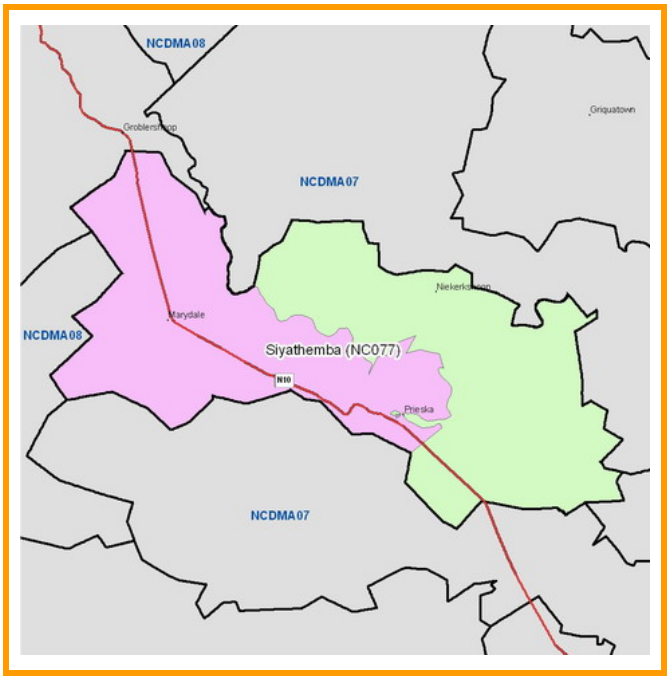
SIYATHEMBA MUNICIPALITY



INTEGRATED WASTE MANAGEMENT PLAN FOR THE SIYATHEMBA MUNICIPALITY

FINAL

October 2007

KWEZI V3 ENGINEERS

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APPENDIX B: TYPICAL PROCEDURE FOR LANDFILL AUTHORISATION

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 tonnes per day.

Composting is the controlled aerobic biological decomposition of organic matter, such as food scraps and plant matter, into humus, a soil-like material. Aerobic is the decomposition process in the presence of oxygen.

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 medical 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 minimize negative impacts to the environment.

Daily cover is a daily application and compaction of approximately 15 centimetres of soil 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 centimetres.

Groundwater is all waters 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 centimetres, 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.

Medical 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 organisation responsible for the operation of the landfill. The operator may be the owner, another public agency or private contractor.

Owner is the person or organisation that 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 unauthorised 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 authorised 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 sludges 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

AP	Action Plan
APIG	Action Plan Implementation Group
CBD	Central Business District
CEC	Committee for Environmental Co-ordination
CONNEPP	Consultative National Environmental Policy Process
DEAT	Department of Environmental Affairs and Tourism
DFA	Development Facilitation Act 67 of 1995
DME	Department of Minerals and Energy
DTL	Departmental Task Leader
DWAF	Department of Water Affairs and Forestry
ECA	Environment Conservation Act, Act No. 73 of 1989
IDP	Integrated Development Plan
IP&WM	Integrated Pollution and Waste Management
IWM	Integrated Waste Management
IWMP	Integrated Waste Management Plan
LDO	Land Development Objectives
LUPO	Land Use Planning Ordinance
LGTA	Local Government Transition Act 209 of 1993
LFA	Logical Framework Analysis
NEAF	National Environmental Advisory Framework
NEMA	National Environmental Management Act, Act No. 107 of 1998
NWMS	National Waste Management Strategy
OLGA	Organised Local Government Act 52 of 1997
PMG	Project Management Group
PPA	Physical Planning Act 125 of 1991
PSC	Project Steering Committee

SECTION 1:
INTRODUCTION

1 INTRODUCTION

The Pixley Ka Seme District Municipality appointed KV3 Engineers to assist with the compilation of an Integrated Waste Management Plan (IWMP) for the Waste Management Division of the Siyathemba Municipality. As a requirement of the National Waste Management Strategy (NWMS) and the IDP Process all Municipalities are faced with the obligation to compile such a plan by end 2004 but at present many municipalities are still in the process of compiling an IWMP.

The compilation of this IWMP will be done in line with the Draft Starter Document for Integrated Waste Management Planning in South Africa made available by DEAT. The draft process of compiling the IWMP consisted of two phases. The Status Quo for Phase 1 consisted of an assessment of the current status of waste collection systems and existing disposal sites, service delivery capacity and a needs analysis for each of these aspects.

The second phase will comprise the compilation of the IWMP. The Objectives and Goals identified will be included in this phase, with alternatives for obtaining these being considered and evaluated on a high level thereafter. Based on the preferred options selected for implementation a programme was developed and cost estimates compiled to facilitate inclusion of the plan into the IDP.

SECTION 2:

BACKGROUND

2 BACKGROUND

2.1 GENERAL

The Siyathemba Municipality (SM) is situated in the Northern Cape and forms part of the Pixley Ka Seme District Municipality that also includes the Ubuntu, Umsobomvu, Emthanjeni, Renosterberg, Thembilihle, Siyancuma and Kareeberg Local Municipalities. The total demarcated municipal area serviced by the SM covers approximately 8251 km^2. The area has a low rainfall, mainly in the summer months. As a result of the scarcity of rainfall, with the exception of the small stock farming, all economic activities in the region are concentrated around the Orange River. The Municipal Main offices are situated in Prieska, with Niekerkshoop and Marydale forming the other major towns.

According to information from the 2007/2008 Integrated Development Plan for Siyathemba Municipality, the total population of the Siyathemba Municipality is 17 513 people. , of which most of the Demographic Distribution is as follows:

Settlement type	Population (2007)
Prieska (urban)	10 858
Marydale (urban)	2 101
Niekerkshoop (urban)	1 926
Siyathemba Farms (rural)	2 628
Total	17 513

According to the latest census (2001), the area has a total of 4180 households (Prieska – 62%, Marydale – 12%, Niekerkshoop – 11% and the Farms 15%)

The natural population growth for the Northern Cape is probably in the region of 1.5 – 2.0% annually. Because there is an overall outwards migration of people from the Northern Cape to other parts of South Africa, the actual population growth for the Northern Cape, and also for Siyathemba Municipality, was estimated to be in the region of 1,0% per year.

The SM will continue to experience population growth despite an increase in the number of HIV/Aids infections, whereas the farmland areas show a typical pattern of depopulation due to urban migration.

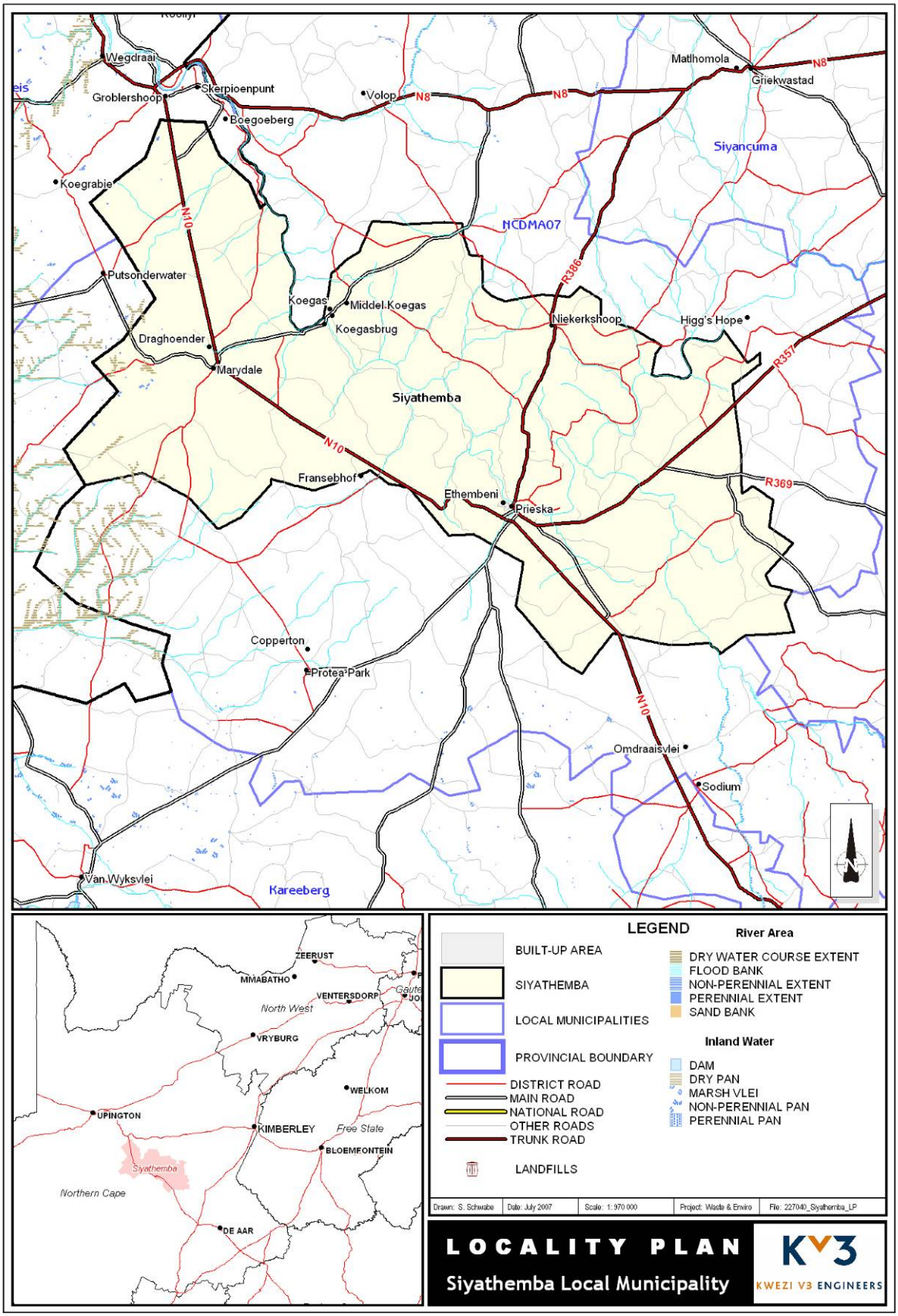
2.2 STUDY AREA

The following towns and areas formed part of this study:

Urban areas:

- Prieska
- Niekerkshoop
- Marydale

The entire study area is shown on the following map:


Wegdraai
Groblershoop
Skerpioenpunt
Boegoeberg
Volop
N8
Matlhomola
Griekwastad
Siyancuma
Koegrabie
N10
NCDMA07
R386
Putsonderwater
Koegas
Middel Koegas
Koegasbrug
Niekerkshoop
Higg's Hope
Draghoender
Marydale
R357
Siyathemba
N10
Fransebhof
Ethembeni
Prieska
R369
Copperton
Protea Park
N10
Omdraaisvlei
Sodium
Van Wyksvlei
Kareeberg
N
ZEERUST
MMABATHO
VENTERSDORP
North West
VRYBURG
WELKOM
UPINGTON
KIMBERLEY
Free State
BLOEMFONTEIN
Siyathemba
Northern Cape
DE AAR
LEGEND
BUILT-UP AREA
SIYATHEMBA
LOCAL MUNICIPALITIES
PROVINCIAL BOUNDARY
DISTRICT ROAD
MAIN ROAD
NATIONAL ROAD
OTHER ROADS
TRUNK ROAD
LANDFILLS
River Area
DRY WATER COURSE EXTENT
FLOOD BANK
NON-PERENNIAL EXTENT
PERENNIAL EXTENT
SAND BANK
Inland Water
DAM
DRY PAN
MARSH VLEI
NON-PERENNIAL PAN
PERENNIAL PAN
Drawn: S. Schwabe
Date: July 2007
Scale: 1: 970 000
Project: Waste & Enviro
File: 227040_Siyathemba_LP
LOCALITY PLAN
Siyathemba Local Municipality
KWEZI V3 ENGINEERS

2.3 LEGISLATIVE FRAMEWORK

Following is a short summary of all the relevant legislation pertaining to waste management.

The South African Constitution (Act 108 of 1996) is the supreme law of the land. All law, including environmental waste management planning must comply with the Constitution.

The Constitution states that the people of South Africa have the right to an environment that is not detrimental to human health, and imposes a duty on the state to promulgate legislation and to implement policies to ensure that this right is upheld. All departments of state or administration in the national, provincial or local levels of government have similar obligations. The principles of co-governance are also set out in the Constitution and the roles and responsibilities of the three levels of government are defined.

According to the Constitution, responsibility for waste management functions is to be devolved to the lowest possible level of government. Local government therefore is assigned the responsibility for refuse removal, refuse dumps and solid waste disposal. Provincial government has the exclusive responsibility to ensure that local government carries out these functions effectively.

