# INTEGRATED WASTE MANAGEMENT PLAN

## JULY 2013


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# EXECUTIVE SUMMARY

**Introduction**

Aurecon SA was appointed by the Senqu Municipality (SM) to compile their Integrated Waste Management Plan. The Integrated Waste Management Plan (IWMP) will contribute to a better understanding of the total infrastructure needs within the community and will assist the Municipality in decision-making to determine the overall infrastructure maintenance and replacement costs. The IWMP will also guide the Municipality in selecting the most appropriate funding mechanism.

Several plans contribute to the development of the Integrated Development Plan (IDP) and Comprehensive Municipal Infrastructure Plan (CMIP) of which the IWMP is one of them. An IWMP is a high level strategic document that looks broadly at the waste management offering within a defined area and if necessary, proposes further steps that the responsible authority might consider taking to achieve a comprehensive integrated waste management service. The development of the plan included the following steps:

1. Background study.
2. Status quo analysis.
3. Establishing strategic objectives and priorities.
4. Gap analysis.
5. Development of goal, objectives and strategies.

Information presented enables the reader to gain an understanding of the waste management practices within the context of SM.

The SM is a small Municipality and that is currently experiencing major challenges with regards to waste disposal and waste minimisation.

**Desired Future State**

A desired future state for the SM in terms of waste management is a Municipality that is aware and actively involved in waste avoidance initiatives, that runs well co-ordinated and efficient recycling and waste treatment facilities and provides all residents with a basic waste collection service. The waste division should be financially stable providing a good quality service to the consumer at a reasonable cost, and should be managed with an adequate number of well trained staff. SM should have waste management by-laws in place that are monitored regularly for compliance. By-laws must therefore be revised by the Municipality to bring about positive change and commitment to the minimum standards. By-laws must take cognisance of more recent legal and policy developments, in particular the waste management hierarchy and principles of IWM planning. There should be adequate disposal sites for future requirements for all waste types. The Municipality should further provide campaigns and education drives to ensure that the public is aware of the impacts of waste on people's health and the environment. It is imperative to ensure that non-compliances which were identified during the assessment of the 1st Guidelines for Integrated Waste Management Plan (G-IWMP) by the Eastern Cape Department of Environmental Affairs and Development Planning (DEADP) are addressed. The

non-compliances identified during the first G-IWMP were considered when developing this 2nd G-IWMP.

In conclusion, the following remarks were drawn and needs to be addressed:

- Enforcement of legislative requirements and in particular compliance with the latest National Environmental Management Waste Act, 2008 (NEMWA) in regards to Integrated Waste Management, Licensing and remediation will need to be ensured.
- The development of Municipal By-Laws needs to be prioritised to ensure the implementation of the Integrated Waste Management Planning;
- Improvement and Maintenance of asset management and prioritisation of waste management needs in terms of plant and equipment;
- Waste generated is incinerated, buried or burnt releasing highly toxic Persistent Organic Pollutants (POP) into the air and groundwater, this has to be stopped (no license). This is not an acceptable practice.
- Identification of roles and defining responsibilities of staff in terms of waste management;
- Lack of waste generation data;
- Lack of waste minimisation initiatives. Limited progress has been made in SM towards implementing the ideals of the waste hierarchy;
- Very little, if any, awareness and education programmes have been implemented within SM;
- Lack of a Waste Management Policy (incl. Hazardous Waste) and compliance with Provincial legislative requirements;
- A lack of financial and human resources will be the key constraints in the development of waste management services in SM; and
- Financial analysis with cost recovery and realistic tariff determination to be included in the Waste Policy and revised By-Laws.

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# TECHNICAL DEFINITIONS

**Aquifer** is a water bearing formation capable of supplying a sufficient yield for a community based potable water source.

**Cell** is a volume of waste generally placed during one working day and covered on all horizontal surfaces by cover soil.

**Communal Landfill** is the smallest landfill classification with a capacity of less than 25 ton per day;

**Confirmation of Site Feasibility** is the initial step in the DWAF permitting process that establishes the basic site features and general feasibility for a fully permitted landfill.

**Controlled landfill** is a solid waste management facility used for the disposal of non-hazardous domestic waste and non-infectious Health Care Risk Waste, which employs compaction of wastes, covering of waste with soil cover material, and the management of leachate and gaseous materials produced by the organic decomposition of the landfilled waste, all in such a manner as not to harm human health and minimise negative impacts to the environment;

**Daily cover** is a daily application and compaction of soil, with a minimum thickness of 15 centimeters, intended to control blowing litter, odours, flies, rats and fires, intended for an exposure of less than one week.

**Design Drawings** are drawings prepared by the landfill designer and include dimensions, specifications and other technical data regarding the construction of the landfill;

**Domestic solid waste (General Waste)** is solid waste generated by single or multifamily residential dwellings, and solid waste of a non-hazardous nature, generated by wholesale, retail, institutional or service establishments such as office buildings, stores, markets, restaurants, theatres, hotels, warehouses, industrial operations and manufacturing processes;

**Final Cover** is an application and compaction of soil on the landfill after it has reached its designed elevation. The final cover soil shall be relatively impermeable and have a thickness of approximately 50 centimeters. However, the required thickness do vary with the respective type of landfill and must be consistent and in accordance with the design as specified by the *DWAF Minimum Requirements for Waste Disposal by Landfill, Second Edition 1998.*

**Groundwater** is all water flowing or existing under the ground surface;

**Hazardous waste** is any waste which by reason of chemical reactivity or toxic, explosive, corrosive or other characteristics causes danger or is likely to cause danger to human health or the environment,

whether alone or in combination with other wastes. Hazardous waste is categorized in four hazard ratings with 1 being the most hazardous and 4 being the least hazardous.

**Incineration** is the controlled combustion of solid waste employing closed combustion chambers, controlled combustion air, temperature monitoring and control to insure complete combustion of organic matter with a minimum of undesirable air emissions and wastewater discharges;

**Intermediate cover** is an application and compaction of cover having the same functions as daily cover but applied at a thickness of 30 centimeters, intended to be exposed for a period of one week to one year.

**Landfill Classification** is a system under the DWAF Minimum Requirements for classifying landfill according to the type and size (TPD) of the landfill, and its potential for significant leachate generation;

**Landfill gas** is the gaseous by-product of organic decomposition of landfilled waste. Landfill gas contains significant concentrations of methane gas, which is explosive at concentrations exceeding 5 percent.

**Leachate** is the liquid by-product of organic decomposition of landfilled waste or any liquid that comes in contact with solid waste in a sanitary landfill;

**Lift** is a series of one or more landfill cells forming a section of landfilled waste that extends horizontally across the landfill.

**Health Care Risk Waste** is any waste generated by hospitals, clinics, nursing homes, doctor's offices, medical laboratories, research facilities and veterinarians, which are infectious or potentially infectious;

**Operating Plan** consists of drawings, descriptions and other documents regarding the operation of the landfill, placement of waste, building daily cells and lifts, leachate management, landfill gas management and all other functions related to the operation of the landfill.

**Operator** is the person or organization responsible for the operation of the landfill. The operator may be the owner, another public agency or private contractor.

**Owner** is the person or organization who owns the property and/or facilities that constitute the Landfill.

**Perimeter drains** are open ditches surrounding the landfill installed to prevent surface water from entering the landfill.

**Recycling** is the sorting, processing, and transportation of solid waste materials, products or containers for the purpose of remanufacture or reuse;

**Scavenging** is the unauthorized separation of solid waste for recyclable materials and food for human consumption;

**Solid Waste** is waste of a solid nature generated by a person, business or industry;

**Solid Waste Management facility** is any facility used for the transportation, processing or disposal of solid waste, and includes transfer stations, recycling facilities, composting facilities, waste incinerators, and sanitary landfills;

**Sorting** is the authorized separation of solid waste materials for the purpose of recycling or disposal, either at the source of generation or at a solid waste management facility;

**Special waste** is a non-hazardous waste, which due to its nature requires special or separate handling at a sanitary landfill. Special wastes include but are not limited to tires, asbestos, demolition waste, industrial sludge of a non-hazardous nature, paper mill sludge, olive oil waste, abattoir wastes and petroleum waste oil;

**Surface water** is all water in or coming from a water source which is found on the surface of the ground, excluding water under the surface of the ground and seawater;

**Transfer Station** is a facility that receives solid waste from collection vehicles and reloads that waste into larger vehicles for transfer to a disposal or processing facility;

**Vectors** are birds, insects, and rodents capable of carrying disease-causing bacteria, viruses or fungi from one host to another.

**Water Balance** is a method for determining the potential for significant leachate generation which includes climatic conditions (rainfall and evaporation) and site condition;

**Working area** is the area of the landfill where waste is unloaded, compacted and covered. It generally includes adequate space for several trucks to unload at the same time, for waste compaction and storage of cover soil.

# ABBREVIATIONS

| | |
|---|---|
| BA | Basic Assessment |
| CFL | Carbon Fluorescent Light |
| CMIP | Comprehensive Municipal Infrastructure Plan |
| DEA | Department of Environmental Affairs |
| DLGH | Department of Local Government and Housing |
| DWA | Department of Water Affairs |
| DWAF | Department of Water Affairs and Forestry |
| EIA | Environmental Impact Assessment |
| FSS | Farming Settlement Scattered |
| G-IWMP | Guidelines for Integrated Waste Management Plan |
| HCRW | Health Care Risk Waste |
| IDP | Integrated Development Plan |
| IWMP | Integrated Waste Management Plan |
| IWMS | Integrated Waste Management System |
| JGDM | Joe Gqabi District Municipality |
| Kg/p/day | Kilogram per person per day |
| Km | Kilo metre |
| KPI | Key Performance Indicator |
| MEC | Member of the Executive Council |
| MGP | Municipal Growth Points |
| MRF | Material Recycling Facility |
| NEMA | National Environmental Management Act |
| NWMS | National Waste Management Strategy |
| PGP | Provincial Growth Points |
| POP | Persistent Organic Pollutants |
| RDV | Rural Dense Village |
| RS | Rural Scattered |
| RSV | Rural Small Village |
| SANS | South African National Standards |
| SDF | Spatial Development Framework |
| SM | Senqu Municipality |
| UFT | Urban Formal Town |
| WIS | Waste Information System |

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# 1. SCOPE OF PLAN

## 1.1 Overall Aim and Goals

Senqu Municipality (SM) appointed Aurecon to assist in developing an Integrated Waste Management Plan (IWMP) for the Solid Waste Disposal Division for the Municipality. As a requirement of the National Waste Management Strategy 2011 (NWMS) and the Integrated Development Plan (IDP) process all Municipalities are obliged to compile an IWMP.

The compilation of this IWMP is done in line with the draft guidelines for compiling waste master plan documentation made available by the National Department Environmental Affairs (DEA) as well as the Draft Starter Document for Integrated Waste Management Planning in South Africa.

The IWMP process consists of two phases, the first of which being an assessment of the status quo and needs analysis and the second consists of future planning. The Status Quo within Phase 1 consists of an assessment of the current status of waste collection systems and existing disposal sites, service delivery capacity and needs analysis for each of these aspects within the municipality. The Status Quo and Needs Analysis in conjunction with the Trends and Forecasts for the municipality forms the platform for all the planning activities and are included in the first section of this document.

The Goals and Objectives identified will make up the second Phase of the final IWMP report which will include alternatives. The Alternatives obtained are considered and evaluated on a high level basis. Based on the recommended options selected for implementation, a programme and cost estimation is developed to facilitate inclusion of the IWMP into the IDP.

Implementation requires that municipalities move away from traditional “end of pipe” solutions that focus on waste after it has been generated i.e., collection, transport, processing, recycling or disposal of waste material to a service which focuses on the prevention of waste as well as the minimisation of waste as a by-product of production. This approach is a recognition of the widely adopted ***Waste Hierarchy*** which includes the 3Rs of waste management (reduce, reuse and recycle) as well as energy recovery. Only after these efforts, the residual waste should be disposed of at landfill site. The delivered service must maximise efficiency and minimise environmental impacts and financial costs with the ultimate aim of improving quality of life for all individuals. Any IWMP must suggest measures that are practical, achievable, implementable and sustainable. Refer to Figure 1.


**Figure 1: Waste Hierarchy**[1]

Integrated Waste Management is a multi-functional approach that requires the co-operative effort of government and waste generators. Government must ensure that there is a waste management service delivery system providing a network of collection and disposal options so that generators can effectively exercise their responsibilities which include separating their waste at source (the point of generation) and then properly recycling, storing and disposing of the different parts of the waste.

The IWMP addresses several key objectives:

- Discussion of the current situation in respect of the description of the population development profile of the area; reviews the quantities and types of waste that are generated in the area; describes the services that are provided or that are available for the collection; minimisation; re-use, recycling and recovery; treatment and disposal of waste; and provides an indication on the number of persons in the area who are not receiving waste collection services.
- Identification and planning for future waste management needs and requirements of the SM.
- Ensuring that the plan identifies strategies for provision of adequate and equitable waste services to all residents within the SM.
- Incorporating the principles of the internationally acceptable waste management hierarchy into daily, as well as short to long-term, waste activities and planning.
- Building on the waste management foundations currently established and improving all aspects of waste management within the SM.
- Promoting the reduction of the quantity of waste that is disposed off at landfill by the continual support of private and community waste minimisation and recycling projects and initiatives and the development of municipal projects.
- Recommending that the Municipality establish systems to have critical waste information at hand for optimisation of waste management services.
- Ensuring that all recommendations minimise adverse social and environmental impacts related to waste management and thereby improving the quality of life for the communities of the SM.

[1] National Waste Management Strategy, March 2011

- Assessing the institutional arrangements of the SM and recommending measures for optimising the efficiency of the waste management system in terms of infrastructure, equipment, human resources and the development of skills and capacity.

### 1.1.1 IWMP responsibilities

The National Waste Management Strategy (2011) allocated the following responsibilities for IWMP:

- The National Department of Environmental Affairs (DEA) will draft and promulgate regulations and guideline documents for integrated waste management planning for all waste types.
- The Provincial environmental departments will develop hazardous waste management plans and prepare provincial environmental and waste management plans that incorporate the IWMP's submitted by local government and industry. These will be submitted to the Central Executive Committee for approval, which will facilitate inter-provincial coordination, particularly in relation to planning for facilities for treatment and disposal of waste.
- Local Government will develop and submit plans for integrated general waste management to the respective provincial environmental departments.
- Waste management plans for industrial waste that is disposed of at private and/or dedicated disposal facilities, will be prepared by the developers/owners and submitted to the respective provincial environmental departments.

### 1.1.2 Methodology

The following methodology was followed for the status quo investigation:

- All relevant records were obtained for the purposes of the study.
- Relevant officials from the Municipality were interviewed.
- Areas in the study area were visited to obtain first-hand knowledge and information of the existing status of the waste management service rendered.
- Details regarding Health Care Risk Waste generators were obtained from the relevant medical facilities and the Municipality.
- Various organisations involved in solid waste management were interviewed.
- The municipal area was assessed with consideration of waste generation, summary of collection volumes, existing collection systems, equipment, personnel and landfill status. The status quo was completed based on the findings per the assessment undertaken.
- The current waste management practices were evaluated against the principles contained in the waste management hierarchy and waste management aspects were evaluated, from the points of generation all the way through to end disposal/ landfill.

The Status Quo Report compiled for the IWMP provided an indication of the planning context within which the greater IWMP for the SM was formulated, as well as additional legislative frameworks that needed to be considered when undertaking the compilation of an IWMP.

The Status Quo Report set the platform for the completion of all subsequent stages of the integrated waste management planning for the SM. The next stage of the process entailed the identification of so-

called “gaps” in the current waste management practices, such that waste management planning can focus on addressing the major shortfalls in respect of current waste management practices.

The SM IWMP also clearly sets out the IWMP goals, policies and objectives to which the SM should strive in order to remain compliant with the overall goals and objectives of the NEMWA. The IWMP also provides an evaluation of alternative waste management scenarios and options that were scrutinized and considered for possible implementation by the SM to address their waste management needs in a sustainable manner. The most suitable options were then translated into implementable projects as part of the IWMP Implementation Plan. The said Implementation Plan sets the time-frames over which specific projects should be rolled out by the SM.

