



Draft Report

# Organic Waste Diversion Plan

Witzenberg Local Municipality

**Cape Winelands District Municipality**

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# 1 Introduction

## 1.1 Background

Zutari has been appointed by the Cape Winelands District Municipality (CWDM) in the Western Cape to assist with the developing an Organic Waste Diversion Plan (OWDP) on a District level as well for each of the Local Municipalities. This OWDP is compiled for the Witzenberg Local Municipality (WLM).

The CWDM comprises of the following municipalities:

- Drakenstein Local Municipality (DLM);
- Witzenberg Local Municipality (WLM);
- Stellenbosch Local Municipality (SLM);
- Breedevalley Local Municipality (BVLM); and
- Langeberg Local Municipality (LLM).

The Witzenberg Local Municipality comprises of the following main areas as per the municipal Integrated Waste Management Plan (IWMP):

- Ceres;
- Tulbagh;
- Wolseley;
- Prince Alfred Hamlet; and
- Op-die-Berg

This report is for the OWDP plan for the above mentioned local municipal areas and are being developed based on the principles and requirements of the National Waste Management Strategy (GN R. 56 of 28 January 2021) (NWMS) and the requirements of the Western Cape Department of Environmental Affairs and Development Planning (DEADP).

The NWMS has the concept of “circular economy” at its centre. Circular economy is an approach to minimising the environmental impact of economic activity by reusing and recycling processed materials to minimise: (a) the need to extract raw materials from the environment; and (b) the need to dispose of waste. The circular economy is built on innovation and the adoption of new approaches and techniques in product design, production, packaging and use. These principles need to apply to all waste streams including organic waste.

The NWMS is important in terms of facilitating the implementation of the National Environmental Management: Waste Act, Act 59 of 2008 (NEM:WA). NEM:WA aims to promote diversion of waste from landfill. Numerous regulations have followed to promote this, specifically the National Norms and Standards for Organic Waste Composting (R 561 of 25 June 2021).

The following requirements from the DEADP need to be fulfilled through the development of this OWDP:

- The OWDP’s timelines need to be under pressure for the municipalities to meet the 50% target for 2022.
- The department is concerned that data is not captured correctly or not reported correctly, especially with the interventions that are currently taking place in the LMs. The recording of all interventions for diversion will help show that 50% is being diverted.
- Private sector involvement and enforcing the by-laws on organic waste would make a big impact if reported on correctly.

Thus, the compilation of this OWDP has focused on these requirements for the WLM.

## 1.2 Objectives

The objective in the development of this OWDP is to meet the required legislative requirements of the DEADP's Provincial Organic Waste Strategy (March 2020) in line with "Addendum C: Developing an Organic Waste Diversion Plan" of the Strategy.

## 1.3 Scope of Works

This OWDP should provide the following as a minimum:

- Status Quo of organic waste sources and volumes disposed at the Municipal Waste Management Facilities (WMFs);
- Current diversion rates within the WLM;
- Annual targets to achieve 50% diversion rate by 2022 and 100% diversion rate by 2027; and
- Where required, diversion of organic waste from landfill to meet the licence conditions.

## 1.4 Organic Waste definitions

The Norms and Standards for Organic Waste Composting (GN 561 of 2021) provides the following definitions:

- **Organic waste:** means waste of biological origin which can be broken down, in a reasonable amount of time, into its base compounds by micro-organisms and other living things and/or by other forms of treatment.
- **Organics:** means both processed and unprocessed compostable organic waste.

For the purpose of this Plan, "*organic waste*" is regarded as waste which is produced by all waste generators served by municipal collection services for general municipal waste. The main categories of organic waste would include:

- **Food waste:** mix of cooked and raw leftovers after the preparation and consumption of human food originating from households/residential areas as well as from commercial activities, such as restaurants, canteens, bars, etc.
- **Greens or garden waste:** waste coming from maintaining private residential areas/gardens (households) as well as from Municipal public areas, such as parks, playgrounds, verges etc.
- **Industrial waste:** the mixture of different types of residues of raw vegetables/food waste and woody materials such as packaging. This can include organic waste streams from agro-industries, such as food and animal feed processing or the processing of agricultural products for other purposes.

## 1.5 Motivation for Organic Waste Diversion

The following are the overarching benefits of diverting organic waste from landfill:

- Reduced cost of landfill disposal.
- Landfill air space savings.
- Reduction in greenhouse gas emissions.
- Reduced possibility of environmental pollution from landfill management i.e., leachate generation and improved air quality impacts.

- Long term/future avoided costs and savings as a result of saved landfill airspace.
- Positive impact as a result of recovering a valuable resource (organics) and processing these to produce beneficial soil amendments (i.e., compost) or used for electricity generation (i.e., biogas).
- Practical application of a circular economy strategy to waste management which keeps organic materials in circulation at their highest value.

## 2 Review of legislation and by-laws

The following Legislative requirements and underlying principles will need to be considered when developing the strategy for organic waste management in WLM.