In addition to the Constitution, a number of government policies and statutes are relevant to waste management at the local government level, which includes the following:

- National Environmental Management Act 107 of 1998
- National Environmental Management: Waste Management Bill, 2007
- Environment Conservation Act 73 of 1989
- Local Government Transition Act 209 of 1993
- Municipal Demarcation Act 27 of 1998
- Municipal Structures Act 117 of 1998
- Municipal Systems Act 32 of 2000
- The Development Facilitation Act 67 of 1995
- The Physical Planning Act 125 of 1991
- National Environmental Management: Air Quality Act of 2004
- National Water Act 36 of 1998
- National Health Act 61 of 2003

- White Paper on Environmental Management Notice 749 of 1998
- White Paper on Integrated Pollution and Waste Management for South Africa, Notice 227 of 2000
- Minimum Requirements for Waste Disposal by Landfill, 2nd edition, 1998
- Minimum Requirements for the Handling and Disposal of Hazardous Waste, 2nd Edition, 1998
- Minimum Requirements for Monitoring at Waste Management Facilities, 2nd edition, 1998
- National Waste Management Strategy and Action Plans.
- Relevant Provincial Legislation
- Local government by-laws on waste management.

2.3.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT 107 OF 1998

The National Environmental Management Act (NEMA) provides for co-operative governance by establishing principles and procedures for decision-makers on matters affecting the environment. An important function of the Act is to serve as an enabling Act for the promulgation of legislation to effectively address integrated environmental management. Some of the principles in the Act are – Accountability; Affordability; Cradle to Grave Management; Equity; Integration; Open Information; Polluter Pays; Subsidiary; Waste Avoidance and Minimisation; Co-operative Governance; Sustainable Development; and Environmental Protection and Justice.

Chapter 2 makes provision for the establishment of the Committee for Environmental Co-ordination (CEC). The objective of the committee is to promote the integration and co-ordination of environmental functions by the relevant organs of state and in particular to promote the achievement of the purpose and objectives of environmental implementation plans and environmental management plans.

Chapter 3 requires that national government departments that have waste management responsibilities and every province must develop environmental implementation plans (EIPs) every four years and an environmental management plan (EMP). Local government is obliged to exercise its responsibilities in accordance with these plans and to report annually within four months from the end of its financial year on implementation of the environmental management plan or environmental implementation plan. Provincial government must ensure that municipalities adhere to the relevant environmental implementation and management plans within its province, as well as the principles in the preparation of any policy, programme or plan, including the establishment of Integrated Development Plans (IDPs) and Land Development Objectives (LDOs).

Chapter 7 imposes a duty of care in respect of pollution and environmental degradation. Any person who has caused significant pollution or degradation of the environment must take steps to stop or minimise the pollution. Where an incident occurs that is potentially detrimental to the environment, the person who is responsible for the incident or the employer must, within 14 days of the incident, report to the Director-General, provincial head of department and municipality. The relevant authority may specify measures to address the problem and remediate the area within 7 days. The Acts also attach consequences for breaching the duty of care, namely that government authorities are empowered to issue directions and to remediate the situation and recover costs where the directions are not complied with.

Chapter 8 provides that the Minister and every MEC and municipality may enter into an environmental management co-operation agreement with any person or community for the purpose of promoting compliance with the principals laid down in NEMA. Environmental Co-operation Agreements may contain an undertaking by the person or community concerned to improve the standards laid down by law for the protection of the environment and a set of measurable targets and a timeframe for fulfilling the undertaking.

Chapter 9 allows the Minister to make model by-laws aimed at establishing measures for the management of environmental impacts of any development within the jurisdiction of the municipality, which may be adopted by the municipality as by-laws. Any municipality may request the Director-General to assist it with its preparation of by-laws on matters affecting the environment and the Director-General may not unreasonably refuse such a request. The Director-General may institute programmes to assist municipalities with the preparation of by-laws for the purposes of implementing this Act.

Section 24 and 24D of NEMA requires that an environmental impact assessment be conducted prior to the establishment of waste disposal facilities.

2.3.2 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE MANAGEMENT BILL, 2007

The National Waste Management Bill, gazetted in January 2007, will entrench best practices in waste management into law, replacing the outdated and unsustainable “end of pipe” approach with a new, more environmentally responsible and sustainable approach.

The Bill deals with minimising the consumption of natural resources, waste generation, recycling, waste disposal, prevention of pollution, promotion of waste services, remedying land degradation, and achieving integrated waste management reporting and planning.

The Bill was available for comment until 12 April 2007. The aim of this process was to incorporate public input before submitting the Bill to Parliament in July for approval and promulgation.

2.3.3 ENVIRONMENT CONSERVATION ACT 73 OF 1989

The object of the Environment Conservation Act is to provide for the effective protection and controlled utilisation of the environment. The ECA was amended in 2005 (Environment Conservation Amendment Act 50 of 2003) to provide for the transfer of the administration of waste disposal sites from the Minister of Water Affairs and Forestry to the Minister of Environmental Affairs and Tourism. This transfer was enacted with the publishment of Government Gazette No 28346 to be implemented as from 3 January 2006. Any person who intends to establish or operate a waste disposal site must apply for a permit from the Minister of Environmental Affairs and Tourism. The permit is made subject to a number of conditions, which *inter alia* pertain to the design, construction, monitoring and closure of a waste disposal site.

Waste is defined in ECA to mean ”any matter, whether gaseous, liquid or solid or any combination thereof, which is from time to time designated by the Minister by notice in the *Gazette* as an undesirable or superfluous by-product, emission, residue or remainder of any process or activity”. Waste products may originate from domestic, commercial or industrial activities. In a subsequent regulation (GN 1986 0f 24 August 1990) the Minister excluded the following wastes from those covered by ECA, i.e. sewage sludge, radioactive waste, building rubble, as well as mining, metallurgical and power generation wastes. These wastes are dealt with under other legislation. The Minister of Environmental Affairs and Tourism however amended the definition of waste to include building rubble used for filling or levelling purposes on 3 February 2003.

In terms of the Section 19 of the Act, it is an offence to litter on any place to which the public has access and the person or authority in charge of the area must provide containers for the discarding of litter. In addition, every authority in control of any place must remove the litter within a reasonable time. Provision is made for the appointment of inspectors to investigate compliance with the Act. In terms of Section 24A of the Environment Conservation Act, a competent authority may make regulations with regard to the control of the dumping of litter.

Section 20 deals with waste management, including with the establishment and operation of waste disposal sites. A disposal site is any site used for the accumulation of waste for the purpose of disposal or treatment. Such sites may only be operated under a permit issued by the Minister of Environmental Affairs and Tourism and may be subject to specified conditions. The DWAF Minimum Requirements documents form the basis for the permitting process and may be included as permit conditions, thereby becoming legally binding on the permit holder. The permit holder is generally required to operate, maintain and attend to the closure of a waste disposal site in compliance with the permit conditions, as well as in accordance with the guidelines set out in the Minimum Requirements documents.

2.3.4 MUNICIPAL DEMARCATION ACT 27 OF 1998

The Municipal Demarcation Act 27 of 1998 provides criteria and procedures for the determination of municipal boundaries by an independent authority. In terms of the Act, the Municipal Demarcation Board is established to determine municipal boundaries.

Section 24 provides that when demarcating a municipal boundary, the Board must aim to establish an area that would enable the municipality to fulfil its Constitutional obligations, including the provision of services in an equitable and sustainable manner, the promotion of social and economic development and the promotion of a safe and healthy environment. The tax base must also be as inclusive as possible of users of municipal services in the municipality.

2.3.5 ORGANISED LOCAL GOVERNMENT ACT 52 OF 1997

The Organised Local Government Act 52 of 1997 provides for the recognition of national and provincial organisations representing the different categories of municipalities and determines various procedures concerning local government, including procedures by which local government may consult with national and provincial government.

2.3.6 MUNICIPAL STRUCTURES ACT 117 OF 1998

The main object of the Municipal Structures Act 117 of 1998 is to provide for the establishment of municipalities in accordance with the requirements relating to categories and types of municipality and to provide for an appropriate division of functions and powers between categories of municipality. It is one of a set of legislation that is aimed at the transformation of local government into a more financially sustainable and performance orientated sphere of government. The Act is aimed at creating the permanent structures mandated by the Constitution, which will replace the transitional structures created by the Local Government Transition Act. Municipalities are categorised either as A, B or C. depending on the level of development.

Chapter 5 sets out the functions and powers of the municipalities in accordance with the Constitution.

2.3.7 MUNICIPAL SYSTEMS ACT NO. 32 OF 2000

The Municipal Systems Act describes the core principles, mechanisms, and processes that are necessary to enable municipalities to move progressively towards the social and economic upliftment of communities and ensure access to services that are affordable to all. Its focus is primarily on the internal systems and administration of the municipality.

The Act enables the process of decentralisation of functions through assigning powers of general competence to local Government. Municipal by-laws are regulated to achieve harmony with national and provincial legislation.

As service authorities, municipalities remain responsible for the effective delivery of services and must provide an appropriate policy and regulatory framework. This can be achieved through the most appropriate service provider, ranging from internal departmental delivery to corporatisation and joint ventures to private sector delivery options.

Performance management systems are to be developed to measure and evaluate performance in priority areas, which are to be reported annually to citizens and other spheres of government.

The process to be followed in planning, drafting and adopting the Integrated Development Plan is set out.

2.3.8 THE DEVELOPMENT FACILITATION ACT 67 OF 1995

The Development Facilitation Act 67 of 1995 sets out a planning and land development system, which ensures that national, provincial, and local government policies are implemented.

Section 28 describes the requirements for Land Development Objectives, which must be developed by each local authority. One of the objectives of Land Development Objectives is to create a new system of planning that encourages sustained utilisation of the environment, particularly with regard to the environmental consequences of developments.

Municipalities are encouraged to co-operate in order to develop the capacity of each municipality to exercise its powers and duties and manage its affairs.

2.3.9 THE PHYSICAL PLANNING ACT 125 OF 1991

The objective of the Physical Planning Act 125 of 1991 is to provide for the division of the country into regions and to promote regional development. Policy plans consist of broad guidelines for the future physical development of the area and restrictions are placed on the use of land in the area to which the plan relates. Local authorities are required to develop urban structure plans for their areas of jurisdiction.

2.3.10 NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT OF 2004

The purpose of the National Environmental Management: Air Quality Act of 2004 is to provide for the prevention of the pollution of the atmosphere.

The Act sets out the procedure for the permitting of Scheduled Processes, which includes waste incineration processes. A registration certificate is a mandatory requirement and the Act prohibits any person from carrying on a Scheduled Process unless that person is the holder of a current registration certificate. A current registration certificate is granted after compliance with the conditions of a provisional registration certificate and the requirements of the Department of Environmental Affairs and Tourism to whom this power has been delegated. The current registration certificate also is issued subject to conditions. These include the condition that all appliances used for preventing or reducing to a minimum the escape into the atmosphere of noxious or offensive gases shall be properly operated and maintained and that the best practice means for achieving this are implemented.

The Act also provides for the control and regulation of smoke pollution arising from any fuel-burning appliance.

The Act also deals with dust control. Whenever dust originating on any land in a dust controlled area is causing a nuisance to persons residing or present in the vicinity of that land, the owner or occupier may be required to take the prescribed steps or adopt the “best practicable means” for the abatement the dust.

2.3.11 NATIONAL WATER ACT 36 OF 1998

The National Water Act contains a number of provisions that impact on waste management, including the disposing of waste in a manner, which detrimentally impacts on a water resource and the discharge of waste into a water resource. The Act allows the Minister to make regulations for:

- Prescribing waste standards, which specify the quantity, quality and temperature of waste that may be discharged or deposited into or allowed to enter a water resource.

- Prescribe the outcome or effect, which must be achieved through management practices for the treatment of waste before it is discharged or deposited into or allowed to enter a water resource.

- Requiring that waste discharged or deposited into or allowed to enter a water resource be monitored and analysed according to prescribed mechanisms.

2.3.12 NATIONAL HEALTH ACT 61 OF 2003

The National Health Act 61 of 2003 provides measures for the promotion of health, for the rendering of health services and defines duties of certain authorities which render health services in the Republic

The duties and powers of local authorities are set out in the Act. It provides that every local government is obliged to take measures to maintain its district in a clean and hygienic condition and to prevent the occurrence of any nuisance, unhygienic or offensive condition or any other condition, which could be of danger to the health of any person. A "nuisance" includes any accumulation of refuse or other matter that is offensive or is injurious or dangerous to health. The local government is obliged to abate the nuisance or remedy the condition and to prevent the pollution of any water intended for the use of the inhabitants of its district.