The following assumptions were made where insufficient information was available:

1) Waste Generation Calculations:
   - Domestic Waste Generation – 7 days a week
   - Business Waste Generation – 6 days a week
2) Waste Collection Calculations:
   1. Domestic & Business – 5 days a week
3) Mass and Volume Calculations:
   2. Domestic, Business & Garden – $m^3$ = 0.4 ton
4) Where recorded generation rates were not available the following quantities[2] were used:
   3. Rural Settlements (Poor Communities) – 0.41 kg per person per day
   4. Small Urban – 0.74 kg per person per day
   5. Medium Urban – 1.29 kg per person per day

### 1.1.3 Waste Management Needs

Based on the information collected, the needs of the Municipality for the immediate future were identified and measured against the existing IDP objectives.

## 1.2 Geographic Area and Activities to be addressed

Senqu Municipality is situated within the Joe Gqabi District Municipality, in the Eastern Cape Province. The SM comprises of three major towns, namely Lady Grey, Barkley East and Sterkspruit, with three hamlets, referring to Rhodes, Rossouw and Herschel and as well as 85 Villages. The Municipality covers an area of 7 329 km² and is demarcated into 19 wards. It is strategically located to join the Free State Province and one country namely the country of Lesotho.

**See attached Layout Geographic Area Map in Appendix 1**

[2] IWMP toolkit, paragraph 2.2.3

# 2. BACKGROUND INFORMATION

## 2.1 Policy and Legislation

### 2.1.1 Legislative Framework

The piece of legislation most pertinent to the management of waste in South Africa is the recently enacted National Environmental Management Waste Act, (Act 59 of 2008). The act was promulgated in order to provide for institutional arrangement and planning matters, to provide for national norms and standards for regulating management of waste by all spheres of government, to provide for the licensing and control of waste management activities and all matters connected therewith. In essence it provides the much needed legislative framework for the management of waste in South Africa.

### 2.1.2 Guidelines for the Development of Integrated Waste Management Plans (IWMPs)

The IWMP Guidelines provide a background for the compilation of Integrated Waste Management Plans which includes a short historical overview of IWMP's to date and basic description of the legal framework pertaining to IWMP development.

The integrated waste management planning process incorporates all the major stages of the environmental planning process, namely:

- Analysing the current situation and legal framework;
- Making projections of future requirements;
- Setting objectives;
- Developing projects and programmes to reach the set objectives;
- Implementation of plan (activities, projects and programmes);
- Monitoring and Evaluation (M&E) of the programmes and plans implemented; and
- Periodic review of the plan to ensure continuous improvement.

### 2.1.3 National Environmental Management Waste Act, (Act 59 of 2008)

Chapter 1, Section 2 of the Act describes the objectives of the act:

a) to protect health, well-being and the environment by providing reasonable measures for

- minimising the consumption of natural resources;
- avoiding and minimising the generation of waste;
- reducing, re-using, recycling and recovering waste;
- treating and safely disposing of waste as a last resort;
- preventing pollution and ecological degradation;
- securing ecologically sustainable development while promoting justifiable economic and social development;
- promoting and ensuring the effective delivery of waste services;
- remediating land where contamination presents, or may present, a significant risk of harm to health or the environment; and
- achieving integrated waste management reporting and planning.

b) to ensure that people are aware of the impact of waste on their health, well-being and the environment;
c) to provide for compliance with the measures set out in paragraph (a); and
d) generally, to give effect to section 24 of the Constitution in order to secure an environment that is not harmful to health and well-being.

The Act requires the drafting of a National Waste Management Strategy (2011) (NWMS) for achieving the objectives of the Act. The Act sets waste service standards, covering areas such as tariffs, quality of service and financial reporting. The Act requires that each Municipality designate a waste management officer.

The Act requires each Municipality to produce an Integrated Waste Management Plan (IWMP) and to submit this plan to the Member of the Executive Council (MEC) for approval. The approved IWMP must be included in the Municipal Integrated Development Plan (IDP). Before finalising the IWMP, the Municipality is required to follow the consultative process as defined in Section 29 of the Municipal Systems Act. This can be done either as a separate process or as part of the consultative process relating to its IDP. The Act also outlines the minimum contents required in an IWMP. The contents of this IWMP were guided by those for a standard IWMP. There are two key differences between what should be included in an IWMP and what has been covered in this IWMP. Firstly, to complete an IWMP the public participation process as described in Section 29 of the Municipal Systems Act must be followed and secondly, an IWMP includes a detailed implementation strategy for the identified projects which has not formed part of this IWMP.

The NEMWA provides the definitions of waste as well as the listed activities that require licensing. This Act also provides specific waste management measures for remediation of contaminated land as well as for compliance and enforcement. Waste and waste management activity as amended by Act 14 of 2013[3] is defined as follow:

"**waste**" means:

a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or
b) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the *Gazette*,

but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste—

i. once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered;
ii. where approval is not required, once a waste is, or has been re-used, recycled or recovered;

[3] Published under Government Notice 449 in Government Gazette 37714 of 2 June 2014.

iii. where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or

iv. where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste."

"**"waste management activity"** means any activity listed in Schedule 1 or published by notice in the Gazette under section 19, and includes:

a) the importation and exportation of waste;
b) the generation of waste, including the undertaking of any activity or process that is likely to result in the generation of waste;
c) the accumulation and storage of waste;
d) the collection and handling of waste;
e) the reduction, re-use, recycling and recovery of waste;
f) the trading in waste;
g) the transportation of waste;
h) the transfer of waste;
i) the treatment of waste; and

the disposal of waste."

### 2.1.4 Constitution of the Republic of South Africa

The South African Constitution (Act 108 of 1996) is the supreme law of the land. Section 24 of the Act states that "it is the right of every person living in South Africa to experience an environment that is not harmful to their health or well-being". This imposes a duty on all organs of state to promulgate legislation and to implement policies that ensure that this right is upheld. Chapter 7 of the Constitution specifically describes the role and responsibility of local government as:

- to promote social and economic development
- to promote a safe and healthy environment.

The Municipality is responsible for waste removal, managing waste disposal facilities and cleansing as it sees it as a part of the basic service and as per Schedules 4 and 5 of the constitution.

### 2.1.5 National Environmental Management Act, 1998 (Act No. 107 of 1998)

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) was promulgated in November 1998. It is the key legislation for environmental management in South Africa. NEMA promotes social, economic and environmental sustainability with a key focus on the conservation of the environment. The Act requires environmental process to be transparent and to provide capacity for disadvantaged stakeholders to participate. NEMA promotes the need for co-operative governance where more than one government department may be involved in the decision-making for a proposed development.

NEMA was amended in April 2006 and again in June 2010, providing a new list of activities that require environmental authorisation through different processes. The list describes those activities that require a basic environmental assessment (BA) and those that require a full environmental impact assessment

(EIA). Both the BA and EIA involve public participation. Both processes are detailed and involved, however the EIA involves a longer timeframe, being broken down into scoping and impact assessment phases in comparison to a BA. :

- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- Development must be socially, environmentally and economically sustainable. The Act further defines in considerable detail the approach to sustainable development.
- Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated.
- Environmental justice must be pursued so that adverse environmental impacts are not in any way discriminatory to any part of the population.
- There must be equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being.
- The participation of all interested and affected parties in environmental governance must be promoted throughout the life cycle of any project or programme and any decision making process.
- Community well-being and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and the recognition of all forms of knowledge, including traditional and ordinary knowledge.
- The social, economic and environmental impacts must be considered, assessed and evaluated
- Process must be transparent.
- The rights of workers must be protected and the vital role of women and youth in environmental management and development must be recognised and their full participation promoted
- There must be harmonisation between policies, legislation and actions relating to the environment. Global and international responsibilities relating to the environment must be incorporated at national interest.

### 2.1.6 National Waste Management Strategy (2011)

The National Waste Management Strategy (2011) (NWMS) was promulgated on 4 May 2012 to address South Africa's waste management challenges, and gave effect to the suite of policies and relevant legislation which preceded it. The overall objective of the strategy is to reduce the generation of waste and reduce the impact of all forms of waste on economic development, health and the quality of environmental resources. The NWMS sought to achieve the following goals:

- Strategies, objectives, plans, guidelines, systems and procedures relating to the protection of the environment and the generation (including avoidance and minimisation of such generation), re-use, recycling, recovery, treatment, disposal, use, control and management of waste in order to achieve the objectives of the Waste Act.
- Mechanisms, systems and procedures for giving effect to the Republic's obligations in terms of international agreements
- National norms and standards for waste management, including planning and national norms for service delivery
- Practical measures for achieving co-operative governance in waste management matters

- Guidance on raising awareness regarding the impacts of waste on health and the environment.
- Approaches for securing compliance with the requirements of the Waste Act.

The roles and responsibilities in terms of the NWMS for local government include:

- Integrated waste management planning: Local government will be responsible for the compilation of general waste management plans for submission to provincial government.
- Waste information system: Local government will be responsible for data collection.
- Waste minimisation: Local government will implement and enforce appropriate national waste minimisation initiatives and promote the development of voluntary partnerships with industry.
- Recycling: Local government are to establish recycling centres and/or facilitate community initiatives.
- Waste collection and transportation: Local government is to improve service delivery. Private public partnerships to assist service delivery are encouraged.
- Waste disposal: Local government is to take responsibility for the establishment and management of landfill sites, and to promote development of regionally based facilities. Formalising and controlling of scavenging is the responsibility of the permit holder.

### 2.1.7 Municipal Systems Act, 2000 (Act 32 of 2000)

In terms of Section 25 of the Municipal Systems Act (MSA) each municipal council must, within a prescribed period after the start of its elected term, adopt a single, inclusive and Integrated Development Plan (IDP) for the development of the municipality. In relation to waste management, the IDP is required to include sectorial environmental plans which would be an IWMP for waste management. In their IDP's municipalities are required to ensure proper resource allocation to achieve the targets set in the respective plans.

### 2.1.8 Municipal By-Laws

Municipalities are required to draft and maintain municipal by-laws which detail the responsibilities of the municipalities and the residents within a defined municipal boundary. In terms of Chapter 7 on Local Government, section 162 on the publication of municipal by-laws of the Constitution of the Republic of South Africa:

A municipal by-law may be enforced only after it has been published in the official gazette of the relevant province.

A provincial official gazette must publish a municipal by-law upon request by the Municipality.

Municipal by-laws must be accessible to the public.

SM By-Laws for Dumping and Littering, Gazette 1405, Notice 191 was promulgated on 9 December 2005. These By-Laws however only addresses dumping and littering and are therefore insufficient.

The following gaps were identified in the SM By-Laws. The gaps have been identified as per section and subsections which are not included in the SM By-Laws under Waste Management section.

- **General Duty of Care**

- Not addressed in the report

- **Municipal Services**
  - Duty to Provide Access to the Municipal Service
  - Provision of the Municipal Service
  - Service Providers
  - Collection in Rural Areas
  - Recycling
  - An obligation of Generators of domestic waste, business waste and dallies.
  - Liability to pay for the municipal service
- **Commercial Services**
  - Provision of commercial services by licensing and flow control
  - Co-ordination of waste the disposal of waste by the Council
  - Storage of Business, Industrial and Recycling Waste
  - Collection and disposal of industrial, business and recyclable waste
  - Storage, collection and disposal of garden waste and bulky waste
  - Storage, collection and generation of building waste
  - Generation of building waste
  - Storage of building waste
  - Collection and disposal of building waste
  - Generation of special industrial, hazardous or health care risk waste
  - Storage of special Industrial, hazardous or health care risk waste
  - Collection and disposal or special industrial or health care risk waste
- **Tyres, disused vehicles or machinery and scrap metal**
  - Generation of tyres, disused vehicles or machinery and scrap metal waste.
  - Storage of tyres, disused vehicles or machinery and scrap metal waste.
  - Collection and disposal of tyres, disused vehicles or machinery and scrap metal waste.
- **Recyclable waste**
  - Generation of recyclable waste
  - Storage of recyclables waste
  - Collection of recyclable waste
- **Agriculture and farm waste**
  - Disposal
- **Transportation and Disposal of Waste: Only transportation of waste is discussed in the By Laws.**
  - Collection of waste
  - Duties of person transporting waste
  - Disposal of waste
- **Licensing**
  - Licensing requirements
  - License applications
  - Suspension and revocation of licenses
  - License terms and conditions

- Renewal of licenses
- Display of licenses
- Prohibited conduct
- Exemptions
- Transitional provisions

- **Enforcement and Service of documents**
  - Compliance with the By-Laws
  - Identification Documents
  - Powers of authorized persons
  - Powers of entry and Inspection
  - Use of force entry
  - Powers to question
  - Liabilities and compensation
- **Service of Notice and Documents**
  - Compliance notices
  - Offences and penalties
  - Enforcement
  - Appeals
  - Exemptions
  - Severability
  - Complaints
  - Representative
- **Judicial Enforcements**
  - Service of documents process
  - Service of notice
- **General Provisions**
  - Ownership
  - State and Council Bound

### 2.1.9 Polokwane Waste Summit Declaration (September 2001)

During September 2001 a national waste summit was held at Polokwane. It was attended by all stakeholder groupings in the waste field in order to jointly chart a way forward in terms of waste management. The resultant Polokwane Declaration includes a vision and goal for the management of all waste, i.e. domestic, commercial and industrial:

- Vision - To implement a waste management system, this contributes to sustainable development and a measurable improvement in the quality of life by harnessing the energy and commitment of all South Africans for the effective reduction of waste.
- Goals - To reduce waste generation and disposal by 50% and 25% respectively by 2012 and develop a plan for zero waste by 2022. The Polokwane Declaration has significant implications for local government. In order to move towards the goal it will be necessary for government and other stakeholders to engage more closely toward the achievement of this goal in a realistic and

practical manner. The key actions in the Polokwane Declaration that impact on local government include the following:

- Implement the NWMS (2011).
- Develop and implement legislative and regulatory framework.
- Waste reduction and recycling.
- Develop waste information and monitoring systems.

### 2.1.10 International Conventions

South Africa is a signatory to the Basel (1994) and Stockholm Conventions (2001). The key objectives of the Basel Convention are:

- to minimize the generation of hazardous wastes in terms of quantity and hazardousness;
- to dispose of them as close to the source of generation as possible;
- to reduce the movement of hazardous wastes.

A central goal of the Basel Convention, acceded to buy South Africa in 1994, is “environmentally sound management” (ESM), the aim of which is to protect human health and the environment by minimizing hazardous waste production whenever possible. ESM means addressing the issue through an “integrated life-cycle approach”, which involves strong controls from the generation of a hazardous waste to its storage, transport, treatment, reuse, recycling, recovery and final disposal.
The Stockholm Convention on Persistent Organic Pollutants (POPs), to which South Africa became a signatory in 2001. It is global treaty to protect human health and the environment from persistent organic pollutants (POPs). POPs are particularly carcinogenic and are toxic to both humans and wildlife. The burning of waste is it open burning on landfill sites or incineration has the potential to produce high volumes of POPs into the atmosphere. Burning of waste is still a common practice in SM and urgent measures need to be taken to address this reality.

## 2.2 Demographics

The Senqu Municipality (SM) is situated in the Eastern Cape Province. It falls within the Joe Gqabi District Municipality together with three other local municipalities viz. Maletswai, Gariep and Elundini. The municipal area is bordered by the following:

- North: Kingdom of Lesotho,
- East: Elundini Local Municipality,
- South: Emalahleni and Sakisizwe Local Municipalities and
- West: Maletswai Local Municipality.

SM comprises of three major towns Lady Grey, Barkley East and Sterkspruit with three hamlets Rhodes, Rossouw and Herschel and 85 Villages.

According to the results from the Census 2011, the population in SM is 134 150 with 38 045 households. Females make up 53% of the population and males 47%. The population is characterised

as 6% urban and 94% rural. The growth rate of SLM is -0.12% this negative growth rate is due to the effects of out migration as well as the impact of HIV and Aids[4].

