style-type: none"> ○ Tertiary education (or equivalent) ○ In-service training ○ Computer training
4. Personal attributes	<ul style="list-style-type: none"> ○ Ability to gather and analyse data and information ○ Self motivating ○ Attention to detail. ○ Ability to motivate staff ○ Ability to meet deadlines ○ Integrity ○ Ability to communicate effectively ○ Self starter (initiative) ○ Service orientated ○ Ethical ○ Objective



Position:	Provincial Waste Information System Administrator	Position Type:	Full-time or Part-time
Location:	At office	Duties:	Administer the implementation and operation of the SAWIS in the province.

The Provincial Waste Information System Administrator (PWISA) (See Section 3) will have the following tasks in managing the WIS in their province

1. Approve registration of new waste activities within the province;
2. Verify data submitted to the SAWIS by data providers (Section 7);
3. Authorise data submitted to the SAWIS; and
4. Ensure compliance in terms of enforcing the Waste Information Regulations.

The PWISA may be supported by District Waste Information Officers (DWIO), provincial government personnel responsible for waste information within designated districts or regions within the province.

Inherent requirements of the job – Competency Profile

1. Knowledge	In order to fill the post efficiently and effectively, the incumbent must have general knowledge of: <ul style="list-style-type: none"> o Environmental issues, especially those relating to waste. o Environmental Information Systems o Government's standard administrative procedures. o General management practise.
2. Skills	<ul style="list-style-type: none"> o Leadership o Strategic thinking (advanced) o Communication (verbal and written) o Computer literacy (advanced) o Planning (advanced) o Analytical thinking o Waste Management
3. Learning indicator	<ul style="list-style-type: none"> o B degree in environmental management (or equivalent); and/or o B degree in information technology; and/or o In-service training; and/or o 2 or more years of experience in the area of information systems management.
4. Personal attributes	<ul style="list-style-type: none"> o Ability to work in a multi-skilled team o Ability to gather and analyse data and information o Ability to work under pressure o Ability to take expert advice o Self motivating o Objective o Integrity o Ability to communicate effectively with a wide range of stakeholders from industry to community based organisations. o Attention to detail. o Ability to work with "difficult" stakeholders. o Ability to meet tight deadlines o Ability to motivate staff o Self starter (initiative) o Service orientated o Ethical o Ability to translate complex waste management concepts into a form that is accessible to various stakeholders.



Position:	District Waste Information Officer	Position Type:	Full-time or Part-time
Location:	At office	Duties:	Provide support to the PWISA in the implementation and operation of the SAWIS in the province.

The District Waste Information Officer (DWIO) (See Section 3) will have the following tasks in implementing the WIS in their province

1. Support the facilities within their districts in terms of
 - a. capacity building,
 - b. compliance monitoring with the Waste Information Regulations, and
 - c. verification of data.
2. Support the PWISA in managing the SAWIS within the province

Inherent requirements of the job – Competency Profile

1. Knowledge	In order to fill the post efficiently and effectively, the incumbent must have practical general knowledge of: <ul style="list-style-type: none"> o Environmental Information Systems o Environmental issues, especially those relating to waste. o Government's standard administrative procedures.
2. Skills	<ul style="list-style-type: none"> o Analytical thinking o Waste Management o Planning (advanced) o Computer literacy o Communication (verbal and written)
3. Learning indicator	<ul style="list-style-type: none"> o B degree in environmental management (or equivalent); and/or o B degree in information technology; and/or o In service training; and/or o 1 or more years of experience in the area of information systems development and implementation.
4. Personal attributes	<ul style="list-style-type: none"> o Ability to work in a multi-skilled team o Ability to gather and analyse data and information o Ability to work under pressure o Ability to take expert advice o Self motivating o Objective o Integrity o Ability to communicate effectively with a wide range of stakeholders from industry to community based organisations. o Attention to detail. o Ability to work with "difficult" stakeholders. o Ability to meet tight deadlines o Ability to motivate staff o Self starter (initiative) o Service orientated o Ethical o Ability to translate complex waste management concepts into a form that is accessible to various stakeholders.