2.3.13 WHITE PAPER ON ENVIRONMENTAL MANAGEMENT NOTICE 749 OF 1998

The White Paper on Environmental Management was published in 1998. This policy sets out government's objectives in relation to environmental management, how it intends to achieve its objectives, and to guide government agencies and organs of state in developing strategies to meet their objectives.

The policy document is an overarching policy framework that refers to all government institutions and to all activities that impact on the environment. The policy states that government will allocate functions to the institutions and spheres of government that can most effectively achieve the objectives of sustainable development and integrated environmental management. This would include the allocation if certain functions to the municipal sphere of government.

Where appropriate, provincial and local government are to develop their own legislation and implementation strategies to address their specific needs and conditions within the framework of the policy.

2.3.14 WHITE PAPER ON INTEGRATED POLLUTION AND WASTE MANAGEMENT FOR SOUTH AFRICA, NOTICE 227 OF 2000

The White Paper of Integrated Pollution and Waste Management was published in March 2000 and represents formal government policy regarding integrated pollution and waste management. Integrated pollution and waste management is defined as a holistic and integrated system and process of management aimed at pollution prevention and minimisation at source, managing the impact of pollution and waste on the receiving environment and remediating damaged environments. Waste management is to be implemented in a holistic and integrated manner and

extend over the entire waste cycle from cradle-to-grave and will include the generation, storage, collection, transportation, treatment and disposal of waste.

The overarching goal reflected in the policy is integrated pollution and waste management, with the intention being to move away from fragmented and uncoordinated pollution control and waste management towards integrated pollution and waste management as well as waste minimisation. Within this framework of the overarching goal, the following strategic goals apply:

1. Effective institutional framework and legislation;

2. Pollution and waste minimisation, impact management and remediation;

3. Holistic and integrated planning – the intention is to develop mechanisms to ensure that integrated pollution and waste management considerations are integrated into the development of government policies, strategies and programmes as well as all spatial and economic development planning processes and in all economic activity. The strategic mechanisms include the following:

- The incorporation of integrated environmental management principles and methodologies in spatial development planning as it relates to pollution and waste management;
- Making timeous and appropriate provision for adequate waste disposal facilities;
- Developing management instruments and mechanisms for the integration of pollution and waste management concerns in development planning and land allocation;
- Developing appropriate and agreed indicators to measure performance for inclusion in EIPs and EMPs as provided for in the National Environmental Management Act;
- Participation and partnerships in integrated pollution and waste management governance;
- Empowerment and education in integrated pollution and waste management;
- Information management; and
- International co-operation.

2.3.15 DWAF MINIMUM REQUIREMENTS FOR LANDFILL, 2ND EDITION, 1998

The Minimum Requirements provide applicable waste management standards or specifications that must be met, as well as providing a point of departure against which environmentally acceptable waste disposal practices can be assessed. The objectives of setting Minimum Requirements are to:

- Prevent water pollution and to ensure sustained fitness for use of South Africa's water resources.

- Attain and maintain minimum waste management standards in order to protect human health and the environment form the possible harmful effects caused by the handling, treatment, storage and disposal of waste.

- Effectively administer and provide a systematic and nationally uniform approach to the waste disposal process.

- Endeavour to make South African waste management practices internationally acceptable.

- Before a waste disposal site permit is issued, adherence to the Minimum Requirement conditions will be required from the permit applicant. The Minimum Requirements promote the hierarchical approach to waste management, as well as a holistic approach to the environment.

2.3.16 NATIONAL WASTE MANAGEMENT STRATEGY AND ACTION PLANS.

The overall objective of this strategy is to reduce the generation of waste and the environmental impact of all forms of waste and thereby ensure that the socio-economic development of South Africa, the health of the people and the quality of its environmental resources are no longer adversely affected by uncontrolled and uncoordinated waste management. The internationally accepted waste hierarchical approach was adopted of waste prevention/minimisation, recycle/reuse, treatment and finally disposal.

The strategy outlines the functions and responsibilities of the three levels of government and where possible, firm plans and targets are specified. During the development of the strategy a number of priority strategic initiatives were identified which were categorised into short-term (by the year 2004), medium-term (by the year 2008) and long-term (by the year 2012) initiatives. Action plans have been developed for the short-term initiatives for integrated waste management planning, a waste information system, waste minimisation and recycling, general waste collection, waste treatment and disposal, and capacity building, education, awareness and communication. A

logical framework analysis approach was adopted to develop the Action Plans that analysed the problems, stakeholders, and the risks to successful implementation followed by the development of outputs, activities, inputs and assumptions, as well as a proposed allocation of functions, roles, and responsibilities of the three levels of government.

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 are 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.

2.3.17 POLOKWANE WASTE SUMMIT DECLARATION

During September 2001 a national waste summit was held at Polokwane, in the Northern Province. 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, which 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 25% and 50% 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.
- Develop and implement legislative and regulatory framework.
- Waste reduction and recycling.
- Develop waste information and monitoring systems.

2.4 GENERAL

It must be noted that some of the above Acts and Regulations are currently (2007) under review for changes and / or additions, and some are due for complete replacement with new Acts soon.

SECTION 3:

STUDY AREA AND STATUS QUO

3 STUDY AREA AND STATUS QUO

3.1 INTRODUCTION

The Siyathemba Municipality currently provides services to the following towns:

- Prieska
- Niekerkshoop
- Marydale

The status quo study will assess the municipal area with consideration to the various service categories as well as evaluate the service delivery in each of the towns in the Municipality. The service categories that are taken into consideration can be summarised as follows:

- Refuse Removal: Residential, Commercial, Industrial, Garden Refuse and Builders' Rubble
- Street and ablution cleaning
- Landfill Sites, Transfer Stations and Bulk Containers

The Status Quo investigation of the waste management section considered each of these aspects of service delivery by the Siyathemba Municipality as shown in the following table.

SERVICE CATEGORY	SERVICE ASPECTS CONSIDERED
Refuse removal	Waste generation, collection system, collection equipment, personnel, residential, commercial, garden refuse and builders' rubble, medical and hazardous waste, mining industry, obvious needs.
Street Cleansing	Regularity of service, equipment, personnel, obvious needs
Landfill Sites, Transfer Stations and Bulk Containers	Waste generation, collection and transportation, personnel, equipment, landfill operation, transfer stations, garden refuse sites, obvious needs

In addition to this existing structure, the status quo study also considered planned developments, service extensions and any planned projects that have been identified in the IDP.

3.2 SIYATHEMBA MUNICIPALITY

3.2.1 SERVICE AREA AND REFUSE COLLECTION

The waste service delivery of the Siyathemba Municipality is co-ordinated from Prieska. A regular waste removal service is provided to all the urban areas in the Municipality. The farming areas of the Siyathemba Municipality do not receive a waste removal service. The provision of such a service is at the moment not envisaged by the Municipality. There are also no private waste contractors active within the municipal area.

The service delivery for the various towns is managed from the regional service delivery centres due to the distance of the towns from each other. Each town is therefore responsible for the day to day management of refuse collection.

The Table below gives the areas that are serviced and the frequency of the waste removal service.

AREA	FREQUENCY OF SERVICE (days per week)
Prieska:	
Residential	**1**
Business	**1**
Niekerkshoop:	
Residential	**1**
Business	**1**
Marydale:	
Residential	**1**
Business	**1**

Street sweeping is done in the CBD's of areas of Prieska, Niekerkshoop and Marydale. There is no street sweeping in the residential areas, the residential areas will only be cleaned if it is necessary to do so.

The following table gives the details of the area and frequency of service for street sweeping.

AREA	FREQUENCY OF SERVICE
Prieska	**Monday - Friday**
Niekerkshoop	**Monday - Friday**
Marydale	**Monday - Friday**

3.2.1.1 WASTE RECEPTACLES

The Siyathemba Municipality utilises a black refuse bag system. Residents have to buy their own refuse bags. The Municipality accepts any number of bags per household, so there is no specific limit. The bags are placed on the curb outside the house and collected from there.

3.2.1.2 NEW DEVELOPMENTS

New residential and commercial developments are planned for the Siyathemba Municipality where refuse collection service will have to be rendered in future. These include 43 low income RDP houses in Niekerkshoop; 43 low income RDP houses in Marydale; 114 low income RDP houses in Prieska. After completion of these houses in Prieska, another additional 250 low income RDP houses is planned for development in Prieska.

The new developments still need to be incorporated into the refuse collection service.

3.2.2 MUNICIPAL BY-LAWS PERTAINING TO WASTE

The Siyathemba Municipality does not have a set of by-laws which comprehensively address the Council's responsibility for the removal of refuse, management of disposal facilities, waste minimisation, illegal activities, payment of fees and penalties.

3.2.3 WASTE GENERATION RATES

3.2.3.1 POPULATION GROWTH RATES

The effective annual population growth rate for the SM is in the region of 1% per annum.

3.2.3.2 WASTE GENERATION

The landfill sites in the Municipal area do not have weighbridges and therefore the quantities of waste disposed of are not exactly known. The daily tonnages of waste generated were obtained by applying per capita waste generation rates to the figures for the population served. These rates vary with the socio-economic standing of the population, from 0.3 kg per capita per day in the poor areas, to 1.0 kg per capita per day in the affluent areas.

The mathematical estimation of the amount of waste generated within the municipal area is indicated in the table below:

AREA	2007 POPULATION	GENERATION RATE (KG/P/D)	GENERATED WEIGHT (TONS/WEEK)	GENERATED WEIGHT (TONS/ANNUM)
Prieska	**10 858**	**1.0**	**76**	**3925**
Niekerkshoop	**1 926**	**0.3**	**4**	**208**
Marydale	**2 101**	**0.3**	**4.4**	**229**

The waste collected in Prieska is transported to the existing permitted Prieska Landfill site. The waste collected in Marydale is disposed of at the existing unauthorised Marydale Landfill site, while all waste collected at Niekerkshoop is disposed of at the existing unauthorised Niekerkshoop Landfill site.

3.2.3.3 WASTE CHARACTERISTICS

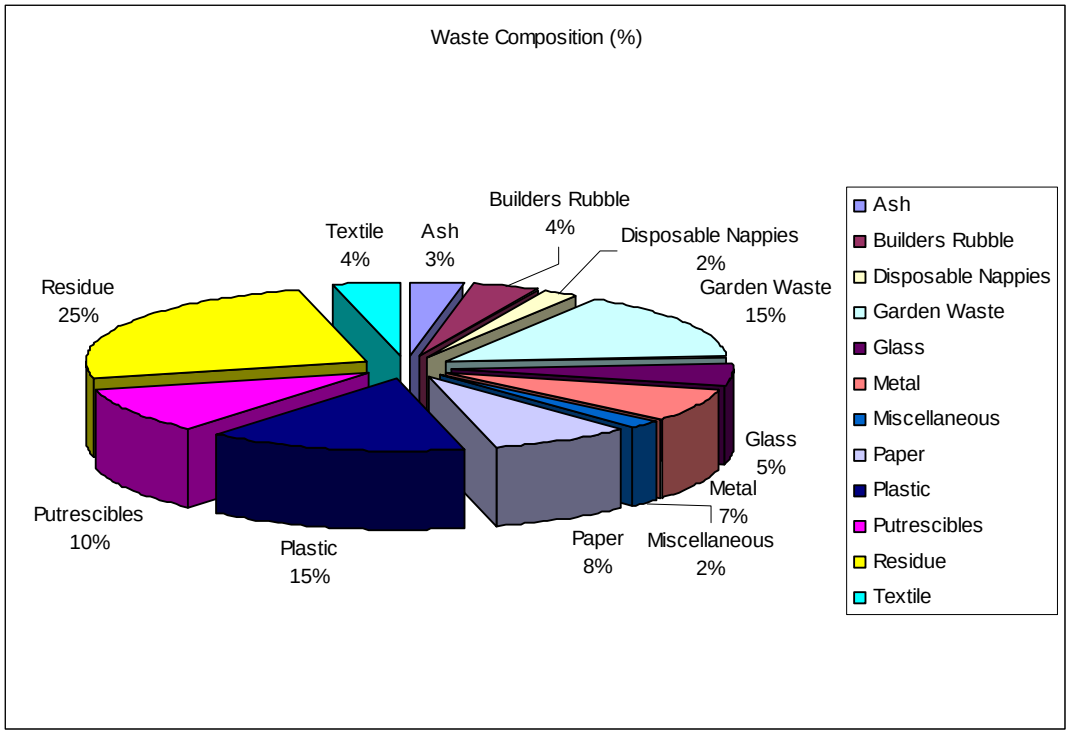
For the composition of the waste stream the waste body was divided into 13 categories that include both recyclable and non-recyclable material. They included plastic bottles, plastic film, paper separated by grade such as newspaper and inserts versus higher quality office paper, glass, organic material and ash. It must be noted that the waste on the landfill sites is burned on a regular basis, reducing the quantity of papers and plastics. It further makes the distinction between ash and organics extremely difficult.