Table 1-2 and Figure 2 below shows the population and number of households as reported in the South African Census 2011:

| Towns | Population Census 2011 | Number of Households Census 2011 |
|---|---|---|
| Barkley East | 9986 | 2631 |
| Herschel | 2189 | 612 |
| Lady Grey | 1395 | 356 |
| Rhodes | 506 | 144 |
| Rossouw | 302 | 57 |
| Sterkspruit | 1893 | 609 |

**Table 1: Demographics of SM**

| Main Type | Population | Households |
|---|---|---|
| Rural | 112 081 | 31 788 |
| Urban | 22 069 | 6258 |
| **Total** | **134 150** | **38 045** |

**Table 2: Summary of the Demographics of SM**

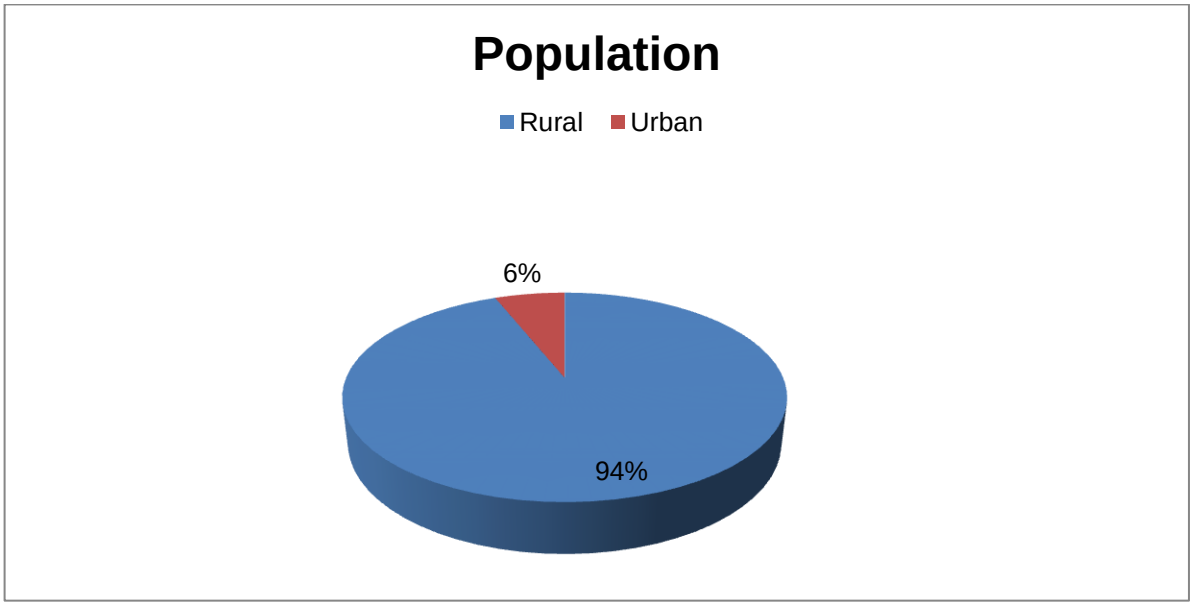



**Figure 2: Total Population of SM**

Senqu Municipality (SM) area has a very young population with 46% in the age group 0-19 years. The age group 20-49 years makes up 35% of the population, which illustrates that a strong labour component is available. Females constitute 54% of this age group.

[4] Integrated Development Plan 2011 – 2016 (Revised 2012 – 2013)

## 2.3 Waste Quantities and Characteristics

### 2.3.1 Households

SM has a spread out settlement pattern with a few urban centres and the majority of settlements in rural areas. Figure 3 and Figure 4 below give an indication of typical waste streams for rural poor households and middle income urban households. It is interesting to note the marked reduction in the percentage of recyclables in waste from poorer households compared to middle income households. Poorer households also tend to produce a much higher percentage of organics. Generation rates[5] per capita are as follow:

- Low income= 0.41kg/per person/day
- Middle income=0.74kg/per person/day
- High income= 1.29kg/person/day

The likely waste streams from the different areas influence the waste management strategy that should be adopted. For example the viability of recycling initiatives as well as the potential for composting will be greatly influenced by both the quantity and composition of the waste stream.

Figure 3 and Figure 4 is examples of typical waste profiles found in high and low density as well as lower and higher income communities. Figure 3 is based on a waste profile from a densely settled low income urban area and Figure 4 is based from a low density high income area. These Figures were informed by the Working with Waste: Guidelines on Recycling of Solid Waste compiled by the DEA. Note the difference in waste composition is measured by mass. The figures will differ even more if the composition of waste is measured by volume instead of by mass.

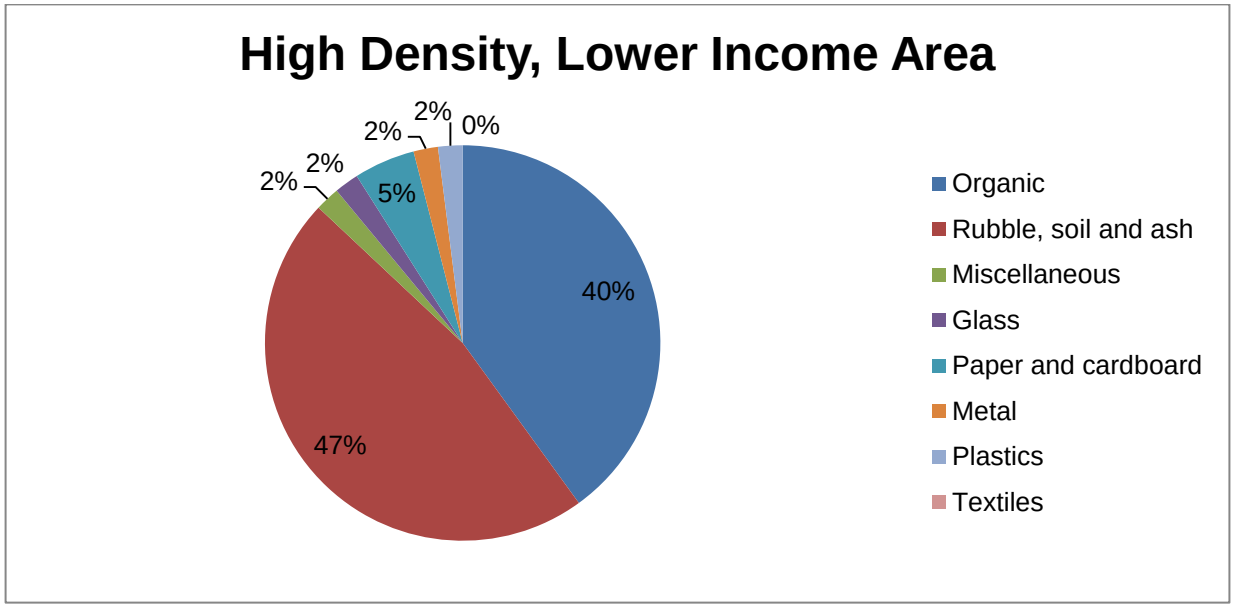



**Figure 3: Typical Waste Stream in Rural Areas[6]**

[5] Guideline for the development of Integrated Waste Management Plans (IWMP), Department Environmental Affairs
[6] Working with waste: Guidelines on recycling of solid waste compiled by the DEA

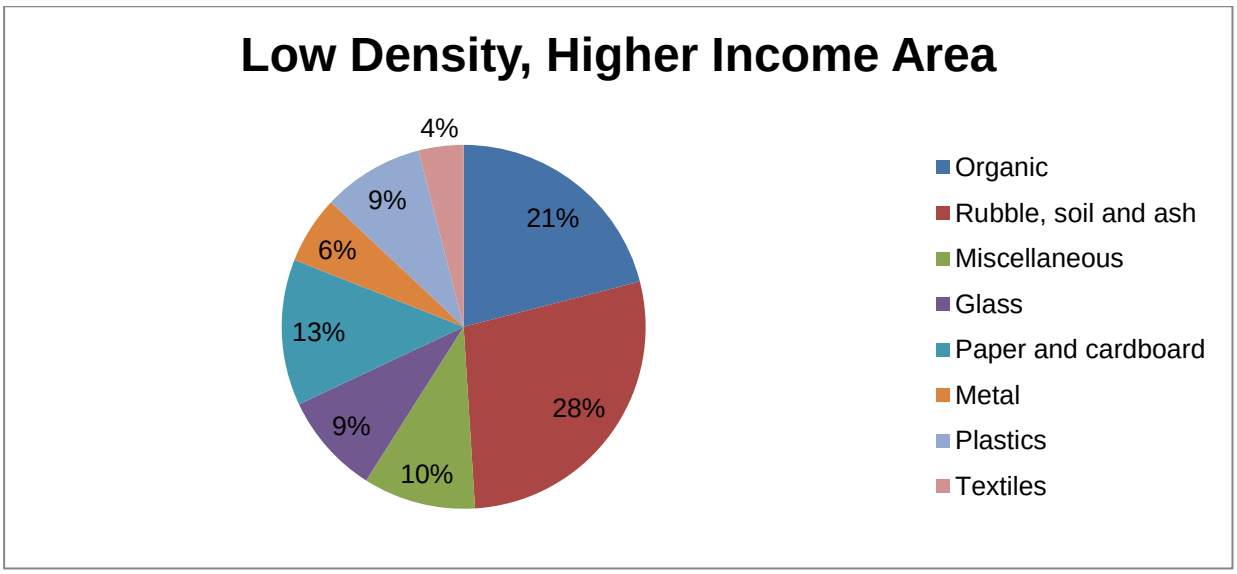



**Figure 4: Typical Waste Stream in Middle Income Rural Areas**[7]

### 2.3.2 Businesses

Business areas have a different waste generation profile. They are significant waste generators but with a higher percentage of packaging material in the waste. The composition of business waste can vary significantly between different types of businesses. Business waste in general has a higher potential for recycling due to the fact that waste materials are more homogeneous or exist in higher concentrations within the waste stream, as compared to, for example, what can be found in household waste. Most businesses generate what is classified as a general waste originating from offices, common areas and lounges and service areas. If this waste is properly managed by being separated at source, businesses can contribute to a sustainable solution for waste management.

Waste from the informal business sector is often problematic. Particularly where trading is concentrated, littering and illegal dumping often occurs.

### 2.3.3 Farming

Agricultural producers and farms generate a variety of waste including some hazardous waste through the use of fertilisers and pesticides, the largest portion will be organic. Resident farm workers have waste generating profiles similar to those in rural settlements but are effectively on private land and might not be covered by the municipal administration. The relative contribution of agricultural activity is small compared to other activities in the area and no records have been kept for waste arising from the agricultural activity. Part of the solid waste stream generated in South Africa is 6.1% of agricultural waste.

### 2.3.4 Health Care Facilities

Health service provision is a competency of provincial government. SM has four (4) hospitals, twenty (20) Clinics and a few health care centres around its area of jurisdiction.

[7] Working with waste: Guidelines on recycling of solid waste compiled by the DEA

Clinics and Health Care Workers have the potentials to generate Health Care Risk Waste (HCRW), which is by definition hazardous and has to be treated in an appropriate manner. Due to the lack of appropriate HCRW treatment facilities these generation points represent a critical pollution spot. All public clinics and hospitals are under the control of the respective Provincial Department of Health.

Environmental Health Practitioners are responsible for the control of waste management at clinics, being under the supervision of a Chief Environmental Health Practitioner.

In accordance with the international United Nation (UN) Regulations of dangerous goods and the South African National Standards (SANS) No. 10248, hazardous waste is divided in nine (9) different classes. Some of which are further sub-divided. The classes found in the waste depend on the treatment level of the healthcare facilities. Hazardous Health Care Waste which can be found in every healthcare facility is the infectious waste including sharps. This waste is classified as a Class 6 waste (toxic and infectious) with the division 6.2: Infectious substances.

Additionally, SANS 10248 classifies waste streams within healthcare facilities in different Hazardous Ratings (HR 1-4) and in different waste streams. These streams are supposed to be packaged, labelled, handled, stored and treated in accordance to their level of hazard in order to create a safe and environmental sound healthcare waste management:

- Human or anatomical waste
- Infectious human anatomical waste (colour code RED – labelling Class 6.2)
- Infectious animal anatomical waste (colour code ORANGE – labelling Class 6.2)
- Non-infectious animal anatomical waste (colour code BLUE)
- Infectious non-anatomical waste (colour code RED – labelling Class 6.2)
- Sharps (colour code YELLOW – labelling Class 6.2)
- Chemical waste including pharmaceutical waste
- Pharmaceutical or chemical waste (colour code GREEN – labelling different Hazardous Classes)
- Cytotoxic pharmaceutical waste (colour code GREEN – labelling specific sign: red triangle on black background with bold letters: Cytotoxic)
- Radioactive waste (labelling Class 7: Radioactive Material)
- General Healthcare waste (colour code BLACK)
- According to the World Health Organisation (WHO) the proportions of the hazardous components within the healthcare waste are:[i]
    - Infectious waste (15% to 25% of total health care waste) among which sharp waste (1%);
    - Body part or anatomical waste (1%);
    - Chemical or pharmaceutical wastes (3%); and
    - Radioactive and cytotoxic waste or broken thermometers (about 1%).

Sharp wastes, although produced in small quantities, are highly infectious if they are poorly managed. Contaminated needles and syringes represent a particular threat and may be scavenged from waste areas and dump sites and reused. There is no information on the general relation of these fractions in

the waste stream of hospitals and clinics. General waste can be found in the HCRW stream as a result of poor segregation at source.

Hazardous waste should be regulated through the municipal By-Laws; however this is not being addressed by the current By-Laws.

### 2.3.5 Waste Generation Rates

For the purpose of estimating waste quantities in SM, statistics from the Census, 2011 were used. Using typical waste generation figures, the total tonnage of municipal solid waste was calculated. An allowance for commercial waste, builder's rubble and non-hazardous industrial waste was also included.

General waste is waste which does not pose a significant threat to public health and the environment if managed properly. It includes the following waste types:

- Metals
- Paper
- Glass
- Plastic
- Organic
- Inert and Builders Rubble

The households per town figures as provided by SM were used to calculate the waste generation per household. The demographics for households waste for the relevant towns are presented in Table 3 and the projected waste generated in Table 4. The waste generated includes general household waste and organics collected from households as well as businesses.

| Towns | Household per town | Waste generated per household per day[8] (low income group = 2.1kg) | Waste generated per household per month |
|---|---|---|---|
| Barkley East | 2631 | 5525 kg | 168 t |
| Herschel | 612 | 1285 kg | 39 t |
| Lady Grey | 356 | 748 kg | 23 t |
| Rhodes | 144 | 302 kg | 9 t |
| Rossouw | 57 | 119 kg | 4 t |
| Sterkspruit | 609 | 1279 kg | 39 t |

**Table 3: Estimated waste generation per town[9]**

[8] Management of Municipal Solid Wastes: A Case Study in Limpopo Province, South Africa Ogola, J.S., Chimuka, L. and Tshivhase, S

[9] Senqu Municipality

| Area | House holds (2011) | Growth Rate (%) | Projected Population Growth | | | Estimated Waste Generation kg/p/day | Total Estimated Waste Generation ton/month | Waste Growth Rate (%) | Projected Waste Generation ton/month | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2011 | 2015 | 2020 | | | | 2011 | 2015 | 2020 |
| **Barkley East** | 2631 | -0.12% | 2631 | 2618 | 2603 | 5525 | 168 | -0.12% | 168 | 167 | 166 |
| **Herschel** | 612 | -0.12% | 612 | 609 | 605 | 1285 | 39 | -0.12% | 39 | 39 | 39 |
| **Lady Grey** | 356 | -0.12% | 356 | 354 | 352 | 748 | 23 | -0.12% | 23 | 23 | 23 |
| **Rhodes** | 144 | -0.12% | 144 | 143 | 142 | 302 | 9 | -0.12% | 9 | 9 | 9 |
| **Rossouw** | 57 | -0.12% | 57 | 57 | 56 | 119 | 4 | -0.12% | 4 | 4 | 4 |
| **Sterkspruit** | 609 | -0.12% | 609 | 606 | 602 | 1279 | 39 | -0.12% | 39 | 39 | 39 |

**Table 4: Projected waste generation**

## 2.4 Existing Waste Management Strategies, Systems and Practices

### 2.4.1 Waste removal

Only 94 % of the population of SM is living in rural areas. The Municipality offers a high level access to waste in Sterkspruit, Barkly East, Lady Grey and Rhodes, where waste is collected from households and businesses on weekly basis or when requested during festive season. Rossouw, Herschel and the villages are not receiving any service except for the provision of exposure to cleaning campaigns. In the absence of resources temporary workers are utilized to attend to littering.