Position:	National Waste Information System Administrator	Position Type:	Full-time
Location:	At office	Duties:	Administer the implementation and operation of the SAWIS in South Africa.

The National Waste Information System Administrator (NWISA) (See Section 3) will have the following tasks in managing the WIS in South Africa

1. Approve registration of new sites within the country where waste activities take place;
2. Verify data submitted to the SAWIS by provinces (Section 7); and
3. Publish final annual statistics on the quantities and types of waste landfilled, treated and reprocessed in South Africa.
4. Ensure compliance in terms of enforcing the Waste Information Regulations

The NWISA may be supported by Regional Waste Information Officers (RWIO), national government (DEAT) personnel responsible for waste information within designated regions of South Africa, e.g. clusters or groupings of provinces.

Inherent requirements of the job – Competency Profile

1. Knowledge	In order to fill the post efficiently and effectively, the incumbent must have general knowledge of: <ul style="list-style-type: none"> o Environmental issues, especially those relating to waste. o Environmental Information Systems o Government's standard administrative procedures. o General management practise. 		
2. Skills	<ul style="list-style-type: none"> o Leadership o Strategic thinking (advanced) o Communication (verbal and written) 	<ul style="list-style-type: none"> o Computer literacy (advanced) o Planning (advanced) 	<ul style="list-style-type: none"> o Analytical thinking o Waste Management
3. Learning indicator	<ul style="list-style-type: none"> o B degree in environmental management (or equivalent); and/or o B degree in information technology; and/or o In service training; and/or o 3 or more years of experience in the area of information systems development and implementation. 		
4. Personal attributes	<ul style="list-style-type: none"> o Ability to work in a multi-skilled team o Ability to gather and analyse data and information o Ability to work under pressure o Ability to take expert advice o Self motivating o Objective o Integrity o Ability to communicate effectively with a wide range of stakeholders from industry to community based organisations. 		
		<ul style="list-style-type: none"> o Attention to detail. o Ability to work with "difficult" stakeholders. o Ability to meet tight deadlines o Ability to motivate staff o Self starter (initiative) o Service orientated o Ethical o Ability to translate complex waste management concepts into a form that is accessible to various stakeholders. 	



Position:	Regional Waste Information Officer	Position Type:	Part-time
Location:	At office	Duties:	Provide support to the NWISA in the implementation and operation of the SAWIS in South Africa.

The Regional Waste Information Officer (RWIO) (See Section 3) will have the following tasks in implementing the WIS in South Africa

1. Support the provinces in their region in terms of
 - a. capacity building,
 - b. compliance with the Waste Information Regulations, and
 - c. verification of data.
2. Support the NWISA in managing the SAWIS within the provinces.

Inherent requirements of the job – Competency Profile

1. Knowledge	In order to fill the post efficiently and effectively, the incumbent must have practical general knowledge of: <ul style="list-style-type: none"> o Environmental Information Systems o Environmental issues, especially those relating to waste. o Government's standard administrative procedures.
2. Skills	<ul style="list-style-type: none"> o Analytical thinking o Waste Management o Planning (advanced) o Computer literacy o Communication (verbal and written)
3. Learning indicator	<ul style="list-style-type: none"> o B degree in environmental management (or equivalent); and/or o B degree in information technology; and/or o In service training; and/or o 1 or more years of experience in the area of information systems development and implementation.
4. Personal attributes	<ul style="list-style-type: none"> o Ability to work in a multi-skilled team o Ability to gather and analyse data and information o Ability to work under pressure o Ability to take expert advice o Self motivating o Objective o Integrity o Ability to communicate effectively with a wide range of stakeholders from industry to community based organisations. o Attention to detail. o Ability to work with "difficult" stakeholders. o Ability to meet tight deadlines o Ability to motivate staff o Self starter (initiative) o Service orientated o Ethical o Ability to translate complex waste management concepts into a form that is accessible to various stakeholders.



Annexure 2

Waste Information Regulations



Annexure 3 Users' Manuals