The Table Below indicate the waste composition as a percentage of the sample. It should however be noted that the organic percentage is probably lower than expected due to the regular burning.

The waste on the landfill site is not covered regularly on all the landfills and the waste body present represents a relatively long disposal period.

Waste Stream Composition	Percentage
Ash	3
Builders Rubble	4
Disposable Nappies	2
Garden Waste	15
Glass	5
Metal	7
Miscellaneous	2
Paper	8
Plastic	15
Putrescibles	10
Residue	25
Textile	4
Total	100

The graph below provides a graphic presentation of the above table.



3.2.4 WASTE MINIMISATION STRATEGIES

There are currently no formal Municipal driven waste minimisation activities taking place in the Siyathemba Municipality. However, the municipality is assisting one individual to recycle glass bottles from the landfills.

The Municipality is also currently not offering any recycling incentives to private people or businesses.

3.2.5 ILLEGAL DUMPING

Illegal dumping of waste is common in several of the outlying and township areas. The Municipality has to collect this waste at an unnecessary cost. The Siyathemba Municipality has recognised the need for education of the people regarding this practice; however nothing has yet been implemented.

The Municipality is also experiencing dumping of waste in areas not demarcated for waste disposal.

3.2.6 GARDEN REFUSE

In all the towns within the municipal area, small amounts of garden waste are collected together with general household waste. Disposal of garden waste by private persons are free of charge at the various disposal sites.

The amount of garden waste generated within the Municipal area is not known due to the fact that the Municipality has no control over the disposal of garden waste. Waste volumes are also not recorded at the entrances to the disposal sites.

3.2.7 PERSONNEL

The Siyathemba Municipality renders its own waste collection and street cleaning service.

The waste service is rendered together with other municipal services in the three towns with the largest contingent of workers present in Prieska. The Municipality is experiencing shortages of labour, specifically supervision and labour at the various landfills. They are also experiencing a shortage in personnel working in technical services and assistants to those technicians.

3.2.8 EQUIPMENT

The equipment that is utilised by the Siyathemba Municipality is given below in the Table below.

REG NUMBER	MODEL	VEHICLE DESCRIPTION	CONDITION*	BASED
DBR 984 NC	1985	Isuzu Tipper truck (6m^3)	Bad	Prieska
BFN 334 NC	1993	Tractor Trailer	Fair	Niekerkshoop
BFD 423 NC	1977	Tractor Trailer	Bad	Marydale

- Note that the indicated **VEHICLE CONDITION** is a subjective as assessment of the vehicles and no mechanical assessment of the vehicles had been conducted for this study.

Tipper truck in Prieska

Trailer in Marydale

Tractor in Marydale

Tractor trailer in Niekerkshoop

The Siyathemba Municipality has a few vehicles that are old and are due for replacement. The tipper truck utilised in Prieska for example are in need of replacement. The Municipality is responsible for the maintenance of their own vehicles.

3.2.9 LANDFILL

The Siyathemba Municipality has three landfill sites namely Prieska, Marydale and Niekerkshoop. All three the sites are managed by the Municipality.

The landfill in **Prieska** is a Class G:C:B$^-$ permitted site. The site has approximately enough airspace for the next 20 years. The site is not well managed due to certain financial and personnel constraints. The waste is not covered on a regular basis and is burned once disposed of. The site is not fenced and access is not controlled. No record-keeping takes place at the entrance to the site. Wind-blown litter is a serious problem at the site. There was one employee stationed at the site.

Position of site:	4 km south of town.
Permit:	Yes
Year issued:	14/4/2003
Classification of site:	Class G:C:B-
Type of Operation (end – tip, trench, cell):	There is only a large area excavated for dumping purposes. Waste is disposed hap-hazardly and burned.
Estimated size of site:	Approximately 2 ha.
Estimated remaining life of site:	The remaining life of the site is 20 years
Separation of fresh and contaminated water:	None in place.
Groundwater monitoring:	Not required in permit
Volumes per day, week or month:	It is estimated that the site receives approximately 76 tonnes per week.
Is cover material available?	No
Is the drainage sufficient?	No
Is there access control?	No

Is the site fenced?	No.
Does the site have a sufficient buffer zone?	Yes. No houses are situated in the proximity of the site.
Type of equipment utilised on site:	None
Operating hours:	7h30 to 16h30
Estimating cost for closure:	No estimate regarding closure exists. Due to the extended life of the site the savings plan is not in place yet.
Saving plan for closure:	

Non-working incinerator at Prieska disposal site.

Waste burned at Prieska disposal site

The landfill site at **Niekerkshoop** is located 7 km outside town. The site is fenced (needs maintenance) but access is not controlled. The open burning of waste in a pit forms part of the operational procedure for the site. The waste is not covered on a daily basis due to the absence of proper landfill equipment. The operation of the site is not up to an acceptable standard.

Position of site:	7 km east of town
Permit:	No
Year issued:	N/A
Classification of site:	Not permitted - no classification.
Type of Operation (end – tip, trench, cell):	Site is an open pit where waste is burned indiscriminately.
Estimated size of site:	Approximately 2.5 ha.
Estimated remaining life of site:	20 years
Separation of fresh and contaminated water:	None in place.
Groundwater monitoring:	No groundwater monitoring takes place.
Volumes per day, week or month:	It is estimated that the site receives approximately 4 tonnes per week.
Is cover material available?	No
Is the drainage sufficient?	No
Is there access control?	No
Is the site fenced?	Yes, however the existing fence needs some maintenance
Does the site have a sufficient buffer zone?	Yes, the site is situated some distance away form the town
Type of equipment utilised on site:	None
Operating hours:	None
Estimating cost for closure:	No estimate regarding closure exists. The Municipality must budget for the closure and rehabilitation in the near future.
Saving plan for closure:	

	
Waste is burned at the Niekerkshoop site	**Some scrap meal dumped at Niekerkshoop disposal site**

The **Marydale landfill site** is located 3 km north of town. The site is not fenced and access is not controlled. Wind-blown litter is also a serious problem in the vicinity of the site. There is no landfill equipment on the site and therefore covering of the waste does not occur at all. The site is not properly operated with waste being disposed of haphazardly and burned after disposal.

Position of site:	3 km North of town
Permit:	No
Year issued:	N/A
Classification of site:	Not permitted - no classification.
Type of Operation (end – tip, trench, cell):	Site is an open pit where waste is burned indiscriminately.
Estimated size of site:	Approximately 1.5 ha.
Estimated remaining life of site:	Expected to be 20 years
Separation of fresh and contaminated water:	None in place.
Groundwater monitoring:	No groundwater monitoring takes place.
Volumes per day, week or month:	4.4 tonnes/week
Is cover material available?	No

Is the drainage sufficient?	No
Is there access control?	No
Is the site fenced?	No
Does the site have a sufficient buffer zone?	Yes
Type of equipment utilised on site:	None
Operating hours:	7h30 to 16h30
Estimating cost for closure:	No estimate regarding closure exists. The Municipality must budget for the closure and rehabilitation in the near future.
Saving plan for closure:	

	
No access control or fence at Marydale disposal site	**Waste is burned at Marydale disposal site**

3.2.10 TRANSFER STATIONS

The Siyathemba Municipality has no transfer stations within the municipal area.

3.3 NEEDS ANALYSIS

From the Status Quo and Needs Analysis study, certain needs pertaining to the waste disposal service in the Siyathemba Municipality were identified that requires attention. These needs are summarised below.

- There are no waste minimisation strategies that have been developed. These need to be addressed and implemented.

- The new developments that are taking place in the Siyathemba Municipality must be included for the provision of a waste disposal service.

- Illegal dumping of waste is common in several of the outlying and township areas. The illegal disposal should be addressed in order to manage and minimise the illegal activities pertaining to waste disposal.

- New Municipal By-Laws should be drafted by the District Municipality (for use by the local municipalities within the District) that pertain directly to waste and issues surrounding waste management. Issues such as waste minimisation and recycling etc. should be dealt with in the By-Laws.

- The Siyathemba Municipality has a shortage of personnel, specifically with regard to the management of the disposal sites. Limited or no personnel are present at the disposal sites. Vacant posts should be filled and posts should be created for the management of the disposal sites.

- The Siyathemba Municipality has a few vehicles that are old and in poor condition that are due for replacement.

- The Niekerkshoop and Marydale disposal sites are not authorised. The process to authorise these disposal facilities should be initiated by the Municipality. The operation of these sites is not up to standard. The sites should be upgraded (properly fenced/secured, guard house with ablution) and the operations should be improved in accordance with the Minimum Requirements for Waste Disposal by Landfill document.

- The Prieska disposal site should be upgraded (fenced, guard house and ablution facility) and operated in accordance with the permit conditions for the site, as well as the Minimum Requirements for Waste Disposal by Landfill as published by the Department of Water Affairs and Forestry.

- Access should be controlled at the disposal facilities and a record should be kept of the types and volumes of waste that is being disposed of at each site.

- Municipal waste records should be kept and maintained for informed future decision-making purposes and to comply with the Government's Waste Information System requirements.

- A mitigation strategy or some form of succession planning should be developed for the expected increase in HIV-AIDS related deaths amongst personnel.

- A public awareness and education program should be implemented consisting of flyers, newspaper notices and road shows.

SECTION 4:
INDUSTRIAL AND MINING WASTE

4 INDUSTRIAL AND MINING WASTE

Industries in the area are mostly confined to light industries. The Municipality is currently not experiencing any problems with regard to the disposal of hazardous waste from industry or mining activities on the existing disposal facilities.

SECTION 5:
MEDICAL WASTE

5 MEDICAL WASTE

There are one Provincial hospital (in Prieska) and smaller medical clinics in Niekerkshoop and Marydale. The Municipality is not involved in the removal of any medical waste from these institutions. The medical waste is collected by SANUMED and incinerated and disposed of in the Free State. The Municipality does not experience any problems with medical waste at the landfill sites.

SECTION 6:
COSTS AND TARIFFS

6 TARIFFS

6.1 CURRENT TARIFF STRUCTURE

The Table below lists the tariff of charges for 2006/2007.

TARIFF OF CHARGES: CLEANSING SERVICES (WASTE MANAGEMENT)	2006/07 TARIFF (R)
Refuse per household per month per service	36.51

SECTION 7:
TRENDS AND FORECAST

7 TRENDS AND FORECAST

Decision-making and planning has to be based on sound input and data. The following trends were identified for the Siyathemba Local Municipality for population, economic growth and waste generation.

7.1 POPULATION

The Population within the Siyathemba Local Municipality is approximately 17 513. The effective annual population growth rate for the SM is in the region of 1% per annum.

7.2 ECONOMIC GROWTH

The South African GDP increased with 3.7% for 2004 – 2005, but is anticipated to increase to 5.1% for the period 2005 – 2006. Such a growth could translate into an effective increase in the waste generation growth rate. Since the focus on waste minimisation and recycling is expected to sharpen in the immediate future any minimal growth associated with economic growth will be cancelled out by the associated waste reduction that will mainly be expected from higher income groups.

7.3 WASTE GENERATION

Waste generation growth estimates should take the economic growth, population wealth as well as the population growth rate into consideration as a zero increase in population size, but a fast growing economy will result in a waste generation growth and vice versa.

The estimated waste generation models will give a prediction until the year 2014. Growth rates used were applied using Per Capita Waste Generation Figures as defined in the Minimum Requirements Documents. These growth rates do not take any recycling activities into account and is likely to be an overestimate of the actual growth in waste generation.