#### 2.4.1.1 Rural Areas

With no waste collection taking place in the rural areas, illegal dumping as well as burning of waste is taking place in SM and it's a huge problem within the Municipality. This is a problem further compounds the effect of contamination, pollution, damage to tourist assets and the environment. There is also no real policing of illegal dumping.

There are small businesses in the rural areas of SM, and waste is not collected by the Municipality. Waste produced by the small business is mostly burnt or buried on site.

#### 2.4.1.2 Urban areas:

The main urban area of Lady Grey, Barkley East, Sterkspruit and Rhodes is serviced by the Municipality. The local waste disposal sites are available for the public to use in regards to disposal of their wastes. Garden waste and builders rubble removal is not formally addressed and is taken to the waste disposal site or dumped illegally. The estimated number of households in the Municipality is 38 045 and 4917 of the households waste is collected by the SM, this is a shortcoming which requires urgent attention.

Table 4 below illustrates how waste removal is handled in the area. According to Stats SA, (2011) 13% of households did receive a collection service by the local authority/private company. It is evident that 87% residents have no access to household waste removal services.

| Source | Households |
|---|---|
| Removed by local authority/private company at least once a week | 4750 |
| Removed by local authority/private company less often | 167 |
| Communal refuse dump | 478 |
| Own refuse dump | 26487 |
| No rubbish disposal | 5698 |
| Other | 465 |
| Total | 38 045 |

**Table 5: SM Waste Removal**[10]

Based on this information the theoretical waste generation figures are given below in Table 6.

| | Population | Waste generated (kg/day) | Generated weight (tons/day) | Generated weight (tons/years) |
|---|---|---|---|---|
| Urban | 22 069 | 1.5 | 33.1 | 12 045 |
| Rural | 112 081 | 0.3 | 33.6 | 12 271.3 |
| **TOTAL** | **134 150** | | **66.7** | **24 316** |

**Table 6: SM waste generation figures**

### 2.4.2 Illegal dumping

Illegal dumping does occur in open field and illegal borrow pits situated in urban and rural areas. The Municipality does not have By-Laws addressing illegal dumping. Illegal dumping is prominent in townships and around the current “illegal waste disposal site”. In order to address the problem of illegal dumping, an awareness campaign should be initiated. The objective of this campaign is to make the communities aware of health and environmental impacts of illegal dumping. SM has embarked on Waste Management Programmes, with the view to changing the mind-set and behavioral practices of all the communities. It is clearly evident from the figure below that illegal dumping is a problematic issue especially in the Sterkspruit Area. (Refer to figure 5).

[10] Census 2011

**Figure 5: Illegal dumping**

### 2.4.3 Garden refuse and builders rubble

There are no dedicated builder's rubble sites in SM. Builder's rubble is used to fill borrow pits in Lady Grey and Barkley East.The Municipality is also responsible for collecting garden refuse. The disposal of garden refuse is a major problem as there is no proper facility for garden refuse disposal in the SM. SM is not even planning to have garden refuse facilities in the future; however, proper facilities are required for garden refuse and builder's rubble.

### 2.4.4 Waste minimization strategies

SM has no waste minimization strategy in place. The NWMS (2011) and the Polokwane Declaration of Intent (September 2001) sets a clear mandate for the prioritisation of waste avoidance in South Africa.

Figure 1 illustrates the well-known waste hierarchy. The top three tiers: avoid, reduce and reuse form part of waste avoidance as all three interventions prevent potential waste from even entering the waste stream. 'Waste avoidance refers to a pro-active approach by industrial as well as domestic waste producers to minimise the volume of waste, by not creating the waste in the first place'[ii] Recycling which is often seen as the epitome of waste reduction options, in fact only sits in the middle of the hierarchy.

At a governmental / legislative level, an example of a waste avoidance intervention was the introduction of a levy on plastic shopping bags. This initiative spurned the production of better quality bags that people were more likely to reuse, therefore reducing the number of plastic bags entering the waste stream and littering the environment.

At a domestic level, waste avoidance can be practiced by people making an effort to use items for purposes over and above the original intent. Household composting is also considered waste avoidance, as the material that would normally have entered the waste stream is converted into a useful gardening resource.

Waste avoidance is going to play an increasingly significant role in waste management in the years to come. It is therefore critical that SM develop a municipal waste minimization strategy.

### 2.4.5 Specific Waste Streams

No assumptions could be made to determine the waste volumes of specific waste streams due to the fact that information regarding waste volumes is insufficient as there are no weighbridges at the landfill

sites. Typical waste streams in the rural areas is about 49% organic, 16% fines, 10% plastics, 6% glass, 5% paper, 5% cardboard, 3% tins and cans, 2% textiles and 2%[11] other.
It is evident that the following waste streams will constitute large amount of the waste generated in SM:

- Plastics
- Glass
- Cartons
- Garden waste
- Organics and
- Fines (other).

It can be concluded that there is a large potential for recycling and composting in SM.

### 2.4.6 Existing Waste Avoidance in Senqu Municipality

There are no formalised waste avoidance initiatives underway in SM.

### 2.4.7 Waste Reduction

As mentioned previously the Polokwane Declaration Intent (September 2011) aims at dramatically reducing waste to landfill in the next 12 years. Part of achieving this vision will be a dramatic increase in recycling.

Key factors in achieving waste reduction are the following:

- Separation/ segregation at source;
- Recycling, and
- Compositing.

Waste recovery or recycling has been identified as one on the main objectives of the NWMS (2011). The objectives were listed as the following:

- Increasing and extending waste recycling in selected pilot areas;
- Identification of new waste streams for recycling;
- Expansion of the existing recycling initiatives and improvement as well as implementation of new recycling initiatives; and
- Identification and development of appropriate mechanisms to promote sustainable recycling by all members of the recycling chain.

The efficiency of waste reduction can only be determined through the implementation of a Waste Information System (WIS). This system should track the quality and quantity of recyclables recovered and compost produced. Public awareness and education campaigns are also critical to ensure the much needed support of the general public.

### 2.4.8 Recycling

There are only a few informal recycling programmes in SM, extracting less than 1% of the potential recyclable product. Some waste is bought from informal waste reclaimers within the community. No information is available regarding reclaimable material from the current waste stream.

[11] Working with waste: Guidelines on Recycling of Solid Waste - DEA

**Figure 6: Informal Recycling Initiative at Lady Grey Landfill Site**

### 2.4.9 Composting

There are no formalised composting initiatives underway in SM.

### 2.4.10 Equipment

The equipment that is utilised by the Senqu Municipality per respective town is given below in Tables 6 to 9.

**Lady Grey**

| Make | Type | Year | Registration | Condition |
|---|---|---|---|---|
| Landini | Tractor | 2010 | FJT 486 EC | Good |
| | Trailer | 2010 | FJT 414 EC | Good |
| Isuzu 150 | Truck | 2008 | FKR 791 EC | New |
| Hino 150 | Tipper Truck | 2009 | FHM 952 EC | New |
| Komatsu | TLB | 2011 | FSJ 984 EC | New |
| Isuzu | Bakkie | 2002 | CYH526 EC | Poor |
| Opel Corsa | Bakkie | 2010 | FKL 638 EC | Reasonable |

**Table 7: Equipment used in Lady Grey**

**Sterkspruit**

| Make | Type | Year | Registration | Condition |
|---|---|---|---|---|
| Massey Ferguson | Tractor | 2000 | CVF 509 EC | Poor |
| Nissan Cabstar | Truck | 2008 | FDF 771 EC | Good |
| | Trailer | 1997 | CGV 297 EC | Poor |

**Table 8: Equipment used in Sterkspruit**

**Barkley East**

| Make | Type | Year | Registration | Condition |
|---|---|---|---|---|
| | Trailer | 2010 | FJT 438 EC | Fair |
| Nissan Cabstar | Truck | 2008 | FDF 779 EC | New |
| UD Trucks | Tipper Truck | 2011 | FTS 981 EC | New |
| Komatsu | TLB | 2010 | FHF 089 EC | New |

| | | | | |
|---|---|---|---|---|
| Opel Corsa | Bakkie | 2008 | DZP 996 EC | Reasonable |
| Landini | Tractor | 2010 | FJT 447 EC | Reasonable |
| Isuzu | Compactor 20m³ | 2013 | New | Excellent |
| | Trailer | 2008 | FBD 570 EC | Fair |

**Table 9: Equipment used in Barkley East**

**Rhodes**

| Make | Type | Year | Registration | Condition |
|---|---|---|---|---|
| Landini | Tractor* | 2003 | Not available | Fair |
| | Trailer* | 2003 | Not available | Fair |

**Table 10: Equipment used in Rhodes**

The equipment was donated by the Eastern Cape Province. A number of the vehicles have high mileage due to the great distances they are required to travel since many of the areas in the SM are far from each other especially the rural areas.

### 2.4.11 Landfill sites

The landfill sites used by SM are not licensed except Lady Grey and Barkley Landfill Site have Directives (An order or instruction especially one issued by the authority) which were issued by DEA; however, in regards to Barkley landfill site there was no proof of the Directive issued. The landfill sites are not managed, controlled and audited in terms of the current required legislation.

#### 2.4.11.1 Sterkspruit Landfill Site

The SM utilises the Sterkspruit landfill site for the Sterkspruit area. The landfill site is owned and operated by SM. The site is unlicensed and not managed according to the current required legislation. There is no access control and the site is not fenced. There is no plant or equipment available to properly place, cover and compact waste. Typically waste remains uncovered resulting in extensive windblown litter. Burning of waste also occurs on site. Figure 7 and 8 below illustrate the current status of the landfill site.

**Figure 7: Waste placed inside a trench**

**Figure 8: Evidence of burned waste**

### 2.4.11.2 Lady Grey Landfill Site

The SM utilises the Lady Grey landfill site for the Lady Grey and surrounding areas. The landfill site is owned and operated by SM. The site is licensed and classified as a GSB, however, prove of the license is outstanding. There is no plant or equipment available to properly place, cover and compact waste. Waste is incinerated and disposed of in a cell. The site issues described above are evident in Figure 9 - 11 below.


**Figure 9: Notice board at the main entrance**

**Figure 10: Incinerator used on site to burn waste**

**Figure 11: End product from the incinerator**

### 2.4.11.3 Barkley East Landfill Site

The SM utilises the Barkley East landfill site for the Barkley East and surrounding areas. The landfill site is owned and operated by SM. The site is licensed and classified as a GSB; however, proof of the license is outstanding. The site is not managed according to the current required legislation. There is no plant or equipment available to properly place, cover and compact waste. Waste is incinerated and disposed of in a cell. The site is fenced and there is no dedicated official on site for access control. The operation of the Barkley East Landfill Site is illustrated in Figure 12-13.


**Figure 12: Notice board at the main entrance**

**Figure 13: Burning of waste on site using an incinerator**

#### 2.4.11.4 Rhodes Landfill Site

The SM utilises the Rhodes landfill site for the Rhodes and surrounding areas. The landfill site is owned and operated by SM. The unlicensed site is operating ineffectively due to limited equipment. Terreco Environmental CC has been appointed by the SM to undertake the EIA process for the development of the landfill site. The site is not managed according to the current legislation requirement. Typically, waste remains uncovered as there is no plant or equipment available to properly place, cover and compact waste. Burning of waste also occurs on site. The site issues described above are evident in Figure 14 -15 below.

**Figure 14: Overview of Rhodes Landfill Site**

**Figure 15: Waste burned inside a trench**

#### 2.4.11.5 Rossouw Landfill Site

The SM utilises the Rossouw landfill site which is for the Rossouw and surrounding areas. The landfill site is owned and operated by SM. The unlicensed site is operating ineffectively due to limited equipment. Terreco Environmental CC has been appointed by the SM to undertake the EIA process for the development of a new landfill site. The landfill site is situated near the Wasbank River. The site is not managed according to the current legislation requirement. There is no plant or equipment available to properly place, cover and compact the waste. Burning of waste also occurs on site. The site issues described above are evident in Figure 16 below.

**Figure 16: Rossouw Landfill Site**

#### 2.4.11.6 Herschel Landfill Site

Herschel has no landfill site facility. Terreco Environmental CC has been appointed by the SM to undertake the EIA process for the development of a new landfill site.

#### 2.4.11.7 Disposal Facilities Used Outside of SM

SM does not use any cross-border disposal sites.

### 2.4.12 Transfer stations

There are no public drop-off facilities, garden sites or recycling drop-off sites of any sort available to the general public in the SM.

### 2.4.13 Health care risk waste

Waste streams within healthcare facilities are classified in different Hazardous Ratings (HR 1-4) and in different waste streams. These streams are required to be packaged, labelled, handled, stored and treated in accordance to their level of hazard in order to create a safe and environmentally sound healthcare waste management system. Hazardous Health Care Waste which can be found in every healthcare facility is the infectious waste – including sharp waste.

### 2.4.14 Hazardous Waste

Hazardous waste is waste which might have a detrimental effect on public health and is categorised according to the degree at which it might cause harm. SABS code 0228 classifies hazardous waste into the following:

- Class 1 - explosives
- Class 2 - gases
- Class 3 – flammable liquids
- Class 4 – flammable solids
- Class 5 – oxidising substances and organic peroxides
- Class 6 – toxic and infectious substances
- Class 7 – radioactive substances
- Class 8 - corrosives
- Class 9 – other miscellaneous substances

In SM, hazardous waste can be produced mainly by farming activities and health care facilities. Currently the Municipality does not record how much hazardous waste is being generated.

The guideline developed by DEAP and based on the National Waste Management Strategy (2011) indicates that a local municipal IWMP must only cover hazardous domestic waste in detail. 'Framework planning for: hazardous industrial waste, agricultural and forestry waste (pesticides), medical waste, mining waste, power station waste, radioactive medical waste and radioactive mining waste will be done at the provincial government level'

The National Waste Management Strategy (2011) required Provincial Environmental departments to produce integrated hazardous waste management plans, which at this stage the North West Province has not yet developed.

Household hazardous waste: SM is responsible for the management of household hazardous waste. Currently most household hazardous wastes such as batteries and compact fluorescent lights (CFLs) are included in the general waste and either burnt or buried. These wastes contain toxic substances such as mercury and cadmium. Only small amounts of these heavy metals can contaminate large volumes of groundwater when buried or disposed of at landfills. These waste items also decompose very slowly and therefore accumulate in the soil.

### 2.4.15 Public Cleansing

There are currently street/public cleansing activities in Lady Grey, Barkley East, Sterkspruit, Rhodes, Rossouw and Herschel. The rest of the villages in SM are not cleared of litter.

### 2.4.16 Awareness and Education

Public awareness and education is an important factor in sustainable waste management. Waste awareness initiatives have however not been traditionally practiced by SM. This has resulted in large sectors of the public not participating in sustainable waste practices. In order to achieve sustainable waste management, it is imperative that the public become aware and educated about waste issues.
There are currently limited waste awareness campaigns for the community and schools in the Municipality and this remains a major shortcoming.

## 2.5 Economics and Financing of Waste Management

### 2.5.1 Socio-economic data

The general trend is for waste generation to increase with household income, however it is also evident that there is no direct correlation and many variances occur. It is therefore difficult to predict an exact impact on waste generation rates, but it would be acceptable to assume that a dramatic economic growth could be accompanied by an associated increase in waste generation before possible waste minimization strategies take effect. Table 11 below depicts the population distribution between the different socio-economic levels within SM.

| Income Level | Annual Income Range | Population Distribution (%) |
|---|---|---|
| Very High Income | R 204 801 and higher | 0.04 |
| High Income | R 102 401 – R 204 800 | 0.05 |
| Middle Income | R 51 201 – R 102 400 | 0.04 |
| Low Income | R 12 801 – R 51 200 | 1.04 |
| Very Low Income | None – R 12 800 | 98.82 |

**Table 11: Socio Economic Population Distribution**

### 2.5.2 Financial Summary of Waste Management Services of the Senqu Municipality

#### 2.5.2.1 MIG Capital Projects

| Description | Financial Year | | |
|---|---|---|---|
| | 2012 / 2013 | 2013 / 2014 | 2014 / 2015 |
| Solid Waste Sites | R 2 000 000.00 | R 7 000 000.00 | - |

**Table 12: MIG Capital Projects**[12]

#### 2.5.2.2 Budget

Table 13 below is a summary of the budget for waste management services for SM for 2012 to 2015:

| Cost Description | Financial Year | | |
|---|---|---|---|
| | 2012 / 2013 | 2013 / 2014 | 2014 / 2015 |
| Revenue | R 8 277 000.00 | R 13 654 000.00 | R 7 053 000.00 |
| Operational Expenses | R 10 135 000.00 | R 10 846 000.00 | R 11 607 000.00 |
| Capital Expenses | R 4 050 000.00 | R 8 775 000.00 | R 1 967 000.00 |
| **DEFECIT** | **R 5 908 000.00** | **R 5 967 000.00** | **R 6 521 000.00** |

**Table 13: Budget for SM Waste Management Services for 2012 to 2015**

#### 2.5.2.3 Tariff structure

The tariff structure for waste management services is presented in Table 14. The tariffs should however be regulated by the municipal By-laws.

| | 2012/13 Financial Year |
|---|---|
| Domestic Consumers (per month for one removal per week) | R 94.45 |
| Domestic Consumers (Additional removal per load or part thereof) | R 94.45 |
| Commercial Consumers (per month for two removals per week) | R 201.50 |

[12] Integrated Development Plan 2011 - 2016

| | |
|---|---|
| Commercial Consumers (Additional removal per load or part thereof) | R 210.50 |
| Government institutions (per month for two removals per week) | R 1 196.35 |
| Government institutions (Additional removal per load or part thereof) | R 201.50 |
| Garden refuse (per load to be paid in advance) | R 201.50 |
| Building rubble (per load to be paid in advance) | R 350.00 |
| Cleaning of erven | R 201.50 |

**Table 14: Tariff structure for waste management services**

## 2.6 Organisational Structure

Waste Management Division falls under the Directorate Community Services. (Refer to Figure 17)

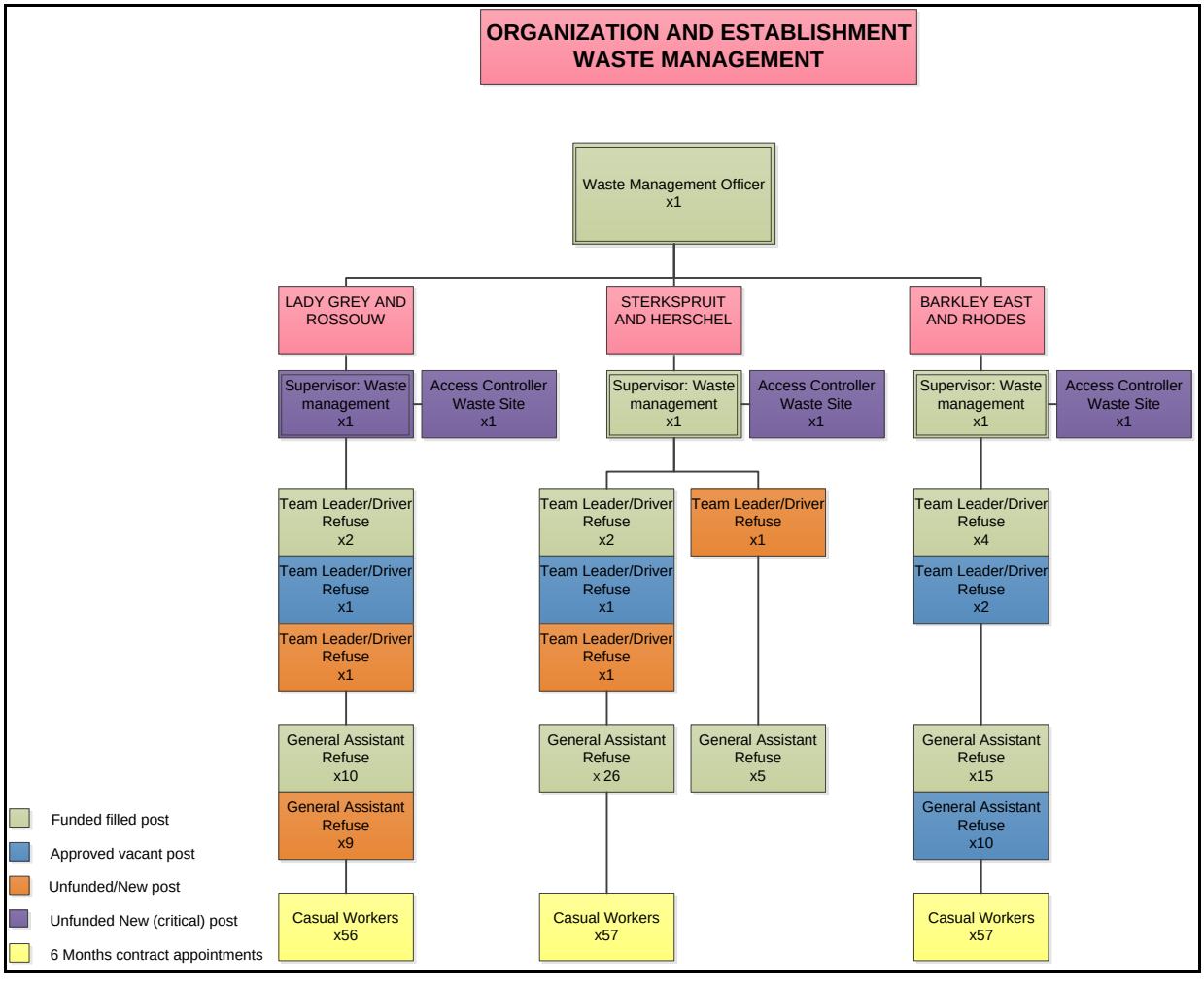



**Figure 17: Waste Management Organisational Structure as per 2012**

## 2.7 Evaluation of Needs and Alternatives

This section will address the evaluation of the current systems, equipment, personnel and landfills. This evaluation was done on the basis of a SWOT analysis, i.e. Strengths, Weaknesses, Opportunities and Threats.

| ASPECTS | STRENGTHS | WEAKNESSES | OPPORTUNITIES | THREATS |
|---|---|---|---|---|
| **Collection Service** | Regular service in Lady Grey, Barkley East, Sterkspruit Rhodes, Rossouw and Herschel. | Waste collection services rendered in rural areas<br>Access control into service areas<br>Inadequate by-laws | Expand household collection services as well as business collections.<br>Updating waste by-laws | Vehicles and equipment<br>Illegal dumping |
| **Personnel** | Skilled personnel for collection and at the landfill. | Inadequate personnel at landfills and for rendering services in rural areas | Train new personnel to expand existing service into rural areas. | Over utilisation of staff |
| **Equipment** | Equipment in fairly good condition with one or two exceptions | Equipment in a poor condition should be replaced. | Upgrade older equipment in fleet.<br>Prepare phased replacement policy. | Maintenance cost. |
| **Landfill** | The landfill sites used by SM are not licensed except Lady Grey and Barkley Landfill Site have Directives | Landfill sites is non-compliant<br>No hazardous disposal site<br>All garden refuse is landfilled | Formalising recycling initiatives.<br>Composting. | Escalating operational cost<br>Possible pollution to the environment |
| **Recycling** | | Recycling initiatives is limited to landfill sites | Separation at source<br>Cooperatives | Market for recyclable material |

| | | | | |
|---|---|---|---|---|
| **Waste information** | Insufficient waste information available | No uniform record keeping in place | Compile WIS system | Noncompliance with relevant legislation. |

**Table 15: SWOT Analysis**

The following gaps were identified in the SM:

- No Waste Policy;
- Waste By-laws for SM insufficient ( to be reviewed and updated);
- Waste collection services are only rendered in urban areas;
- There are very few recycling initiatives in the municipality, extracting less than 1% of the potential recyclable material;
- The landfill sites do not comply with DWA's minimum requirements;
- There is a lack of knowledge regarding the remaining lifespan of the Landfill Sites;
- There is minimal public education and awareness on waste management within SM;
- No initiatives are underway for waste avoidance;
- The situation in terms of garden waste and builder's rubble removal is inadequate;
- There is no initiative underway from SM to address illegal dumping;
- There is a lack of formal data in terms of the efficiency of collection;
- There are inadequate records maintained on the quantities and types of waste collected and disposed. There is no weighbridge or electronic WIS at the Landfill sites; and
- There is no facility available to dispose off hazardous material. A simple, inexpensive intervention a municipality can take is to set up collection points for these items at shopping centres and community drop-off centres. This initiative can greatly reduce the volume of hazardous waste that is buried or disposed off to landfill safeguarding the environment for future generations. SM will also need to include information of the management of hazardous waste in their education and awareness programme.

# 3. STRATEGIC OBJECTIVES

## 3.1 Governance

### 3.1.1 Waste Policy and By-Laws

**Waste Policy:** A waste policy for SM has not been compiled. 'A policy outlines what a government ministry hopes to achieve and the methods and principles it will use to achieve them. A policy document is not a law but it will often identify new laws needed to achieve its goals. It is important to note that is critical to invite public and stakeholder input during the process of developing the waste policy. JGDM has developed an Environmental Policy which addresses issues of waste management.

By-Laws: SM By-Law for Dumping and Littering, Gazette 1405, Notice 191 was promulgated on the 9th of December 2005. This By-Law however only addresses dumping and littering. The By-Laws are insufficient and need to be to be updated and reviewed. The updated waste By-Laws will put in place the necessary institutional and legal frameworks that will enable SM to achieve its goals. This should be in line with the departmental objective stated in the IDP to ensure that Waste Management By-Laws are in place. Compliance monitoring of the By-Laws will also need to be implemented.

This project is considered a high priority project as the development of Waste Policy provides the framework for Waste Management in the municipality and the By-Laws provide the legislative power to enforce the goals in the Waste Policy.

### 3.1.2 Institutional arrangements

The main purpose of an institutional arrangement is to present a strategic plan on how to grow the institutional capacity of the Waste Management Division in line with its future plan. The institutional structure was designed to support the growth of Waste Management Services as further investment occurs, thereby ensuring that there is sufficient capacity to manage the work in the foreseeable future, in line with the strategy.

The SM will need to fund new posts for Lady Grey, Rossouw, Sterkspruit, Hershel, Barkley East and Rhodes as per approved structure in Figure 18. All the vacant post should be filled to render an efficient waste management service. The implementation of the additional capacity should precede the demand for waste services to ensure the municipality has the required capacity. As part of the future institutional strategy the Waste Management Division needs to develop tasks that are required throughout to ensure sustainability and effective service provision of the department:

- Preparing a plan of action to implement structure;
- Developing programs to retain staff;
- Developing training plan to address skills shortages and gaps;
- Implementing annual skills and training matrix program to monitor development; and
- Proactive recruitment and a needs analysis should be undertaken to ensure that the right people, with the right skills are in the right place at the right time. This should be determined by continuous evaluation and enactment of the desired future state and activities conducted to reach this and alignment of institutional practices therewith.

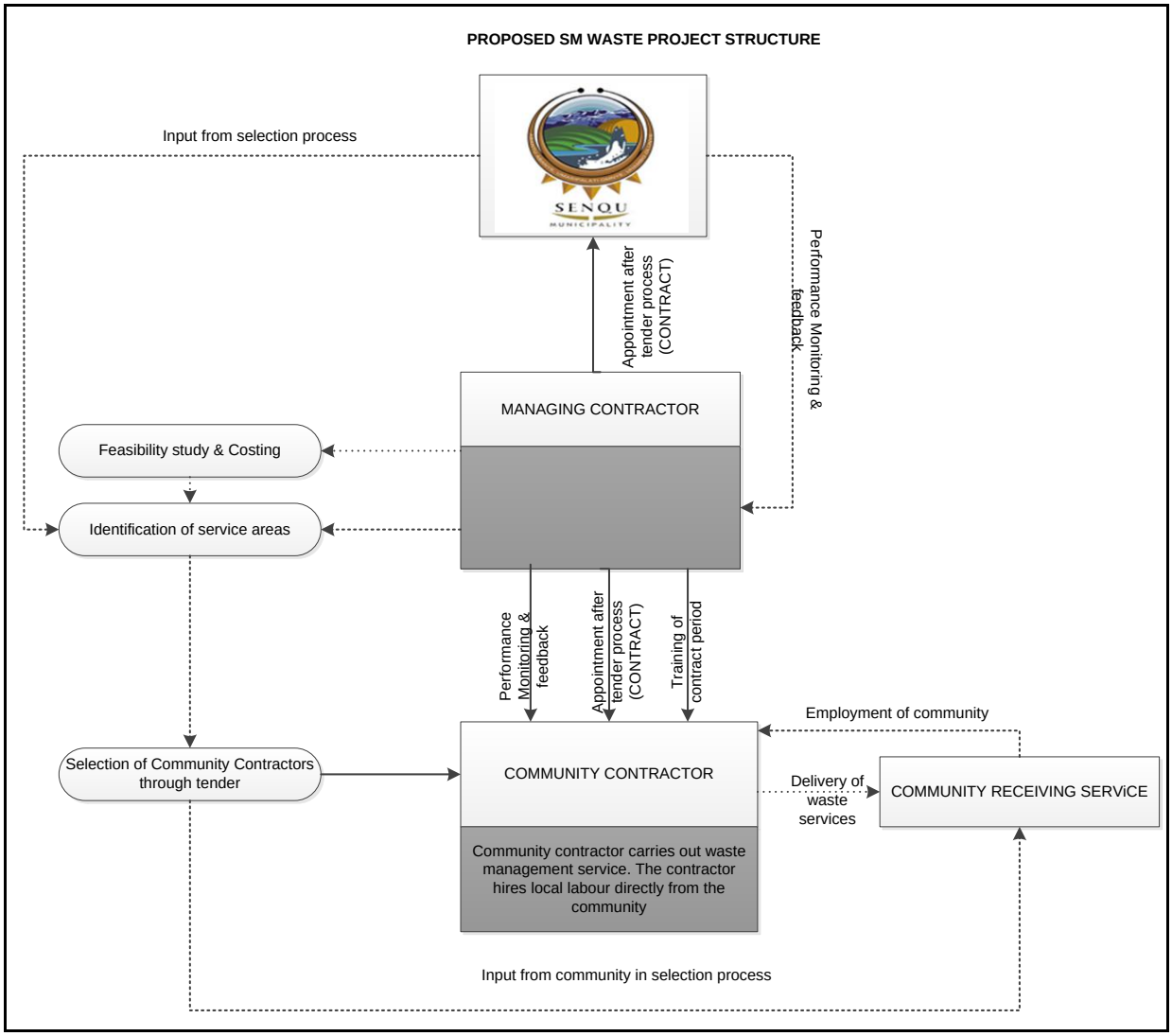



**Figure 18 : Institutional Arrangement**

### 3.1.3 Sustainability Study

The overall aim of an economic waste sustainability study is to reduce the amount of waste being sent to landfill. To make recommendations to improve the economy and effectiveness of waste management through initiatives to move up the waste hierarchy and therefore establish long term priorities for waste management.

## 3.2 Waste Avoidance

Public awareness and education plays a critical part in developing a culture of waste avoidance in a municipality. The campaign will highlight ways in which the public can avoid or prevent waste generation and suggest alternatives to high waste products or activities. This is in line with the National Waste Management Strategy 2011 (NWMS) which is to ensure that communities are educated about waste that can be recycled and reused.

This Waste Avoidance Project is considered a medium priority project as it will need to build on the completion of other projects such as the Waste Policy and By-Laws as well as the filling of posts in the

waste management division. It will include the development of Waste Prevention Guidelines for various sectors of the business community as well as the general public (e.g. waste separation at source and manufacture take back initiatives).

The project will explore the setting of realistic waste avoidance targets and means to encourage people and businesses to participate in the initiative. Participation could be encouraged through the publication of the names of participants and the giving of awards to those who achieve certain targets.