Siyathemba

Population Growth Rates

Area	Current Population	Population Growth	2008	2009	2010	2011	2012	2013	2014
Prieska	10858	1.00%	10966.58	11076.25	11187.01	11298.88	11411.87	11525.99	11641.25
Marydale	2101	1.00%	2122.01	2143.23	2164.66	2186.31	2208.17	2230.25	2252.56
Niekerkshoop	1926	1.00%	1945.26	1964.71	1984.36	2004.20	2024.25	2044.49	2064.93
Siyathemba Farms	2628	1.00%	2654.28	2680.82	2707.63	2734.71	2762.05	2789.67	2817.57
Total	**17513**		**17688.13**	**17865.01**	**18043.66**	**18224.10**	**18406.34**	**18590.40**	**18776.31**

Expected Waste Generation Rates (Kg/day)

Area	Current Population	Generation Rates	2008	2009	2010	2011	2012	2013	2014
Prieska	8442	1	10966.6	11076.2	11187.0	11298.9	11411.9	11526.0	11641.2
Marydale	319	0.3	636.6	643.0	649.4	655.9	662.5	669.1	675.8
Niekerkshoop	317	0.3	583.6	589.4	595.3	601.3	607.3	613.3	619.5
Siyathemba Farms	13115	0.2	530.9	536.2	541.5	546.9	552.4	557.9	563.5
Total	17513		12718	12845	12973	13103	13234	13366	13500

SECTION 8:

GOALS AND OBJECTIVES

8 GOALS AND OBJECTIVES

Seven (7) focus areas have been identified to be addressed for the compilation of an IWMP for the Siyathemba Local Municipality. Based on the Gaps and Needs identified, Goals and Objectives have been identified for each of the categories or focus areas (listed below) discussed.

8.1 DISPOSAL INFRASTRUCTURE DEVELOPMENT

This area relates to the development, upgrading and legalisation of disposal infrastructure. This includes the identification of new infrastructure required, the permitting of existing unauthorised facilities, and the upgrading of the current infrastructure as well as the improvement of management practices at the various locations.

8.2 WASTE COLLECTION INFRASTRUCTURE

The shortcomings in the available collection infrastructure will be identified. This will involve possible fleet shortages, receptacle placement and route planning.

8.3 INSTITUTIONAL CAPACITY AND HUMAN RESOURCES

This area involves the identification of human resource shortcomings and alteration to employee structures.

8.4 FINANCIAL RESOURCES

This area relates to existing and required financial structures and strategies.

8.5 DISSEMINATION OF INFORMATION/COMMUNICATION

This area covers the need for effective record keeping and the development of a Waste Information System, the sharing of available information as well as co-operation of the various stakeholders within the municipality.

8.6 MANAGEMENT OF ILLEGAL ACTIVITIES

This focus area relates to illegal dumping activities within the municipal area. This involves identification of possible illegal dumping hot spots, development of clean up and anti dumping campaigns, possible revision of bylaws as well as revision of collection strategies.

8.7 WASTE MINIMISATION

This area involves the identification of specific waste minimisation strategies, whether it be separation and collection at the source, privatisation of recycling activities, development of collection points throughout the area as well as public awareness/education strategies.

It is important to structure Goals and Objectives in accordance with the Government's strategy of waste minimisation. The official hierarchy adopted in the Government Waste Management Strategy is as follows:

Waste Hierarchy		
Cleaner Production	Prevention	
	Minimisation	
Recycling	Re-Use	
	Recovery	
	Composting	
Treatment	Physical	
	Chemical	
	Destruction	
Disposal	Landfill	

Disposal Infrastructure Development

Goal
Improve, Develop and Maintain Infrastructure to comply with Legislative Requirements and Municipal Needs
Objectives
Authorise the Niekerkshoop and Marydale disposal sites.
Upgrade and Improve management of Prieska, Niekerkshoop and Marydale Disposal Sites

Waste Collection Infrastructure

Goal
Provide Effective Waste Collection
Objectives
Extend Service to Un-serviced Areas
Replace and Maintain Collection Fleet for Service Delivery
Standardise Collection and Optimise Collection Route

Institutional Capacity and Human Resources

Goal
Provide Effective Waste Management Service
Objectives
Effective Structure and Extension of Human Resources
Train Staff

Financial Resources

Goal
Provide Cost Effective Waste Management Service
Objectives
Improve Payment of Service Tariffs

Dissemination of Information/Communication

Goal
Capacity Building through Information Sharing
Objectives
Develop and Maintain a Waste Information System
Contribute to District Forums
Improve Community Awareness and Education

Management of Illegal Activities

Goal
Minimise/Prevent Illegal Activities
Objectives
Develop Penalty System for Illegal Activities
Improve Removal of Illegally Dumped Waste

Waste Minimisation

Goal
Decrease Waste Deposited on Landfill
Objectives
Encourage recycling activities if proven feasible Activities
Encourage Waste Minimisation

SECTION 9: ALTERNATIVES & PROPOSALS

9 ALTERNATIVES

The Goals and Objectives identified in the previous section must now be evaluated and alternative solutions developed to meet them. From the various alternative solutions developed, a number of feasible scenarios, taking into account various aspects of the waste management cycle, will be compiled. These scenarios will then be evaluated in terms of a number of criteria to ensure that the most suitable scenario is selected for implementation.

The following information is provided as background information to enable the reader to better comprehend conditions and terminology.

COLLECTION SERVICES

The three main aspects of collection services are (a) the waste receptacles, (b) collection frequency and (c) position of receptacles.

Waste Receptacles

There are a number of waste receptacles that can be used such as 85 litre bins, 240 litre trolley bins, skip containers, etc. The receptacle will be dependent on the volume of waste generated at the collection point, the type of waste, the type of collection vehicle and the cost of the service to the community. In densely populated areas such as larger cities, the 240 litre wheelie-bin system is fairly common. This is due to the fact that there is generally more waste in these areas requiring larger waste receptacles. These wheelie-bins are emptied mechanically into the collection vehicle. There is however a cost implication since these containers are fairly expensive and costs must somehow be recovered, usually directly influencing the cost of the service. It is however a once off capital cost which might be weighed against the continuously monthly cost of bin liners.

The most commonly used system is the black bag system. Usually a bin liner (black bag) is placed in an 85 litre container (dustbin) and used for disposal purposes. The bag is then removed from the bin and placed on the sidewalk for collection. Bags can be picked up by hand and dropped into the collection vehicle.

In more rural areas almost any type of receptacle is used, depending on how formal the collection system is. In some rural or less affluent areas skip containers are placed at strategic points. The community is then responsible to bring their waste and dispose of it in the skip containers from where it is collected. The level of co-operation from the community usually determines the success of such a system.

For commercial collection, i.e. restaurants, shops, etc., a vast number of receptacles is used. In most instances the type of receptacles are determined by the type and volume of waste disposed of as well as the type of service rendered. In smaller towns the municipality usually renders the service and they provide the receptacles. In larger towns there are usually private contractors collecting waste from commercial collection points.

Generators of industrial waste usually dispose of their waste themselves, or use a private contractor. The receptacles used are usually skip containers.

To summarise, the type of receptacle will be dependent on what the community can afford, the volumes of waste generated, the type of waste and the special needs of the community.

Collection Frequency

The collection frequency is again dependent on the volumes of waste generated, the availability of the equipment and the level of service. The norm is that domestic collection is done once a week in most areas. Commercial collection is dependent on the volumes generated and the types of waste. A restaurant, for instance, will have their waste removed up to four times a week should the volumes require it. This is due to the fact that most of their waste is food residue that can cause an odour and fly problem within a day or two.

Placement of Receptacles

In most instances domestic waste receptacles are placed on the pavement on the day of collection. This allows for easy access to the receptacle and saves on actual collection time. In some instances, collection of commercial receptacles is done from the actual premises.

EQUIPMENT

The type of equipment is usually determined by the cost of the service to the residents, the condition of the collection roads (surface, alignment, etc), the distance to the landfill and the number of collection points serviced per day.

Cost of Equipment

There is a wide range of collection equipment that can be utilised for collection equipment. This can range from a tractor and trailer system (R 360 000) up to a top of the range REL (R 1 100 000). It is vital that the right equipment is utilised for the right conditions and type of service required. This will be clarified in the following points.

Conditions of Collection Roads

The road condition that the collection vehicle has to drive plays a major factor when deciding on a particular collection vehicle. If one has to compare a rural road full of potholes to a road in a city suburb, a tractor and trailer would be more suitable in the rural application as opposed to a state of the art 20 m³ REL, which is not built to drive on poorly maintained roads. The maintenance cost would be above normal for an REL to drive these roads on a daily basis due to wear and tear on components. A tractor and trailer, which is a much more robust type of system, will be better suited to such conditions. In an urban environment a tractor and trailer will be less suited as the landfill is usually far from the collection areas and will take to long to drive to the landfill and back.

Distance to the Landfill

As discussed above, distance to the landfill plays an important role. For instance if the landfill is 20 km from the collection area, a tractor and trailer will spend most of the time driving from the collection area to the landfill and back. A general rule is that a tractor and trailer combination should not drive further than 7 km from the collection area to the landfill. For distances above 7 km, alternative types of vehicles should be considered.

There is a collection system using a mobile compactor with a demountable container. This can be used in various applications. Once the container is full, it is demounted and left for a 'Roll-on Roll-off' truck to collect. The collection vehicle therefore does not waste any time driving to the landfill and back.

Another possible application will be in a regional context where the vehicle collects waste in a certain area, leaves the container at a designated point and moves on to the next area. The container will then be collected by a "Roll-on Roll-off" truck for disposal at the landfill.

Number of Collection Points

The number of collection points becomes critical in an urban area where a 20 m³ REL collects up to 1 200 service points per day. A collection vehicle's sole purpose should be to collect waste and not spend time driving from the collection area to the landfill and back. Aspects such as compaction also play an important role. A 20 m³ REL can collect up to 60 m³ of waste at a time because of a one to three (1:3) compaction ratio, while a tractor/trailer combination can collect only 5 m³ to 10 m³ at a time before it has to offload. The tractor/trailer therefore has to make a lot more trips to the landfill than a 20 m³ REL. The REL therefore has more time for the collection and

service of more points. It must also be noted that the "runners", collecting and loading the collection vehicle, are idling while the vehicle is on the road to the dumpsite and back.

Landfill Equipment

On the larger landfills a landfill compactor, loader, water container and tipper will be found to ensure effective operating conditions. For smaller landfills a TLB will handle waste effectively enough and on communal landfills where the trench system is used, a machine is only required part time. The type of equipment will depend on the type of operation (trench, cell, etc.) and the volume of the waste generated. Compaction is usually an important factor since this allows for more waste to be disposed of at a landfill thereby prolonging the life of the landfill. Economics however play an important role, since the volume of waste has to justify the type of equipment. It is of no use using a 30-ton landfill compactor, capable of handling over 500 tons of waste per day, on a landfill only receiving 10 tons per day. Such a machine cost in the region of R 2 600 000 and operating cost is in the region of R 180.00/hour without the cost of the operator or maintenance costs.

From the above it is evident that the choice of equipment is very important to ensure the correct equipment is used for the correct application.

The following pictures represent some of the equipment mentioned above.

	12 m³ REL

	***Landfill compactor***
	***19 m³ REL: Lifting 240 litre wheel bin*** ***19 m³ REL: Lifting 1.75 m³ wheel bin***
	***Tractor with utility trailer***

	***Gravity compactor***
	***240 litre wheelie bin***

9.1 DISPOSAL INFRASTRUCTURE DEVELOPMENT

Goal
Improve, Develop and Maintain Infrastructure to comply with Legislative Requirements and Municipal Needs
Objectives
Authorise the Niekerkshoop and Marydale disposal sites.
Upgrade and Improve management of Prieska, Niekerkshoop and Marydale Disposal Sites

Objective 1: Authorise the Niekerkshoop and Marydale disposal

The Municipality is currently operating the Niekerkshoop and Marydale landfill sites without operational authorisations issued by the Department of Environmental Affairs and Tourism.

Authorisation applications for the continued operation of the Niekerkshoop and Marydale landfills have to be compiled and submitted to DEAT for issuing. An EIA should be done for each landfill in terms of the EIA regulations. The EIA process runs parallel with the authorisation process by DEAT. An authorisation for continued operation can however only be issued by DEAT once a Record of Decision (RoD) has been issued by the Department of Water Affairs and Forestry. The authorisation applications will have to be submitted to DWAF as well to obtain the required RoD in terms of section 20(6)(b) of the Environmental Conservation Act (50 of 2003).

The operation of the Niekerkshoop and Marydale landfills is not up to standard. Waste is being disposed of haphazardly and burned. The operations should be done in accordance with an operational plan which has to be submitted as part of the authorisation applications for these sites. The sites should be operated in accordance with the Minimum Requirements for Waste Disposal by Landfill. This would *inter alia* entail proper access control and regular covering of the waste at these sites.

Objective 2: Upgrade and Improve Management of Prieska, Niekerkshoop and Marydale Disposal Sites

The **Prieska Landfill Site** is permitted by DWAF as a G:C:B$^-$ site in 2003. The site is however not well managed and not operated in accordance with the permit conditions or the operational plan that was submitted as part of the permit application, due to financial and personnel constraints. The waste is not covered on a regular basis and is burned once disposed of. The waste should be centralised and the working front be kept as small as possible. Waste should then be regularly compacted and covered. The site is not fenced and access is not controlled. No record-keeping takes place at the entrance to the site. The Municipality will have to control access by upgrading the fence and construct a proper entrance with ablution facilities for the workers. With proper access control the Municipality would be able to keep proper records of waste disposed of.