## 3.3 Treatment & Recycling

### 3.3.1 Community drop-off centres

The development of community drop-off centres is a cost effective first step towards increasing recycling in SM. A feasibility regarding the location of the drop-off centres should be investigated. The drop off-centres would be equipped with a number of skips designed to accept different waste streams such as paper, glass, plastic, tins, metals and hazardous waste. Garden waste could be accepted and this could be linked to a composting initiative. These public drop-off centres could also act as waste transfer stations in the future.

Co-operatives should be established and contracts could be drawn up with recycling companies for the collection of the recyclables.

In terms of hazardous waste, a simple, inexpensive intervention the SM can take is to set up collection points for hazardous waste items at shopping centres and community drop-off centres. SM will also need to include information on the management of hazardous waste in their education and awareness programme.

It is envisaged that all these recycling initiatives could have significant local economic development benefits and the project is therefore considered a high priority. Furthermore, if hazardous waste is prevented from going to landfill, it will safeguard the environment for future generations.

It is envisaged that the focus in the first five years will be the development of a working model in SM. The development of additional drop-off facilities will be considered after the development of SM working model.

### 3.3.1.1 Material Recycling Facility – concept:

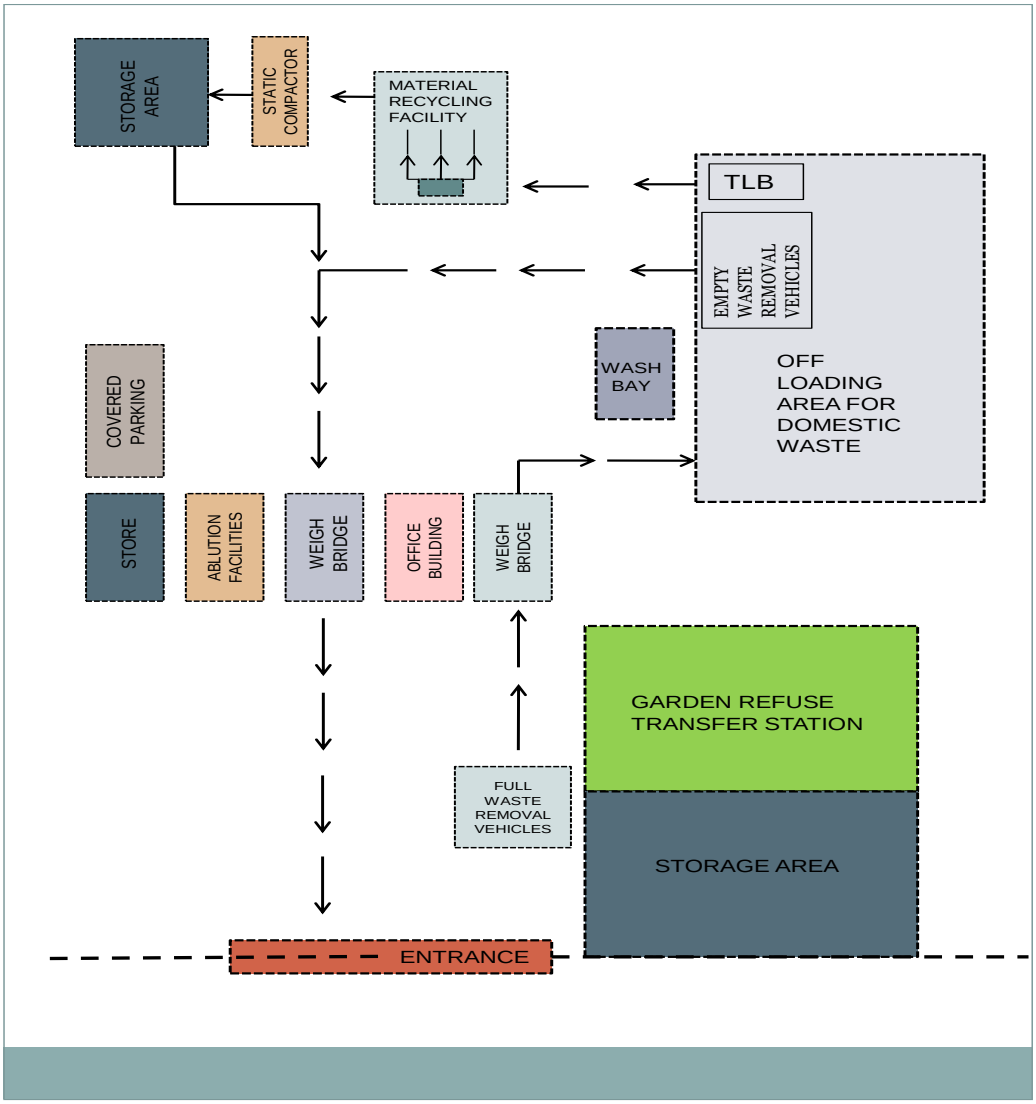



**Figure 19: Material Facility Concept**

**Design Features**

- Large offload area with separate offloading allocation;
- Long in feed conveyor – to enable pre-picking of garden refuse and other non-recyclable material;
- Removal of fine residue before sorting;
- Upfront removal of metals;
- Wide belts to reduce burden depth and improve presentation; and
- Automated removal of recyclables for bailing & compaction.

**Plant Equipment and sizing**

This plant will require 1 line, consisting of the following components:

- 1 x bag breaker
- 1 x rotary screen

- 1 x vibrating screen
- 1 x magnetic separator
- 1 x dual 20 m long sorting line

The in feed conveyor will be manned by manual pre-sort pickers for removal of garden refuse bags or other closed bags containing non-recyclable material based on the colour of the bags.

**Process Description**

1000 ton per day can be delivered to the Material Recycling Facility (MRF). The plant must allow for good logistical flow. The continuity of the plant will rely on a well laid out site which caters for a heavy traffic flow, smooth offloading and turn around and easy supply to the MRF operation. Waste handling is a high volume business and it is imperative to maintain a smooth offloading and plant feeding operation to maximise processing uptime.

The construction of the MRF is designed to include the following unit operations:

- Bag breaking
- Coarse pre-screening (rotary screen)
- Fine particle screening (vibrating screen)
- Good dispersion and presentation (wide belts)
- Large particle removal (utilising manual labour (pickers))
    - Plastics (PET, LD, PP & HDPE)
    - Paper and cardboard
    - Glass
    - Metal removal
    - Aluminium removal (optional)
- Compaction of recyclables
- Transfer of non-recyclables to compaction/future WTE

The plant is a modular design with multiple parallel sorting streams, and can be relocated and/or expanded for the increased capacity anticipated in the future.

It is intended that the design will maximise the manual labour input without compromising the plant overall efficiency. The operating philosophy is to optimise the separation and presentation of the waste material in order to maximise the efficiency of the picking line.

**Offloading and in Feed Operation**

The required footprint is 2000m$^2$.The access road will need to be designed so that the traffic flow is in one direction. Offloading should be to a central area, where the waste can be picked up by FEL and offloaded into a feed hopper. The feed hopper will homogenise the feed and discharge into a transfer conveyor which feeds into the bag breaker. The transfer conveyor will be manned by pickers who will remove identifiable bags (colour coded) which contain non recyclables e.g. Garden refuse street sweepings etc. The bag breaker will shred open the bags releasing the contents.

**Bag Breaking / Shredding**

In this process the plastic carrier bags are broken open to allow the contents to spill out and disperse. The out feed from the bag breaker will begin the process of dispersing/spreading the waste material. This process is crucial to the success of the plant. If this is not achieved then the picking lines will not be efficient as picking personnel will not have sight of the value product.

**Dispersion and Separation**

This operation is performed in a rotating drum screen. The key function is to disperse and liberate the waste material so that the fines can be removed and the waste material is well presented to the picking lines. In the rotary screen the separation process begins.

The screen can have sections with different size holes to allow for smaller particles to fall through. The product falling through the holes will pass over a vibrating screen to remove the sub 50mm particles and the big fraction from the vibrating screen passes via a magnetic separator on to the picking line where value products are removed manually. The fine fraction passes via a magnetic separator before being transported to landfill as residue.

The larger size fractions retained in the rotary screen pass via magnetic separators to picking lines where the value products are removed. The unwanted waste passes on to landfill. There are two options for the rotary screening process. The most practical option is to feed from the bag breaker into multiple smaller rotating screens. This design keeps the picking lines identical and makes it easy to scale the plant up or operate lines independent of each other. The hole size of the screens need not be smaller than 120mm since the material is not loose flowing enough and smaller holes will likely get blinded. Instead we would screen the small fraction a second time over a vibrating screen with 50mm holes. The material passing through this screen will be cleaned for metals and transported direct to landfill. This would give multiple parallel picking lines which could be operated independently of each other.

**Picking and Sorting**

During this operation the material is manually sorted into the various value products, namely glass, cardboard, mixed paper, plastics, LD, PP, HDPE & PET. The selected product is picked from the feed conveyor and dropped into bins. These bins discharge onto cross flow conveyors beneath the operating level and remove the product to storage bins for compaction. For optimum picking efficiency the sorting lines should be double lines this means that each line effectively has 4 picking lines (2 lines for the large fraction and 2 lines for the small fraction).

**Metal Collection**

Provision is made for the removal of ferrous metal using electro magnets. These are mounted between rotary screen screens and the picking lines. The metal scrap will be conveyed to collection bins and removed for compaction. An eddy current device can be installed if the non-ferrous metals need to be removed.

**Vibrating Screens**

Vibrating screens need to be installed for the removal of fine residue. These will catch the fraction passing the rotating screen (120mm holes) and will separate out the sub 50mm for landfill. Screen size will depend on the size range of the value product which needs to be recovered.

**Waste Residue**

The residue will ultimately be the “unpicked’ material, which will comprise largely organic material, with waste material which has not been separated sufficiently for removal. This waste residue has a calorific value which can be utilised to generate power. This could be considered as a later phase. The waste residue will be deposited into a static compactor using 27m³ compact containers which will be transported to the operational landfill sites with Roll on vehicles.

**Job Creation**

The Material Recycling Facility can result in the creation of jobs (dependant on number off shifts per day) directly on the Material Recycling Facility as well as the indirect job creation by virtue of the increased downstream operations, plant design, manufacture, installation and commissioning and associated service industries.

### 3.3.2 Establishing Separation at Source Initiative

There is currently no separation at source initiative at SM. Promotion of separation at source will require an education and training programme and support from the community. Separation at source must then be supported by a service delivery system capable of transporting non-organic recyclables and remaining waste. There is the opportunity to start the initiative in conjunction with private recycling companies. SM can start supplying different coloured bags/bins for various waste types to encourage waste separation. The initiative should aim to change public attitudes and behaviour towards waste. Local campaigns should be run to encourage people to Reduce, Reuse and Recycle waste.

### 3.3.3 HCRW Treatment Facilities

There is a lack of appropriate Health Care Risk Waste (HCRW) treatment facilities in the SM. HCRW generated from private practices and some health care facilities is most likely disposed of illegally. An extension of the medical waste removal service provider is to be considered and/or the provision of HCRW treatment facilities.

This project is considered a high priority as a lack of adequate treatment facilities has considerable negative environmental and public health impacts.

## 3.4 Collections

### 3.4.1 Collection Services

One of the key features of a developmental state is to ensure that all citizens especially the poor and other vulnerable groups have access to basic services. The Constitution of the country places the responsibility on government to ensure that such services are progressively expanded to all, within the limits of available resources. Government policy on most of these issues is progressively moving towards Universal Access including Waste Management.

SM only provides waste collection services to the community and private enterprises of Lady Grey, Barkley East, Rhodes and Sterkspruit.

By not providing waste collection services it leads to illegal and un-policed dumping of waste and which requires urgent attention within the SM. The process of rendering waste collection services will require a waste disposal site or arrangement with neighbouring municipalities to dispose waste at their landfill sites. Rossouw and Herschel will require community-based services, the utilisation of human resource for implementation and cost recovery plan.

Estimating the cost of extending waste services to all residents of SM is very difficult as the method of service provision remains to be finalised. Total Budget for waste management for the 2012/13 financial year is R 10 135 000.00 which should cover the entire value chain of collection, transport and disposal.

## 3.5 Disposal

### 3.5.1 New landfill sites or Waste Treatment Centre

The Sterkspruit landfill site should be closed and rehabilitated and an alternative central collection area / bulk facility area for waste to be identified option should be considered. Try to move away from landfilling in rural areas to collection/ sorting area. By moving to collection/ sorting area the following will be of benefit:

- Substantial cost savings
    - Capital
    - Operational
    - Maintenance
- With these central collection areas, recycling/ separation activities can be initiated.
- Loss impact on the environment.
- Ease to manage and control activities as well as matter of scavengers.

A proper site selection process should be followed which will include a meeting with other potentially affected departments with the SM such as the Provincial Environmental Management Department. Through a negative mapping process, unsuitable locations may be excluded and the remaining sites would feed into an Environmental Impact Assessment (EIA).

### 3.5.2 Compliance of Disposal Facilities

Terreco Environmental CC is currently undertaking the EIA process for the Rhodes disposal site and recommending an alternative landfill facility for Rossouw. They are also investigating a new landfill site for Herschel.

## 3.6 Fleet Management and Equipment

### 3.6.1 Challenges faced by small towns with regards to equipment and logistics

- A lack of financial and human resources are the key constraints in the development of waste management services in small municipalities;
- Municipalities do not always analyze or research the vehicle and equipment types required for waste collection;

- The above has an impact on the selection and design of vehicles / plant / equipment in terms of "right fit for purpose" and on the operating and maintenance costs of vehicles / plant and equipment.

### 3.6.2 Equipment / vehicle selection considerations (collection / transportation)

- Waste type to be removed (recyclable or non-recyclable);
- Waste volumes / tonnes;
- Frequency of collection;
- Geographical area of collection;
- Container / receptacle type(Method of collection);
- Separation at source;
- Collection of recyclable waste;
- Distance between collection points and disposal facilities;
  - Communal collection points
  - Transfer station / recycling / garden site
  - Landfill site
  - Drop-off centre's / shopping centre collection points
- Road conditions;
- Traffic conditions;
- Landfill conditions;
- Driver /Operator skills / know how;
- Maintenance infrastructure (Internal / external);
- Supplier after sales support;
- Efficiency / Fuel consumption (carbon footprint); and
- Asset optimization.

### 3.6.3 Examples of vehicle/ plant/ equipment types

| | |
|---|---|
|  |  |
| Standard LDV / Tipper option | Removable Cage |

| | |
|---|---|
|  |  |
| Standard 4 Tonner/ Tipper option | 4 Tonner Rear View |
|  |  |
| 4 Tonner ( Tipper/ Crew Cab/ Extended sides are optional) | 4 Tonner side/ Rear View |
|  |  |
| 8 Ton Tipper with Crane/ Crew Cab ( Crane/ Crew Cab – are optional) | 8 Ton Tipper with Crew Cab ( Crew Cab / Extended sides are optional) |

| | |
|---|---|
|  |  |
| 13 Ton Skip Loader ( 2 axles) | 13 Ton Skip Loader ( 2 axles) |
|  |  |
|  |  |
| Compactor ( 10/12 $m^3$) | Compactor 20 $m^3$ (3 axles) |

### 3.6.4 Model Required

Example:

Calculate the number of trucks required to transport 30 tonnes of waste per day.

Containers are picked up daily and are 6$m^3$ each.

Waste inside the containers weighs approximately 5 tonnes

| Data: | |
|---|---|
| Total collection time per day (Hours) | |
| Total collection time per day (Minutes) | 480 min |
| Off route time/ delays per day | 10 min |
| Time to drive to and from the depot | 10 min |
| Time to drive to disposal facility | 20 min |
| Time to drive from disposal facility | 20 min |
| Time to off load at the disposal facility | 15 min |
| Time to pick up container (load onto vehicle) | 5 min |
| Time to put container down (off load from vehicle) | 5 min |
| Time to drive between containers | 5 min |
| Waste Tonnages (per day) | 30 Tonnes |
| Container volume ($m^3$) | 6 $m^3$ |
| Container payload (Tonnes) | 5 Tonnes |
| **Calculations** | |
| Number of containers filled/ trips per day | 6.0 |
| Total collection time in minutes (8hrs x 60min) | 480 min |
| Off route time | 10 min |
| Time to and from depot | 10 min |
| **Available collection time in minutes** | **460 min** |
| Total time per container (collect, transport, disposal and return) | 70 min |
| **Possible trips/vehicle/ day (based on available time)** | **6.6** |
| Required trips per day equal | 6.0 |
| Number of vehicle required equals | 0.9 |
| **Therefore one (1) vehicle is required** | **1** |

To redress past imbalances in the provision of waste collection services, it is imperative that acceptable, affordable and sustainable waste collection services be rendered to all South Africans.

It is important that the most appropriate collection vehicles are used for the specific task and geographical terrain.

Health and safety issues must also be considered. Waste must be collected and transported in closed vehicles to prevent littering during transportation.

Maintenance schedules must be adhered to and roadworthiness of vehicles ensured, where applicable in order to ensure a reliable waste collection service.

It is therefore important that there is a proper assessment of the logistics and equipment requirements, to ensure that the appropriate and applicable equipment / vehicles are selected and that the overall system functions well and delivers an acceptable level of service to all households.

## 3.7 Waste Information System

The implementation of a Waste Information System (WIS) follows requirements by the NWMS (2011) in terms of monitoring and reporting and can only be done if the waste management activities are in place in terms of structure, systems, personnel, infrastructure and services.
Why should we collect waste data?

- 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.

### 3.7.1 Resource Equipment

#### 3.7.1.1 Within waste disposal facilities

To successfully implement the WIS at waste disposal facilities the following resources are required for data collection (Note that this excludes the usual operational and resources requirements):

- Facilities that have operational weighbridge for data collection;
- Facilities without weighbridge, where data estimation methods are required.
- Proper infrastructure and equipment (such as computer with necessary weighbridge software).

All data should be captured and stored electronically. This will facilitate efficient data management and will enable SM to easily feed information into the WIS and for future planning purposes. This is considered a low priority project.

The successful implementation of WIS will involve the following steps by the waste disposal facility:

- Step 1: Data Collection
- Step 2: Data Capture
- Step 3: Submission of data to SAWIS
- Step 4: Verification data

These steps are discussed and depicted schematically in figure 20 and 21 below. The resources required in each step are also outlined.

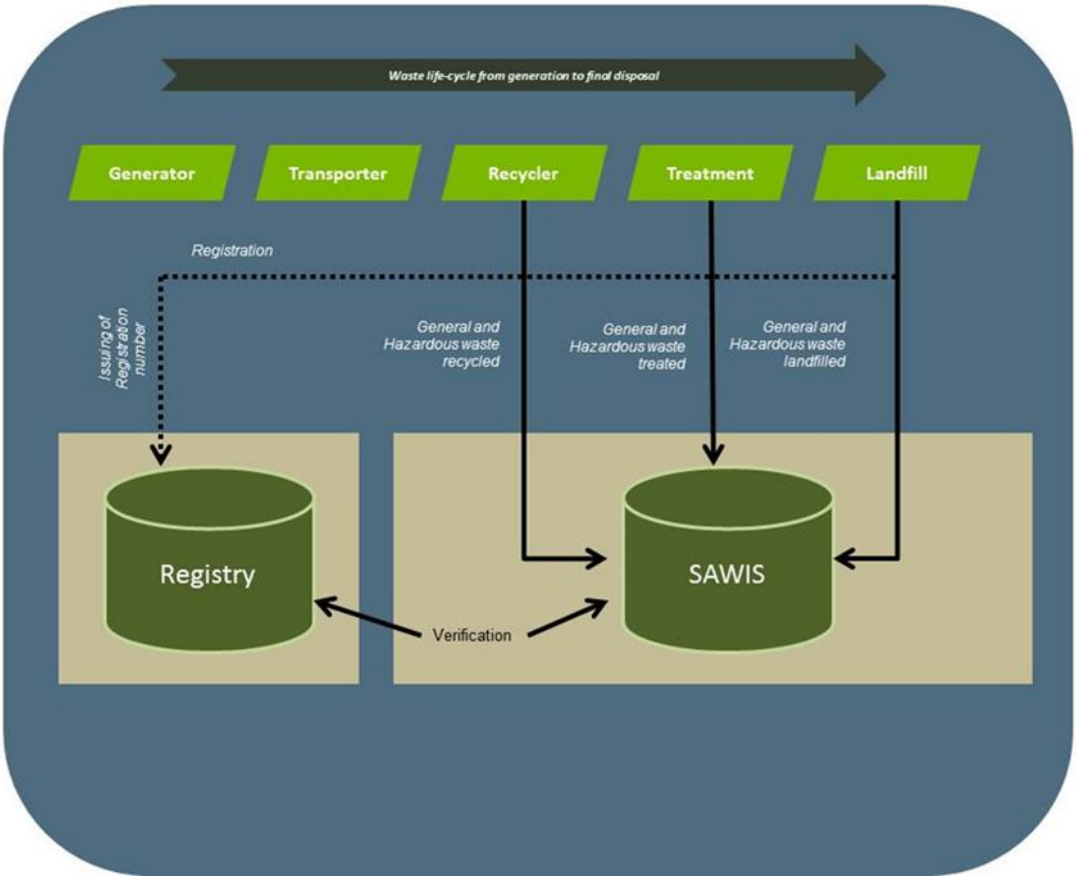



**Figure 20: Waste Life Cycle from Generation to Final Disposal**

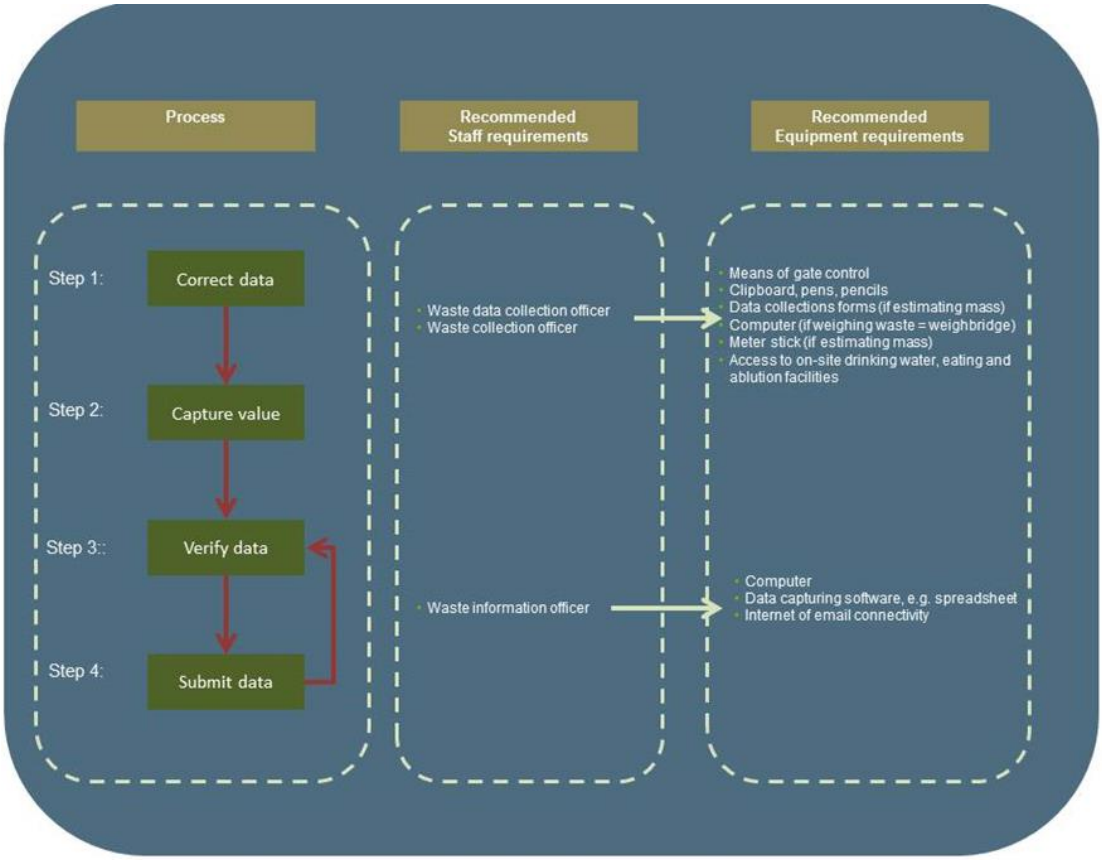



**Figure 21 : SAWIS Steps Implementation Process**

## 3.8 Education and Awareness

A three year education and awareness strategy needs to be devised and implemented. Part of this would include ensuring communities are informed about the health risk of illegal dumping which is part of the implementation strategies of the NWMS (2011).

With the assistance and involvement of local media and communication organisations, waste management and the role of the community would be covered.

This is considered a high priority project as it is a critical part of improving the handling of waste management in the SM. If waste is to be well managed in the municipality, it will require active participation of the community.

| Waste and Education Awareness Strategy | |
|---|---|
| **Project Description** | The SM should develop a Public Awareness/Education Strategy aimed at promoting awareness over waste management related issues within the SM. The strategy should, in particular, focus on bringing to the attention of residents residing in the SM their applicable waste management By-Laws<br>The strategy should be focused on identifying priority focus groups within the SM to target during active awareness campaigns. Homeowners and lawful occupiers of homes within the SM should be the primary focal point of the campaign. Schools and businesses within the SM should be the secondary focus of the campaigns.<br>Different communication mediums (Television. radio, posters, billboards, flyers) should be identified and evaluated, in terms of their anticipated effectiveness, in the development of the strategy.<br>The required strategy should make allowance for an initial focused six months campaign role out. Thereafter, it is recommended that bi-annual campaigns be undertaken by each respective town to ensure that there is a constant awareness amongst SM residents over waste management issues and achievements by the SM. |
| **Project Objective** | To improve compliance by the SM residents to Waste Management By-Laws. In particular, the potential penalties relating to illegal dumping should be clearly communicated.<br>The project will ultimately be aimed at addressing the following key issues:<br>• Reducing the level of illegal dumping and littering;<br>• why place waste in different bins or in a landfill;<br>• Waste Separation at source;<br>• Dangers of scavengers;<br>• Impact of waste in regards to the environment and human health;<br>• Importance of having a waste infrastructure;<br>• Shifting the mind-set of residents in relation to issues to waste |

| | |
|---|---|
| | management and<br>• Daily cover of waste at waste disposal facility. |
| **Responsible Party** | • SM<br>• Environmental service provider.<br>• Potentially, a media house, to provide assistance with development of the education strategy. |
| **Project Period** | Development of Waste Education and Awareness Strategy by SM and roll out of first active campaign – six months.<br>Bi-annual awareness campaigns to be run by SM in respective towns on an on-going basis (Operational Budget). |
| **Project Budget** | R100 000 – for strategy development<br>R 100 000 per active campaign |

## 3.9 Financial

A tariff structure for waste collection services has been approved by SM; this however does not include tariffs for waste disposal at the landfill site. Actual costs must be recovered and this is not seen in this budget due to the fact that the funds provided are through equitable share.

The approved tariffs by Council should be reviewed as some businesses may require more frequent waste collection than others.

This project is considered a high priority project as it has the potential to increase the revenue received from waste services in the municipality and requires limited effort. The National Policy for the Provision of Basic Refuse Removals for Indigent Households incorporates basic solid waste services into the bundle of free basic services and allowance needs to be factored into the setting of tariffs. In addition, a strong agenda has been set for waste minimisation, reuse and recycling, which needs to be incorporated into the budgeting for municipal solid waste services.

Proactive invoicing and debtor control is critical to the running of a sustainable waste service. In particular as services are being rendered it is vital that SM have a proactive approach towards managing bad-debt.

In order to set up proper tariffs for consumers, all the costs associated with providing the solid waste service should be reflected as accurately as possible. This will help in the design of the appropriate tariffs that will ensure that the revenue required to cover these costs is generated.

With regards to the different components of service provision in the municipal solid waste system, there are various factors that drive the cost of provision.

### 3.9.1 Determining Waste Removal Cost

The best way to understand the costs of each component of the solid waste system is to determine these costs on the basis of the main cost items for each component. For solid waste services the main costs items are direct, overhead and capital financing costs. The accompanying solid waste model also assists municipalities in determining the costs of the various solid waste services on the basis of the key cost elements, as described below (SALGA, 2011):

- Direct Costs: exclusive in providing the service
- Overhead Costs: not directly attributed to individuals service
- Capital Financing: financing infrastructure expansion, rehabilitation, capital funding and ensure long-term sustainability of service.

### 3.9.2 Identifying Revenue Sources

In order to provide solid waste services in a financially sustainable manner, the municipality should have a sound revenue base for both operational costs and capital funding. All the funding sources available to the municipality should therefore be identified.

### 3.9.3 Sources of Capital Finance

- Intergovernmental Grants;
- Capital subsidies (MIG, USDG,NDPG, EPNP);
- External loans; and
- Own Sources.

### 3.9.4 Sources of Operating Revenue

The type of solid waste infrastructure provided and associated levels of service have a significant impact on operating costs. The primary sources of revenue for operating expenditure are:

- Tariffs: solid waste services are provided.
- Rates: solid waste services include public services, such as street cleaning.
- Equitable share: the equitable share subsidy from national government is.
- Other subsidies: there may be other operating subsidies, such as for environmental health, fuel levies and RSC that can be used.
- Other revenue streams sale of recyclables, electricity generation or carbon credits.

# 4. IMPLEMENTATION PROGRAMME AND COST ESTIMATES

The projects identified are captured in Figure 22. The table shows implementation phases and associated indicative budgets for each phase. The projects are also categorised as being of a high, medium or low priority.

| | Issue | Current Status | Mitigation Measures | Desired State | Implementation Phases | | | Indicative budget (OB = Operational Budget) | | | Priority level | Possible source of funding | Cash flow forecast | | | | | | Completion date | Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 2 | 3 | 1 | 2 | 3 | High / Medium / Low | Internal / External / Private | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017-2030 | By when does the project need to be completed | New/Approved/Proposed |
| Governance | Waste Policy and By-Laws | No waste policy and incomplete By-Laws | A waste policy should be implemented and by-laws should be reviewed for the SM to ensure compliance with the National Environmental Mangement Waste Act , Act 59 of 2008. | Implementation of the waste policy and reviewed by-laws. SM to comply with relevant legislations. | Drafting of the Waste Policy and reviewing of By-Laws. | Approval from the MEC and Council. | Implementation of Waste Policy and reviewed by-laws. | R 300,000 | OB | OB | H | Internal | N/A | 300000 | OB | OB | OB | 500000 | 2014 | New |
| | Institutional Arrangement | Unfunded new posts. Approved vacant posts. | Funding of new posts. Filling of vacant posts. | Funded new posts and filled vacant posts. | Appointment of vacant posts. Source funding for new posts. | Appointment for new posts. | Development and Training | OB | R 500,000 | R 200,000 | H | Internal | N/A | 200 000 | 600 000 | 600 000 | 600000 | 800000 | 2015 | Approved |
| | Sustainability study | Economic sustainability for SM is not known. | A study on the economical sustainable waste management services in SM should be conducted. | The SM will be able to determine the economic sustainability of the SM and therefore establish long terms priorities for waste management. | Conductiing of a sustainable waste management services in SM. | Source funding | Implementation of economic sustainable waste management service. | R 200,000 | OB | OB | L | Internal | N/A | 100000 | 100000 | N/A | N/A | N/A | 2014 | Proposed |
| Waste Avoidance | Waste Avoidance | No initiatives are underway from SM to promote waste avoidance. | Development of a waste avoidance guidelines for the SM. | Developed waste avoidance guidelines. | Develop waste avoidance guidelines. | Public awareness (e.g. campaigns) | N/A | R 300,000 | R 200,000 | OB | M | Internal | N/A | 300000 | 200000 | OB | OB | 500000 | 2013 | New |