Wind-blown litter is a serious problem at the site. The Municipality has two options available. The first is that the waste is covered or burned as it is disposed of at the landfill site. This however would be impractical as it would lead to ineffective covering and compacting of the waste or could cause nuisance conditions when waste is burned. Another option is to make use of movable fences close to the working face to control wind-blown litter. This is probably the best option as it would require the minimum disruption in the management of the site.

There was one employee stationed at the site. The site should be manned and supervised by a suitably qualified operator to ensure that waste is being disposed of at the dedicated areas on the site. The operator can also do access control.

The site has approximately enough airspace for the next 20 years.

The **Niekerkshoop** landfill site is not authorised in terms of Section 20 of the Environment Conservation Amendment Act, 2003.

The operation of the site is not up to an acceptable standard. The open burning of waste in a pit forms part of the operational procedure for the site. The waste is not covered on a regular basis due to the absence of proper landfill equipment. Waste should be disposed of by keeping the working face as small as possible. The burning of waste should be phased out and a proper cell method should be followed with the operations. Waste should then be regularly covered. An alternative to consider is the trench method of operation, especially if cover material is lacking. The trench method can only be followed as a method to operate the site once the geotechnical characteristics of the area are known.

The site is fenced (needs maintenance) but access is not controlled. This can be done by appointing staff at the entrance to record waste disposal and upgrade the fencing around the site to prevent illegal access. The site should be operated in accordance with an Operational Report

(which has to be compiled and submitted as part of the Authorisation Application to DEAT). In the mean time the site should be operated in accordance with the Minimum Requirements for Waste Disposal by Landfill, especially with regard to the open burning requirements, until this practise has been phased out.

The **Marydale** site is not authorised in terms of Section 20 of the Environment Conservation Amendment Act, 2003.

The site is not fenced and access is not controlled. Wind-blown litter is also a serious problem in the vicinity of the site. There is no landfill equipment on the site and therefore covering of the waste does not occur at all. The site is not properly operated with waste being disposed of haphazardly and burned after disposal. The site should be upgraded (necessary entrance control infrastructure and fencing) and be operated in accordance with an Operational Report which will have to be submitted as part of the Authorisation Application to DEAT and in accordance with the Minimum Requirements for Waste Disposal by Landfill. The operating alternatives would be the same as mentioned above for the Niekerkshoop disposal site.

9.2 WASTE COLLECTION INFRASTRUCTURE

Goal
Provide Effective Waste Collection
Objectives
Extend Service to Un-serviced Areas
Replace and Maintain Collection Fleet for Service Delivery
Standardise Collection and Optimise Collection Route

Objective 1: Extend Service to Unserviced Areas

The Municipality at the moment is delivering a refuse removal service in all the urban areas. New residential developments are planned for the Siyathemba Municipality (which include 43 low income RDP houses in Niekerkshoop; 43 low income RDP houses in Marydale; 114 low income RDP houses in Prieska, as well as another additional 250 low income RDP houses for development in Prieska once the initial ones in Prieska have been completed) where refuse collection will have to be rendered in future. It is essential that in conjunction with the Town Planning Department that future residential and business area expansion are catered for in terms

of refuse removal. This will allow the Municipality to, at an early stage, determine the possible costs involved and therefore will be able to adjust their budget accordingly. This will allow the Municipality to service the new areas when they are developed.

The Municipality at the moment does not provide a waste removal service to the farms in the municipal area. The extent of the Municipality and the remote locations of several of the farms will not make this an economically feasible option. It is recommended that the Municipality assist the farmers by informing them of correct disposal measures and safety precautions.

Objective 2: Extend and Maintain Collection Fleet for Service Delivery

The Siyathemba Municipality do not have sufficient equipment to deliver an effective service in the existing municipal area. The Siyathemba Municipality has a few vehicles that are old and are due for replacement. The tipper truck utilised in Prieska for example are in need of urgent replacement.

It is recommended that a vehicle replacement plan be compiled to ensure that future planning for the replacement of the vehicles is done at the appropriate time. The Municipality should inspect the vehicles and establish a lifespan for each of the vehicles based on the general wear and tear of the vehicle. This will be influenced by the specific route and conditions of the road that the vehicle has to travel. The current condition of the vehicles should also be taken into account. This investigation will determine which vehicles are due for replacement first and the Municipality will be able to budget for such vehicles. Due to cost concerns the Municipality will also be able to divide the capital cost of the vehicles over more than one financial year. The replacement of old and unreliable vehicles is a matter of urgency as this may in future undermine the effectiveness of the current refuse removal system.

With the purchase of the new vehicles it is essential that the Municipality negotiate with the various suppliers for the maintenance of the vehicles. The older vehicles are still maintained by the Municipality, but the phased replacement of the vehicles will allow for the regular service of the vehicles by the supplier. This will prolong the lifespan of the vehicles as well as ensuring that they are more reliable.

Objective 3: Standardise Collection and Optimise Collection Route

The Siyathemba Municipality utilises a black refuse bag system. Residents have to buy their own refuse bags. The Municipality accepts any number of bags per household, so there is no specific limit. The bags are placed on the curb outside the house and collected from there.

The bags have to be loaded onto the back of the collection vehicles by hand. In some instances where black bags are not available the waste is disposed off in any available receptacle.

Due to the limited number of service points in the urban areas of the Siyathemba Municipality and the road conditions, the use of a Rear End Loader (REL) for refuse collection will not be economically feasible. It is therefore suggested that the Municipality should continue with the current refuse collection system, but that it be revised regularly and be adopted should it be necessary.

It would also not be feasible for the Municipality to supply the agricultural holdings with formal receptacles and to render a service.

The extension of the service to new developed areas over time will necessitate new route planning as well as adjustments to the current collection route. The shortest possible route with the least amount of repeat must be established. It is not the purpose of the IWMP to provide detailed route planning. The appointment of a consultant to investigate the possible route is not necessary and should the Municipality feel they have the specific expertise, they can conduct the route planning exercise themselves.

9.3 INSTITUTIONAL CAPACITY AND HUMAN RESOURCES

Goal
Provide Effective Waste Management Service
Objectives
Effective Structure of Human Resources
Train Staff

Objective 1: Effective Structure of Human Resources

The Siyathemba Municipality has a shortage of personnel, specifically with regard to the management of the disposal sites. Limited or no personnel are present at the disposal sites. The proper management of the landfill sites will necessitate that the Municipality has personnel at the sites. Vacant posts should be filled and posts should be created for the management of the disposal sites. Due to the small size of the Niekerkshoop and Marydale sites, the Municipality can appoint at least 1 person per disposal site, which will have to guard the gate (entrance control), supervise/operate the site and pick up wind-blown litter when necessary.

The workers responsible for waste collection have other duties as well.

The following is a breakdown of the possible Municipal requirements.

POST	SHORTAGE	SERVICE AREA
1 x Site Manager 1 x Gate guard 1 x Litter Picker	**1 each**	**Prieska Landfill Site**
1 x Site Manager/gate guard/operator	**1**	**Marydale Landfill site**
1 x Site Manager/gate guard/operator	**1**	**Niekerkshoop Landfill site**

Objective 2: Train Staff

The delivery of an effective refuse delivery service and efficient waste management within the Municipality depends on the ability of the staff to perform their specific functions. It is therefore a non-negotiable that staff is trained to perform their specific duties. Depending on the level of training required, general labourer versus compactor operator, it has to be decided whether to provide in-house training or whether to provide the employee with specialised training. In-house training should only be attempted if the capacity and knowledge exist within the Municipality. Based on the fact that for lower levels employees the knowledge is available within the Municipality, it is recommended that specialists be obtained to provide more specialised training.

9.4 FINANCIAL RESOURCES

Goal
Provide Cost Effective Waste Management Service
Objectives
Improve Payment of Service Tariffs
Standardise Tariff Structure

The Municipality is at the moment experiencing a lack of payment of tariffs, which needs to be rectified to provide a cost effective waste management service.

Objective 1: Improve Payment of Service Tariffs

Formal households as well as businesses currently serviced are billed on a monthly basis in conjunction with their water and electricity bills. Penalties for non-payment of accounts should therefore easily be enforced by withholding services. This however is an administrative problem that generally takes a long time.

The inclusion of more areas however, may increase the likelihood of non-payment by residents. A possible option is a pre-paid system similar to the one used for electricity. The system can be a coupon-based system where coupons can be bought in advance for a specific month. The negative aspect is that non-payment and subsequent non-delivery of services will lead to an increase in the instances of illegal dumping in the area. It is recommended that the pre-paid system be used in accordance with strategies to prevent illegal dumping in the municipal area. It

would also be possible for the Municipality to retrieve some of the lost service fees from the Equitable Share.

Objective 2: Standardise Tariff Structure.

Upgrading service delivery throughout the municipal area will entail standardising the service that is delivered to all the households in the area. All households must therefore be serviced on a weekly basis, either by the Municipality or by the community. It is important that the tariffs identified for service delivery is comparable throughout the municipal area. Specific tariffs for a specific service, municipal or communal, should therefore be levied and not vary depending on the geographical area. The standardisation of the tariff structure will provide uniformity that may encourage payment of Tariffs. Tariffs for additional services, including garden and commercial waste removal, should also be according to service delivery.

9.5 DISSEMINATION OF INFORMATION/COMMUNICATION

Goal
Capacity Building through Information Sharing
Objectives
Develop and Maintain a Waste Information System
Contribute to District Forums
Build Community Awareness

Objective 1: Develop and Maintain a Waste Information System

The main objective would be to develop and maintain a WIS. This system would allow for the keep of comprehensive records of waste disposal and collection on which informed decision-making can be based and to comply with the reporting requirements of the relevant authorities such as DEAT.

The costs involved in the development of a WIS will vary depending on the structure and contentiousness of the area. The National Department of Environmental Affairs and Tourism is at the moment in the process of developing a generic WIS that may be provided to the various Municipalities for implementation.

Objective 2: Contribute to District Forums

The current difference in service delivery management within the Northern Cape Province necessitates that frequent information sharing sessions be held to share capacity building information. Another option is to provide quarterly reports regarding waste management (for each town) to other Local Municipalities. It is proposed that the information sharing sessions would be the preferred option since it would allow for discussions on problems encountered and not only provide information. These quarterly meetings should be attended by all the Local Municipalities within the District Municipality as well as representatives from the relevant Northern Cape Provincial Departments as well as DEAT.

Objective 3: Build Community Awareness

The Siyathemba Municipality presently does not have any formal community awareness campaigns that are directed at informing the general community with regards to disposal and recycling.

A top down approach by the municipality relies heavily on non-payment penalties to ensure that residents comply with legislation. Recycling and waste minimisation initiatives however, are not included in the normal service delivery and can only be effectively achieved with the co-operation of the residents.

It is therefore vitally important that the community is made aware of initiatives, waste recycling activities and the advantages of waste minimisation and recycling by the Municipality. This can either be achieved by advertisements and notices in the local newspapers or by providing information regarding these initiatives on the municipal bills distributed each month. The municipality can also conduct a road show to all the towns to demonstrate to and inform people of waste related issues.

9.6 MANAGEMENT OF ILLEGAL ACTIVITIES

Goal
Minimise/Prevent Illegal Activities
Objectives
Develop Penalty System for Illegal Activities

The Siyathemba Municipality as with several other Municipalities in the country has problems with illegal dumping throughout the municipal area. This can either be attributed to a lack of an effective refuse removal service or residents being unaware of their options regarding private waste disposal. A certain portion of these activities will be eliminated through proper community awareness programs as discussed above.

Objective 1: Develop Penalty System for Illegal Activities

It is imperative that the Municipality develops and implements a system to minimise or stop illegal dumping within the Municipal area. The major problem facing the Municipality is that they do not have the specific manpower to police the illegal disposal of waste. Within the serviced areas it is easier to regulate illegal dumping and introduce a penalty system for offenders. There are several actions the Municipality can take to minimise illegal dumping and introduce such a penalty system.

The first is that the Municipal By-laws must be amended to allow the Municipality to issue spot fines for residents caught dumping waste in illegal areas. This will to a certain degree reduce and prevent illegal dumping within the town boundaries. The disadvantage is that it will not reduce dumping outside the town boundary and it will increase the pressure on already limited human resources.

A second option will be to introduce community awareness whereby a community watch movement is introduced. This will limit the pressure on the human resources of the municipality as neighbourhood watch systems are put in place. Incentives such as discount on regular fees for “clean” neighbourhoods can be introduced to encourage these activities.

A third option is the provision of garden/domestic refuse skips with ramps at strategic locations throughout the town to minimise travelling distances for the general public. The Municipality can then remove the refuse on a monthly basis.

It is recommended that a combination of the above be implemented to find an effective solution to illegal waste. The amendment of the by-laws will provide the municipality to officially produce policies and strategies that will benefit the community. Through community awareness and a neighbourhood watch system the residents will have all the information regarding the disposal of waste in their area. They will also be aware of the incentive scheme to prevent illegal dumping from taking place within their surrounds. To prevent illegal dumping outside of town skips should be placed at strategic location to provide convenient access to a dumping facility.

The costs of the skips are:

Estimated Skip Prices		
Refutainer	**5.5 m^3**	**R 6,500.00**
Refutainer	**6 m^3**	**R 6,800.00**
Refutainer	**9 m^3**	**R 8,200.00**
Refutainer	**11 m^3**	**R 9,200.00**

9.7 WASTE MINIMISATION

Goal
Decrease Waste Deposited on Landfill
Objectives
Encourage recycling activities if proven feasible Activities
Encourage Waste Minimisation

Objective 1: Encourage recycling activities if proven feasible Activities

There are no recycling activities within the Siyathemba Municipal area. The Municipality has to encourage recycling activities if proven feasible by providing measures to increase the convenience of recycling for the average person. Recycling activities tend to fail due to the effort required from the community. The Municipality therefore can place recycling containers at central and visible locations to maximise exposure and convenience. Community awareness about recycling and recycling initiatives must also be increased through advertisements and the distribution of flyers and letters.

There is also a national initiative that will put a levy on the purchase of new and retread tyres. This levy will go into a national fund that will be responsible for the disposal and possible recycling of used tyres.

Objective 2: Encourage Waste Minimisation.

Waste minimisation and recycling at source is more effective than recycling since it reduces the removal and transport costs. It is therefore recommended that waste sorting and minimisation be encouraged amongst the businesses in the Municipal area. It is recommended that a system be implemented whereby businesses within the community are billed for waste removal based on the number of receptacles or mass collected from their premises. They therefore effectively receive a discount for in house recycling activities, as it will limit the number of receptacles collected.

SECTION 10: RECOMMENDATIONS

10 RECOMMENDATIONS

The recommendations that have been proposed during the discussion of the alternatives are listed in the following table (Recommendations for various scenarios are included):

Recommendations		
Focus Area	**Objective**	**Recommendation**
Disposal Infrastructure Development	**Objective 1: Authorise the Marydale and Niekerkshoop Disposal Sites for continued operation**	**Compile authorisation application (including EIA) for Niekerkshoop and Marydale, to be submitted to DEAT.**
	Objective 2: Upgrade and Improve Management of Prieska, Marydale and Niekerkshoop Landfill Sites	**Construct Guard house and ablution facilities at each site**
		Upgrade fencing at Niekerkshoop. Construct fence at Prieska and Marydale landfill sites.
		Improve operations at Prieska, Niekerkshoop and Marydale disposal sites in accordance with operational plans which will have to be compiled and submitted as part of Authorisation Applications (in the case of Marydale and Niekerkshoop) and in accordance with Minimum Requirements and permit conditions (Prieska).
		Maintain Infrastructure on

		the Sites
Waste Collection Infrastructure	**Objective 1: Extend Service to Un-serviced Areas in Municipal Area**	**Include additional residential developments into Service Delivery Area**
		Inform Farmers of Correct Waste Disposal Practices.
	Objective 2: Extend and Maintain Collection Fleet	**Compile Equipment Replacement Plan**
		Negotiate Maintenance Contract with Vehicle Suppliers
		Maintain Current Collection Fleet
	Objective 3: Standardise Collection and Optimise Collection route	**Phase in Standard Refuse Receptacles with new collection equipment.**
		Amend and optimise collection route.
Institutional Capacity and Human Resources	**Objective 1: Effective Structure of Human Resources**	**Appoint a Landfill Manager, a gate guard and a litter picker at Prieska landfill and a site supervisor/operator at Niekerkshoop and Marydale landfill Sites.**
	Objective 2:Train Staff	**Locally train low level staff and provide specialised training for specialised positions.**
		Ensure proper training of

		contracted personnel
Financial Resources	Objective 1: Improve Payment of Service Tariff	Implement pre-paid system
		Implement Penalties
		Redistribute Equitable Share
	Objective 2: Standardise Tariff Structure	Implement Standardised Tariff System
Dissemination of Information / Communication	Objective 1: Develop and Maintain a WIS	Develop WIS
	Objective 2: Contribute to District Forums	Attend workshops
	Objective 3: Build Community Awareness.	Build awareness through flyers, newspaper notices and road shows.
Management of Illegal Activities	Objective 1: Develop Co-operation Strategies to Prevent Illegal Activities.	Amend Bylaws
		Establish Community Watch
		Introduce Incentive schemes for Clean Neighbourhoods.
		Provide Skips throughout Town for Refuse Dumping

Waste Minimisation	Objective 1: Encourage	Provide recycling containers

	recycling activities if proven feasible Activities	**throughout town**
	Objective 2: Encourage Waste Minimisation	**Incentive Schemes for in House Recycling**

SECTION 11: IMPLEMENTATION PROGRAM

11 IMPLEMENTATION PROGRAM

The following is an implementation programme based on the recommendations. The programme identifies actions to be taken to achieve the proposed recommendations.

Implementation Programme

Focus Area	Recommendation	Actions						
		2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015
Disposal Infrastructure Development	**Compile authorisation application (including EIA) for Niekerkshoop and Marydale, to be submitted to DEAT**	Apply for authorisation for continued operation of the Niekerkshoop and Marydale landfill sites, including EIA	Follow up on authorisation status					
	Upgrade and Improve Management of Prieska, Niekerkshoop and Marydale Landfill Sites	Construct guard house and ablution facilities at the Landfill Sites Upgrade fencing at the Niekerkshoop Landfill Site and construct fencing at Prieska and Marydale landfill sites		Audit Management of Landfill Sites	Audit Management of Landfill Sites	Audit Management of Landfill Sites	Audit Management of Landfill Sites	Audit Management of Landfill Sites

Focus Area	Recommendation	Actions						
		2008/2009	**2009/2010**	**2010/2011**	**2011/2012**	**2012/2013**	**2013/2014**	**2014/2015**
Waste Collection Infrastructure	**Extend service to un-serviced areas.**	Assist Farmers with Proper Waste Disposal Techniques	Add new residential development areas as it develops	Add new residential development areas as it develops	Add new residential development areas as it develops	Add new residential development areas as it develops	Add new residential development areas as it develops	Add new residential development areas as it develops
	Extend & Maintain Collection Fleet	Compile Equipment Replacement Plan	Implement Equipment Savings Plan	Replace equipment as Required	Replace equipment as Required Negotiate Maintenance Contract	Replace equipment as Required Negotiate Maintenance Contract	Replace equipment as Required Negotiate Maintenance Contract	Replace equipment as Required Negotiate Maintenance Contract
		Maintain Current Collection Fleet	Maintain Current Collection Fleet	Maintain Current Collection Fleet	Maintain Current Collection Fleet	Maintain Current Collection Fleet	Maintain Current Collection Fleet	Maintain Current Collection Fleet
	Optimise Collection Route	Optimise Collection Route	Include new Areas into Collection Route					

Focus Area	Recommendation	Actions						
		2008/2009	**2009/2010**	**2010/2011**	**2011/2012**	**2012/2013**	**2013/2014**	**2014/2015**
	Standardise Refuse Receptacles	Continue with current refuse collection system, but continuously review the system for possible phasing in of 240 l wheelie bins should it prove to be feasible						
Institutional Capacity & Human Resources	**Employ Additional Staff to manage landfill sites**	Appoint Landfill Manager, gate guard and litter picker at Prieska and a site supervisor/operator at Niekerkshoop and Marydale landfill sites	Employ Staff as Vacancies Develop					
	Locally Train Low Level Staff **Specialised Training for Specialised Posts**	Train New Staff Ensure Training of Landfill Managers						
Financial Resources	**Implement Standardised Tariff Structure**	Evaluate Level of Service Delivery Develop Standardised Tariffs for Specific Levels of Service.		Update Tariffs as Service Levels Improve Increase Tariffs to Combat Inflation				
	Implement Pre-paid system	Inform Community regarding Implementation of System Implement Pre-Paid System		Upgrade System as Required				
Dissemination of Information / Communication	Develop WIS	Appoint Consultant to Develop WIS		Maintain and Update WIS as Situation Change in Municipality				
	Attend Workshops	Attend Quarterly Waste Management Workshops	Attend Quarterly Waste Management Workshops	Attend Quarterly Waste Management Workshops	Attend Quarterly Waste Management Workshops	Attend Quarterly Waste Management Workshops	Attend Quarterly Waste Management Workshops	Attend Quarterly Waste Management Workshops

Focus Area	Recommendation	Actions						
		2008/2009	**2009/2010**	**2010/2011**	**2011/2012**	**2012/2013**	**2013/2014**	**2014/2015**
	Build Community Awareness	Publish Newspaper Notices and Flyers. Conduct Road Shows	Publish Newspaper Notices and Flyers.	Publish Newspaper Notices and Flyers. Conduct Road Shows	Publish Newspaper Notices and Flyers.	Publish Newspaper Notices and Flyers. Conduct Road Shows	Publish Newspaper Notices and Flyers.	Publish Newspaper Notices and Flyers. Conduct Road Shows
Management of Illegal Activities	**Establish Community Watch Programme**	Inform Communities of Proposed Program	Establish Community Watch System Implement Incentive Schemes		Incorporate New Neighbourhoods into the Community Watch System			
	Amend By-Laws	Amend By-Laws	Update By-Laws as Required					
	Provide Skips Throughout Town	Purchase Skips for Existing Neighbourhoods	Purchase Skips for New Developments as the Need Arise					
Waste Minimisation	**Provide Recycling Containers Throughout Town**	Purchase Recycling Containers Locate Containers at Strategic Places Improve Community Awareness	Add Additional Containers to Service New Development Areas Continual Awareness Program					
	Incentive Schemes for In-House Recycling	Develop Discount System for Businesses Implement Discount Strategy	Maintain and Evolve Discount System to Incorporate New Businesses					

Cost Estimates

Focus Area	Recommendation	Actions						
		2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015
Disposal Infrastructure Development	Compile authorisation application (including EIA) for Niekerkshoop and Marydale, to be submitted to DEAT	Apply for authorisation for continued operation of the Niekerkshoop and Marydale landfill sites, including EIA	Follow up on authorisation status					
		R 500 000 (R250 000 per site)	No cost assigned, to be conducted by Municipality/consultant					
	Upgrade and Improve Management of Prieska, Niekerkshoop and Marydale Landfill Sites	Construct guard house and ablution facilities at the landfill sites		Audit Management of Landfill Sites (twice yearly audit) (8% CPI Increase)				
		R 60 000	R 60 000					
		Upgrade fencing at the Niekerkshoop Landfill Site and construct fencing at Prieska and Marydale landfill sites						
		R 172 500	R 172 500	R 50 000	R 54 000	R 58 320	R 62 985	R 68 024

Focus Area	Recommendation	Actions						
		2008/2009	**2009/2010**	**2010/2011**	**2011/2012**	**2012/2013**	**2013/2014**	**2014/2015**
Waste Collection Infrastructure	**Extend service to un-serviced areas.**	Assist Farmers with Proper Waste Disposal Techniques	Add new residential development areas as it develops	Add new residential development areas as it develops	Add new residential development areas as it develops	Add new residential development areas as it develops	Add new residential development areas as it develops	Add new residential development areas as it develops
		No Costs Assigned. To be conducted by Municipality	**No Costs Assigned**	**No Costs Assigned**	**No Costs Assigned**	**No Costs Assigned**	**No Costs Assigned**	**No Costs Assigned**
	Extend & Maintain Collection Fleet	Compile Equipment Replacement Plan	Implement Equipment Savings Plan	Replace equipment as Required	Replace equipment as Required Negotiate Maintenance Contract	Replace equipment as Required Negotiate Maintenance Contract	Replace equipment as Required Negotiate Maintenance Contract	Replace equipment as Required Negotiate Maintenance Contract
		R 25 000	**No Costs Assigned**	**No Costs Assigned**	**No Costs Assigned**	**No Costs Assigned**	**No Costs Assigned**	**No Costs Assigned**
		Maintain Current Collection Fleet	Maintain Current Collection Fleet	Maintain Current Collection Fleet	Maintain Current Collection Fleet	Maintain Current Collection Fleet	Maintain Current Collection Fleet	Maintain Current Collection Fleet
		No Costs Assigned. In Current Municipal Budget	**No Costs Assigned. In Current Municipal Budget**	**No Costs Assigned. In Current Municipal Budget**	**No Costs Assigned. In Current Municipal Budget**	**No Costs Assigned. In Current Municipal Budget**	**No Costs Assigned. In Current Municipal Budget**	**No Costs Assigned. In Current Municipal Budget**
	Optimise Collection Route	Optimise Collection Route		Include new Areas into Collection Route				
		R 12 000	**R 12 000**	**No Costs Assigned. To be Conducted by the Municipality**				