| | Issue | Current Status | Mitigation Measures | Desired State | Implementation Phases | | | Indicative budget (OB = Operational Budget) | | | Priority level | Possible source of funding | Cash flow forecast | | | | | | Completion date | Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 2 | 3 | 1 | 2 | 3 | High / Medium / Low | Internal / External / Private | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017-2030 | By when does the project need to be completed | New/Approved/Proposed |
| Treatment and Recycling | Community drop-off centres | No community drop-off centres for recyclable items. | Design and development of community drop-off centresf for all recyaclabes materials such as plastic, paper, glasses , builders rubble, etc. | Community drop-off centres with skips for different waste streams. | Feasibility Study for the drop-off centres. | Design and Construction of the drop-off centres. | Operation and management of drop-off centres. | R 300,000 | R 1,000,000 | OB | H | External | N/A | 300000 | 1000000 | OB | OB | 500000 | 2014 | New |
| | Co-operatives | Limited recycling initiatives | Establish Co-operatives | Co-operatives responsible for recycling | Establishment of co-operatives. | Education and Training | Implementation | R 250,000 | R 300,000 | OB | H | Internal | N/A | 250000 | 300000 | OB | OB | OB | 2014 | New |
| | Establish separation at source initiative. | No separation or segregation of waste stream. | Implementation of pilot projects for recycling at source initiatives. | Separation or segregation of waste stream at source. | Planning | Awareness and Training | Implementation | R 400,000 | OB | OB | M | Internal | N/A | N/A | 400000 | 50000 | 50000 | 100000 | 2014 | New |
| | HCRW treatment facilities | Lack of appropriate HCRW treatment facilities | Ensure that there is enough Health Care Risk Waste treatment facilities in SM and all of them are serviced. | Compliant HCRW treatment facilities | Determine stakeholders | The stakeholder should facilitate the process. | Implementation | OB | OB | OB | H | Internal | N/A | 20000 | 20000 | 20000 | 20000 | 300000 | 2014 | New |
| Collection | Waste collection services | Waste collection services rendered to the community and businesses. | SM should implement a waste collection service to all areas within Senqu. | Community based services should be rendered to all new areas. | Detailed planning and investigation of cost recovery. | Roll out of collection to all areas. | Implementation | R 200,000 | OB | OB | H | Internal / External / Private | 7400000 | 7800000 | 8000000 | 8500000 | 9000000 | 12500000 | 2013 | Ongoing |

| | Issue | Current Status | Mitigation Measures | Desired State | Implementation Phases | | | Indicative budget (OB = Operational Budget) | | | Priority level | Possible source of funding | Cash flow forecast | | | | | | Completion date | Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 2 | 3 | 1 | 2 | 3 | High / Medium / Low | Internal / External / Private | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017-2030 | By when does the project need to be completed | New/Approved/Proposed |
| Disposal | Waste Disposal Facilities | Landfill sites in SM are not licensed, managed and controlled. | SM waste disposal sites should be licenced with accordance to the National Environmental Mangement Waste Act , Act 59 of 2008. Alternatives in regards to disposal waste facility should be implemented. | Licensed waste disposal facility that is adequate to accommodate waste management activities. | Feasibility Study to determine alternatives for closure and upgrade of waste disposal facilities. | Design and Construction of the waste disposal facility. | Operation and management of waste disposal facilities. | R 200,000 | R 5,000,000 | OB | H | External | N/A | 1000000 | 1000000 | 1000000 | 1000000 | 2000000 | 2014 | New |
| | Closure and rehabilitation of Sterkspruit waste disposal site. | Sterkspruit communities are disposing waste in an illegal waste disposal site. | SM should identify an alternative waste disposal sites or disposal options (e.g. Transfer Stations) to the community. | A new licensed waste disposal site that is adequate to accommodate waste collected for the Sterkspruit area. | Feasibility study for the new waste disposal facility. | Design and Construction of the waste disposal facility. | Operation and management of the waste disposal facility. | R 200,000 | R 5,000,000 | OB | H | External | N/A | 1000000 | 1000000 | 1000000 | 1000000 | 2000000 | 2014 | New |
| WIS | Waste Information System | Record of any waste volumes or its characteristics are insufficient. | Implement an electronic WIS and increase the gathering of information to include waste types and amount of waste recycled. | Accurate record and efficient data management of waste volumes and waste types collected, recycled and disposed. | Implementation of WIS | Monitoring | Monitoring | R 200,000 | OB | OB | L | Internal | N/A | 10000 | 10000 | 100000 | 100000 | OB | 2014 | New |
| Education and Awareness | Education and awareness | Minimal education and awareness campaigns are implemented. | Implementation of Clean-up campaigns, education and awareness at schools and the community regarding the impact of waste. | A well educated community in regards to the impacts of waste on their health and the environment. | Appoint Communication consultant. | Development of three year education and awareness strategy plan. | Implementation of three year education and awareness strategy plan. | OB | OB | OB | H | Internal | N/A | 100000 | 100000 | 100000 | 100000 | 150000 | Ongoing | New |
| Financial | Tariffs | SM has approved tariff structure for waste collection but not for waste disposal at landfill. | Tariffs structure should be reviewed to include waste disposal at landfill and charged once implemented. | Tariffs should be developed for all the waste management activities. | Review tariff structure | Implementation of new tariff structure. | N/A | R 50,000 | OB | OB | H | Internal | N/A | 50000 | OB | OB | OB | OB | 2013 | Approved |

## Figure 22: Implementation Program and Cost Estimates

# 5. Recommendations

It is recommended that SM systematically work through the proposed projects and draft more detailed project implementation plans. Target dates for start and end should be set for the following recommendations:

- Implementation of Waste Policy and By-Laws be reviewed and updated for the SM to ensure compliance with the National Environmental Management Waste Act, Act 59 of 2008.
- Funding of new posts and filling of vacant posts.
- Conducting a study on the economical sustainable waste management services in SM.
- Development of a waste avoidance guideline for the SM.
- Design and development of community drop-off centres for all recyclables materials such as plastic, paper, glasses , builders rubble, etc.
- Establishment of co-operatives for recycling initiatives.
- Implementation of pilot projects for recycling at source initiatives.
- Ensure that there is enough Health Care Risk Waste treatment facilities in SM and all of them are serviced.
- SM to implement a waste collection service to all areas if economic viable.
    - Collect waste from Rural Areas within a 10 km radius.
    - Get residents to bring waste to “Collection Points”.
- Implementation of fleet management and equipment model.
- Staff needs to check/scan vehicles for hazardous waste at Landfill Sites.
- Alternative waste disposal sites or disposal options (e.g. Transfer Stations) to the community.
- Implement an electronic WIS and increase the gathering of information to include waste types and amount of waste recycled.
- Implementation of Clean-up campaigns, education and awareness of the impact of waste at schools and for the community.
- Tariffs structure should be reviewed to include waste disposal at landfill and charged once implemented.

| GAPS | RECOMMENDATIONS | TIMELINES |
|---|---|---|
| No Waste Policy and By Laws insufficient. | Implementation of Waste Policy and by-laws to be reviewed and updated for the SM to ensure compliance with the National Environmental Management Waste Act, Act 59 of 2008. | 12 months |

| GAPS | RECOMMENDATIONS | TIMELINES |
|---|---|---|
| A lack of financial and human resources will be the key constraints in the development of waste management services in SM. Identification of roles and defining responsibilities in terms of waste management. | Funding of new posts and filling of vacant posts. | 36 months |
| Economic sustainable for SM is unknown. | A study on the economical sustainable waste management service in SM should be conducted. | 12 months – Ongoing |
| No initiatives are underway for waste avoidance. | Development of a waste avoidance guideline in SM. | 12 months |
| No community drop - off centres for recyclable items. | Design and development of community drop off centres for all recyclable materials. | 36 months |
| Limited recycling initiatives. | Establishment of co-operatives for recycling initiatives | 24 months |
| No separation or segregation at source. | Implementation of pilot projects for recycling at source initiatives. | 12 months - Ongoing |
| Lack of appropriate HCRW treatment facilities. | Ensure that there is enough Health Care Risk Waste treatment facilities in SM and all of them are serviced. | Ongoing |
| Waste collection services are only rendered in urban areas. | SM to implement a waste collection service to all areas if economic viable:<br>• Collect waste from Rural area within a 10km radius<br>• Get residents to bring waste to “Collection Points” | Ongoing |
| Landfill Sites do not comply with the DWA’s Minimum Requirements | SM landfill sites should be licensed with accordance to the NEMWA (Act of 59 of 2008). | 12 months |

| GAPS | RECOMMENDATIONS | TIMELINES |
|---|---|---|
| Minimal public education and awareness on waste management within SM. | Implementation of Clean-up campaigns, education and awareness of the impact of waste at schools and for the community. | 6 months - Ongoing |
| There is no initiative underway from SM to address illegal dumping. | Awareness campaigns should be initiated to address the problem of illegal dumping. | 6 months |
| Improvement of asset management and prioritisation of waste management needs in terms of plant and equipment. | Implementation of fleet management and equipment model. | 6 months |
| Records of any waste volumes or its characteristic are insufficient. | Implement an electronic WIS and increase the gathering of information to include waste types and amount of waste recycled. | 12 months |
| SM has approved tariff structure for waste collection but not for waste disposal at landfill. | Tariffs structure should be reviewed to include waste disposal at landfill and charged once implemented. | 6 months |

**Table 16: Gaps and Recommendation Summary**

# 6. Public Review and Approval Process

The draft IWMP should be made available to the general public for their inputs by advertising in the local newspaper two weeks before the date of the public meeting:

- Draft copies of the IWMP's should be placed for information purposes at places such as libraries and municipal offices for perusal by the public and give comments.
- A public workshop to discuss the process and detail of the IWMP and to obtain comments.

The comments if any should be addressed and the final IWMP should be presented to Council of SLM for implementation.

# 7. Approval Process for IWMP

Chapter 3, Section 11 4a (ii) of NEMWA states that a municipality must include the approved IWMP in its IDP as contemplated in paragraph 5 of the Municipal Systems Act for approval by Council. This is to ensure that the approved IWMP is included in the IDP and that waste management services are streamlined with other essential services such as water and sanitation, housing and electrification.

# 8. Review of IWMP

The main objective for reviewing the IWMP is to ensure that it is implemented successfully. This IWMP is to be reviewed every five years in line with the IDP requirements. Apart from reviewing the IWMP every five years the annual performance reports should also act as a reviewing mechanism wherein the municipality should evaluate its progress and should take steps in ensuring that it does not lack behind in reaching the goals and targets set out in the implementation plan.

# 9. References:


1. Working with waste: Guideline on recycling of Solid Waste developed for DEA.
2. 2006 Optima Waste Report
3. IWMP developed for UDM, 2005
4. Senqu Municipality IDP, 2011 - 2016
5. Water & Sanitation Backlog Eradication Status Report of 2011 for DWA
6. Guideline for the development of integrated waste management plans developed by DEA


# 10. List of website

www.sawic.org.za

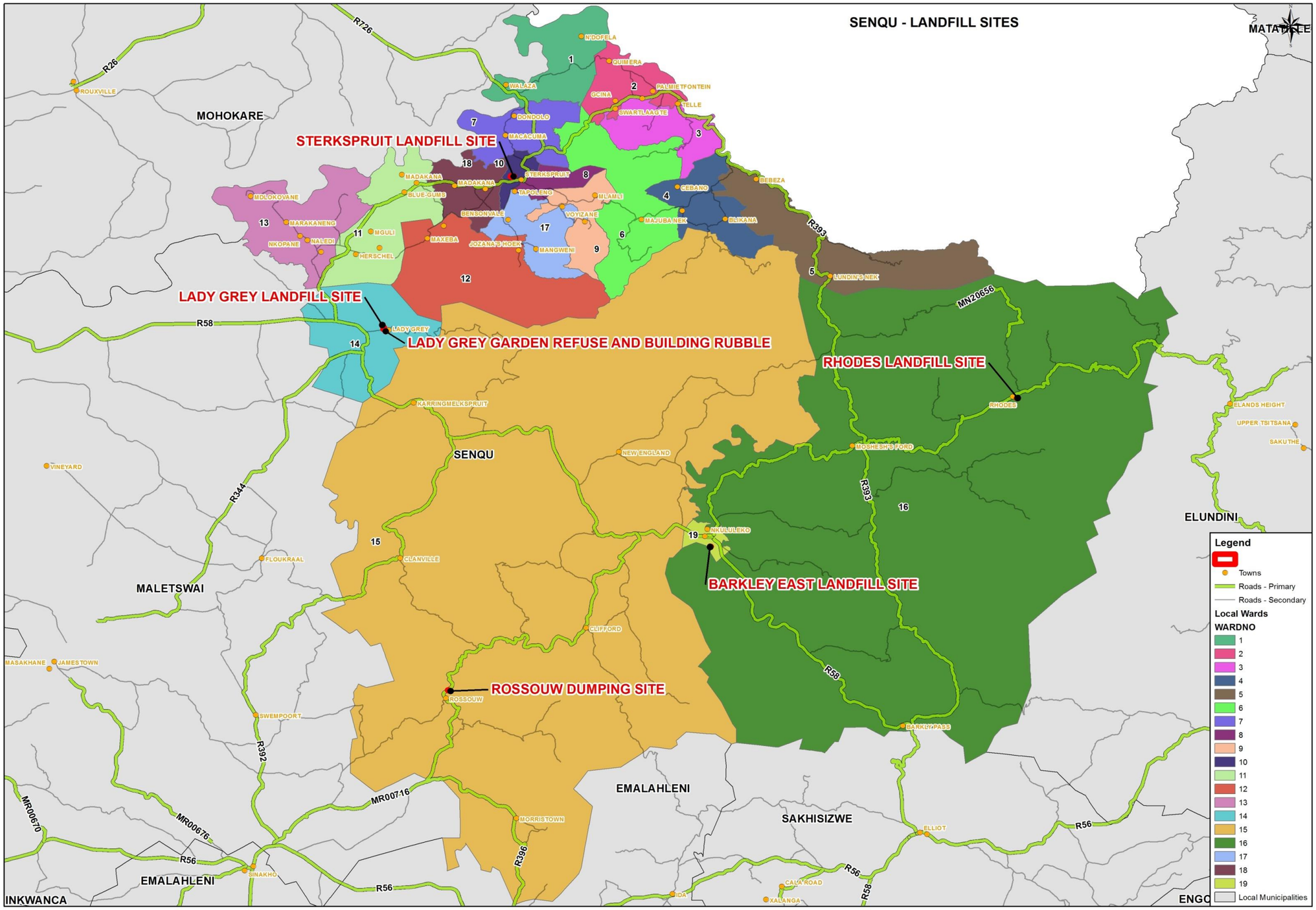
www.statssa.gov.za

www.environment.gov.za

www.senqu.gov.za

# 11. Appendices

Appendix 1: Lay Out Geographic Map.


SENQU - LANDFILL SITES
MOHOKARE
STERKSPRUIT LANDFILL SITE
LADY GREY LANDFILL SITE
LADY GREY GARDEN REFUSE AND BUILDING RUBBLE
RHODES LANDFILL SITE
ROSSOUW DUMPING SITE
BARKLEY EAST LANDFILL SITE
SENQU
MALETSWAI
EMALAHLENI
SAKHISIZWE
ELUNDINI
INKWANCA
ENGC
MATATIELE
R26
R726
R58
R344
R392
R393
R396
MR00716
MR00670
MR00676
MN20656
ROUXVILLE
VINEYARD
FLOUKRAAL
CLANVILLE
JAMESTOWN
MASAKHANE
SWEMPOORT
ROSSOUW
CLIFFORD
MORRISTOWN
SINAKHO
IDA
CALA ROAD
XALANGA
ELLIOT
BARKLY PASS
NKULULEKO
NEW ENGLAND
KARRINGMELKSPRUIT
LADY GREY
RHODES
MOSHESH'S FORD
LUNDIN'S NEK
BLIKANA
MAJUBA NEK
GEBANO
BEBEZA
VOYIZANE
MLAMLI
TAPOLENG
BENSONVALE
MANGWENI
JOZANA'S HOEK
MAXEBA
HERSCHEL
NALEDI
NKOPANE
MARAKANENG
MDLOKOVANE
BLUE-GUMS
MADAKANA
STERKSPRUIT
MACACUMA
BONDOLO
WALAZA
N'DOFELA
QUIMERA
PALMIETFONTEIN
TELLE
SWARTLAAGTE
OCINA
ELANDS HEIGHT
UPPER TSITSANA
SAKU'THE
Legend
Towns
Roads - Primary
Roads - Secondary
Local Wards
WARDNO
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Local Municipalities