Focus Area	Recommendation	Actions						
		2008/2009	**2009/2010**	**2010/2011**	**2011/2012**	**2012/2013**	**2013/2014**	**2014/2015**
	Standardise Refuse Receptacles	Continue with current refuse collection system, but continuously review the system for possible phasing in of 240 l wheelie bins should it prove to be feasible						
		No costs Assigned. To be conducted by the Municipality						
Institutional Capacity & Human Resources	**Employ Additional Staff to manage landfill sites**	Appoint Landfill Manager, gate guard and litter picker at Prieska and a site supervisor/operator at Niekerkshoop and Marydale landfill sites	Employ Staff as Vacancies Develop					
		No Costs Assigned. To be Negotiated by the Municipality	**No Costs Assigned. To be Conducted by the Municipality**					
	Locally Train Low Level Staff	Train New Staff (High First Year Costs Followed by Updating Training if Required)						
		R 50 000	**R 10 000**	**R 10 800**	**R 11 664**	**R 12 597**	**R 13 604**	**R 14 693**
	Specialised Training for Specialised Posts	Ensure Training of Landfill Managers						
		No Costs Assigned. To be Conducted by the Municipality						
Financial Resources	**Implement Standardised Tariff Structure**	Evaluate Level of Service Delivery Develop Standardised Tariffs for Specific Levels of Service.	Update Tariffs as Service Levels Improve Increase Tariffs to Combat Inflation					
		No Costs Assigned. To be Conducted by the Municipality	**No Costs Assigned. To be Conducted by the Municipality**					

Focus Area	Recommendation	Actions						
		2008/2009	**2009/2010**	**2010/2011**	**2011/2012**	**2012/2013**	**2013/2014**	**2014/2015**
	Implement Pre-paid system	Inform Community regarding Implementation of System Implement Pre-Paid System		Upgrade System as Required				
		R 65 000	**R 40 000**	**No Costs Assigned. To be Conducted by the Municipality**				
Dissemination of Information / Communication	Develop WIS	Appoint Consultant to Develop WIS		Maintain and Update WIS as Situation Change in Municipality				
		No Costs Assigned. Generic WIS being designed by DEAT		**No Costs Assigned.**				
	Attend Workshops	Attend Quarterly Waste Management Workshops	Attend Quarterly Waste Management Workshops	Attend Quarterly Waste Management Workshops	Attend Quarterly Waste Management Workshops	Attend Quarterly Waste Management Workshops	Attend Quarterly Waste Management Workshops	Attend Quarterly Waste Management Workshops
		No Costs Assigned	**No Costs Assigned**	**No Costs Assigned**	**No Costs Assigned**	**No Costs Assigned**	**No Costs Assigned**	**No Costs Assigned**
	Build Community Awareness	Publish Newspaper Notices and Flyers. Conduct Road Shows	Publish Newspaper Notices and Flyers.	Publish Newspaper Notices and Flyers. Conduct Road Shows	Publish Newspaper Notices and Flyers.	Publish Newspaper Notices and Flyers. Conduct Road Shows	Publish Newspaper Notices and Flyers.	Publish Newspaper Notices and Flyers. Conduct Road Shows
		R 35 000	**R 12 000**	**R 38 000**	**R 14 000**	**R 40 000**	**R 16 000**	**R 42 000**
Management of Illegal Activities	**Establish Community Watch Programme**	Inform Communities of Proposed Program	Establish Community Watch System Implement Incentive Schemes		Incorporate New Neighbourhoods into the Community Watch System			
		R 20 000	**R 20 000**	**R 20 000**	**No Costs Assigned**			

Focus Area	Recommendation	Actions						
		2008/2009	**2009/2010**	**2010/2011**	**2011/2012**	**2012/2013**	**2013/2014**	**2014/2015**
	Amend By-Laws	Amend By-Laws	Update By-Laws as Required					
		No Costs Assigned	**No Costs Assigned**					
	Provide Skips Throughout Town	Purchase Skips for Existing Neighbourhoods	Purchase Skips for New Developments as the Need Arise					
		R 6 800 /skip						
Management of Illegal Activities	**Provide Recycling Containers Throughout Town**	Purchase Recycling Containers Locate Containers at Strategic Places Improve Community Awareness		Add Additional Containers to Service New Development Areas Continual Awareness Program				
		R 60 000	**R 40 000**	**No Costs Assigned**				
	Incentive Schemes for In-House Recycling	Develop Discount System for Businesses Implement Discount Strategy		Maintain and Evolve Discount System to Incorporate New Businesses				
		No Costs Assigned. To be Conducted by the Municipality		**No Costs Assigned. To be Conducted by the Municipality**				

SECTION 12:
FINANCIAL RESOURCES AND IMPLEMENTATION PRIORITIES

12 FINANCIAL RESOURCES & IMPLEMENTATION PRIORITIES

The Siyathemba Municipality has several financial resources options available to them for the implementation of the various recommendations. The first is resources form the Municipal budget. The majority of the Municipalities within the country however have a severe shortage of Municipal funds. A second option available is in the form of Municipal Infrastructure Grants (MIG) or the Special Municipal Infrastructure Fund (SMIF). The National Government is working on a three-year cycle and business plans have to be submitted for a specific project. The government then approves these projects and funds are made available through the District Municipalities. This MIG grant is from the National Government and is generally only applicable to the building of Infrastructure within a Municipal area, but waste equipment may be considered.

A third option is funding from the development bank and international development organisations, such as the Finnish Environmental Institute. Several International organisations are currently involved in Solid Waste Management and this therefore seems a very viable option.

The Equitable Share provided by the government is at the moment generally used for water and electricity subsidies. It should however be noted that this subsidy should also be used for subsidising refuse removal tariffs.

The implementation plan indicated in Section 11 represents the ideal or complete solution for waste management within the Siyathemba Municipality. Due tot the fact that the Siyathemba Municipality at the moment does not have the financial resources to implement all of the recommendations it is essential that the Municipality prioritise the recommendations and actions as well as identify the persons needed or responsible for the completion of these tasks.

The following is a breakdown of the tasks according to priority and responsibility.

Focus Area	Priority	Requirements/Responsibility
Infrastructure Development	Compile authorisation application (including EIA) for Niekerkshoop and Marydale, to be submitted to DEAT.	Municipality / Consultant
Infrastructure Development	Upgrade and Improve Management of Prieska, Marydale and Niekerkshoop Landfill Sites	Consultant / Municipality / Contractor

Human Resources	Employ Additional Personnel (landfill managers/operators)	Municipality
Waste Collection	Compile Fleet Replacement Plan and Implement Savings Plan	Consultant / Municipality
Waste Collection	Standardise Refuse Receptacles	Municipality
Human Resources	Train Staff	Municipality
Management of Illegal Activities	Compile Suitable By-laws	Legal Expert/Municipality
Community Awareness	Community Awareness and Community Watch	Municipality
Dissemination of Information	Develop and Maintain WIS	DEAT/Municipality
Waste Minimisation	Community Awareness	Waste Recyclers/Municipality
Waste Minimisation	Provide Recycling Containers	Municipality

The above list of priorities is based on the legal requirements faced by the Municipality as well as on strategies and plans already in place. The legal requirements that is not in place is considered to be of the utmost priority while measures recommended to streamline and convenience the waste management process are located further down the priority list.

SECTION 13: SUMMARY

13 SUMMARY

13.1 DISPOSAL INFRASTRUCTURE

The Siyathemba Municipality has three disposal sites to manage namely the Niekerkshoop, Prieska and Marydale sites. The Prieska site is permitted by DWAF and the Municipality needs to conform to the permit conditions for the operation of the site. The Marydale and Niekerkshoop landfill sites are not authorised in terms of Section 20 of the Environment Conservation Amendment Act and authorisation applications (which include an EIA) for the continued operation of these sites should be submitted to DEAT. The Prieska, Marydale and Niekerkshoop disposal sites should be upgraded and the operations at these sites be improved to comply with the Minimum Requirements for Waste Disposal by Landfill and/or the permit conditions for the sites (once authorisations have been issued to all the sites). The sites should be operated in accordance with the Operational Plans (which will have to be submitted as part of the Authorisation Application reports in the case of Marydale and Niekerkshoop). Since Prieska landfill is authorised by DWAF, the site should be operated in accordance with its permit conditions and the approved Operations Report. The Municipality should ensure that the operations at the disposal sites are done in accordance with sound waste disposal principles and that the sites be effectively managed in the future.

13.2 WASTE COLLECTION INFRASTRUCTURE

The Municipality currently does not have sufficient equipment for the delivery of an effective refuse removal service. The waste collection vehicles are old and in a poor condition. There is a need to plan for the future replacement of these vehicles. The compilation of a replacement plan as well as the implementation of a savings plan will assist the Municipality to plan ahead and budget for the vehicles.

13.3 INSTITUTIONAL CAPACITY AND HUMAN RESOURCES

The Siyathemba Municipality at the current moment has limited or no personnel at the landfill sites. Landfill managers/operators (one person at each disposal site) need to be appointed to ensure the proper management of the landfill sites. It is also essential that the municipal workers are properly trained for their specific tasks.

13.4 FINANCIAL RESOURCES

The current billing system does not seem to be effective. A pre-paid system should be investigated to be implemented where non-payment of fees is present.

13.5 DISSEMINATION OF INFORMATION / COMMUNICATION

A Waste Information System needs to be developed to ensure effective waste management. This information will also enable the Municipality to contribute to the quarterly waste management workshops with the other Municipalities in the District Municipality. The aim of these workshops will be to build capacity within them as well as guide Municipalities with less experience. The communities within the municipal area should also be made aware of proper waste management techniques and the service the Municipality renders.

13.6 MANAGEMENT OF ILLEGAL ACTIVITIES

The Municipality has a problem with illegal dumping within the municipal area. To improve the current situation, the Municipality can introduce a neighbourhood watch system that will aim to prevent illegal dumping within their specific area. The Municipality can also deploy skips at strategic locations across the towns to minimise illegal dumping.

13.7 WASTE MINIMISATION

The Siyathemba Municipality at the moment does not have any formal recycling activities. This can also be attributed to the lack of available market for the recycled materials. The distribution of recycle containers throughout town will further encourage recycling activities if proven feasible activities. The implementation of an incentive scheme for in-house waste minimisation for businesses should also be investigated.

SECTION 14: RECOMMENDATION AND CONCLUSION

14 RECOMMENDATIONS AND CONCLUSION

Apart form the recommendations in Section 10, the following recommendations are made:

A Waste Information System should be implemented for the whole district. The aim of this information system will be to provide all the necessary detail information pertaining to waste management i.e. permit status of landfills, volumes disposed of, condition of the landfills, number and type of equipment, date of purchase, operating and maintenance cost, replacement date, type of service, number of service points (domestic, commercial and industrial), the number of personnel involved, etc.

Decisions concerning new equipment or services can then be made based on accurate information provided by the above system. Some of the information in this document can serve as a basis for future development of such a Waste Information System. The above is regarded to be of the utmost importance to the district as well as the local municipalities.

This IWMP should be re-evaluated and expanded to a detail operational plan, once suitable information is available from the system as to ensure that future planning is done correctly:

- Service levels should be workshopped with the community to obtain their views and inputs on the proposed upgrading of their service and the cost implications involved.

- Community awareness campaigns should be implemented to educate the communities on responsible waste management i.e. why a landfill is fenced, why you dispose of your waste in waste receptacles, why waste is covered at a landfill, why illegal dumping is costly, etc.

- The municipalities should promote recycling and/or waste minimisation. The recyclers on site should be formalised to ensure that they co-operate with the landfill supervisors.

The above recommendations together with the recommendations in Section 10 should ensure that the short term waste management requirements in the region are met. Once the Waste Information System is implemented, this Plan should be re-evaluated and if need be adjusted. Long term planning can then be done in a more responsible manner. This will ensure that sound waste management is practised in the region.

APPENDIX A:
Permit for Prieska landfill

APPENDIX B:
Typical Procedure for Landfill Authorisation