### 2.1 Legislative overview

Below is a summary of legislation applicable to the waste management in general which covers organic waste as well: compilation of the OWDS:

#### 2.1.1 Legislation applicable to waste management

- National Environmental Management: Waste Act (Act No. 59 of 2008) (NEMWA);
- The National Environmental Management Act (Act No. 107 of 1998);
- Environment Conservation Act (Act No. 73 of 1989);
- The National Environmental Management: Air Quality Act (Act No. 39 of 2004);
- Hazardous Substances Act (Act No. 5 of 1973);
- National Water Act (Act No. 36 of 1998);
- Municipal Systems Act (Act No. 32 of 2000);
- Municipal Finance Management Act (Act No. 56 of 2003)
- The South African Constitution (Act 108 of 1996);
- Health Act (Act 63 of 1977);
- Occupational Health and Safety Act (Act 85 of 1993);
- Municipal Structures Act (Act 117 of 1998);
- Mineral and Petroleum Resources Development Act (Act 28 of 2002); and
- National Treasury: GRAP 17 and 19 Compliance

#### 2.1.2 NEMWA regulations, norms and standards

- National Waste Information Regulations, R 625 (August 2012);
- National Waste Management Strategy (2020)(GN 56,28 January 2021),
- Waste Classification and Management Regulations R 634 (August 2013);
- National Norms and Standards for the Assessment of Waste for Landfill Disposal R 635 (August 2013);
- National Norms and Standards for Disposal of Waste to Landfill R 636 (August 2013);
- List of Waste Management Activities that have, or are likely to have a detrimental effect on the environment, R 921 (November 2013) (amended);
- National Norms and Standards for extraction, flaring for recovery of landfill gas, scrapping or recovery of motor vehicle, storage of waste R 924 - 926 (November 2013); and
- National Norms and Standards for the Remediation of Contaminated Land and Soil Quality R 331 (May 2014).

### 2.1.3 Other

- Minimum Requirements for Waste disposal by Landfill (DWAF 1998)

### 2.1.4 Legislation relevant to organic waste management

Legislation most relevant to the compilation of the OWDP for WLM is discussed below:

#### **National Organic Waste Composting Strategy (2013)**

The Final National Organic Waste Composting Strategy (NOWCS) Report was published by DEA (now DFFE) in 2013, with the aim to promote the diversion of organic waste from landfill through organic waste composting for soil beneficiation and other users through composting.

The NOWCS is based on five goals which seek to drive viable and sustainable change in response to legislation change, responsible waste handling and enhancing the use of organics in a circular system. The five goals and associated objectives are detailed in the NOWCS, including actions to be undertaken in order to realise each of these goals. Table 1 provides a summary of the five goals and associated objectives of the NOWCS.

**Table 1: Summary of NOWMS 2020 goals**

<b>Goals</b>	<b>Objectives</b>
<b>1. Review legal and regulatory requirements.</b>	The objectives of Goal 1 is to identify legislation and regulations that require modification in order to facilitate the legal registration of composting activities and facilities.
<b>2. Understand and facilitate feedstock sources and opportunities.</b>	Improving the monitoring of organic waste generation, disposal and treatment, as well as identifying both feedstock and product market opportunities
<b>3. Provide the necessary support structure and functions to implementing composting.</b>	The objective of Goal 3 is to consider necessary support structures and functions that would assist in the creation of opportunities, promoted and facilitated by legal enabling frameworks, and financial support and incentivization. Governmental synergies with the private sector and regionalization are also identified as necessary aspects requiring consideration.
<b>4. Undertake education, skills transfer and awareness.</b>	Enhancing public awareness and education campaigns and programmes regarding certain waste types is required in order to assist with not only separation at source, but diversion of organic waste from landfill, by means of potential home composting in urban/residential areas, as well as possible communal composting within the informal, lower-income areas.
<b>5. Incorporate composting into municipal planning, responsibilities and create roles for the private sector.</b>	This goal is about adapting the existing municipal structures to suit roles and responsibilities, including the use of IWMP's and Integrated Development Plans (IDP) and identification of private involvement, where necessary. Waste Management Officers will play a key role in planning and achieving the objectives of the NOWCS.

## **National Norms and Standards for Organic Waste Composting (GN 44762 of 2021)**

On 25 June 2021, the Ministry of Forestry, Fisheries and the Environment promulgated the National Norms and Standards for Organic Waste Composting under the NEMWA. An objective of the Norms and Standards is that organic waste composting will no longer require a waste management license under NEMWA.

The Norms and Standards seek to provide a national uniform approach relating to controlling the composting of organic waste at any facility that falls within the threshold, thereby ensuring that the best practice is always followed. The Norms and Standards are applicable to compostable organic waste and to organic composting facilities with the capacity to process in excess of 10 tonnes per day.

### **Provincial organic waste strategy**

Western Cape Government – DEADP released a Provincial Organic Waste Strategy in March 2020 which focusses on the following:

- Alignment with the principles of the waste hierarchy to address various aspects of organic waste
- Organic waste preventative strategies, making material available as a resource, develop the required infrastructure for recovery and to support the uptake and beneficiation of this resource
- Initiatives being implemented by the private sector and other agencies with a view of forming synergies with these entities working towards a fully integrated strategy
- Identification of possible policy instruments that can be applied by various organs of state to meet the 50% and 100% organic waste targets for 2022 and 2027 respectively.

## **2.2 Waste By-Laws**

### **2.2.1 Witzenberg Waste Management By-law**

Based on the IWMP, the Waste Collection by-laws were published in 2005, and make reference to the development of an 'integrated refuse management plan', the provision of waste management services, handling of recyclable waste, prohibitions in terms of waste management, handling different types of waste, and compliance and enforcement. According to the IWMP the WLM was updating the by-laws to aligned to the NEM:WA. Based on the WLM website, the updated bylaws have not been promulgated at the time of this report.

## 3 Status Quo of Waste Management

### 3.1 Background to Witzenberg Local Municipality

WLM is a local municipality located within the CWDM, in Western Cape Province of South Africa. WLM was established in December 2000 through the amalgamation of the former municipalities and towns of Ceres, Wolseley, Tulbagh, Prince Alfred Hamlet and Op-die-Berg. The locality is shown in

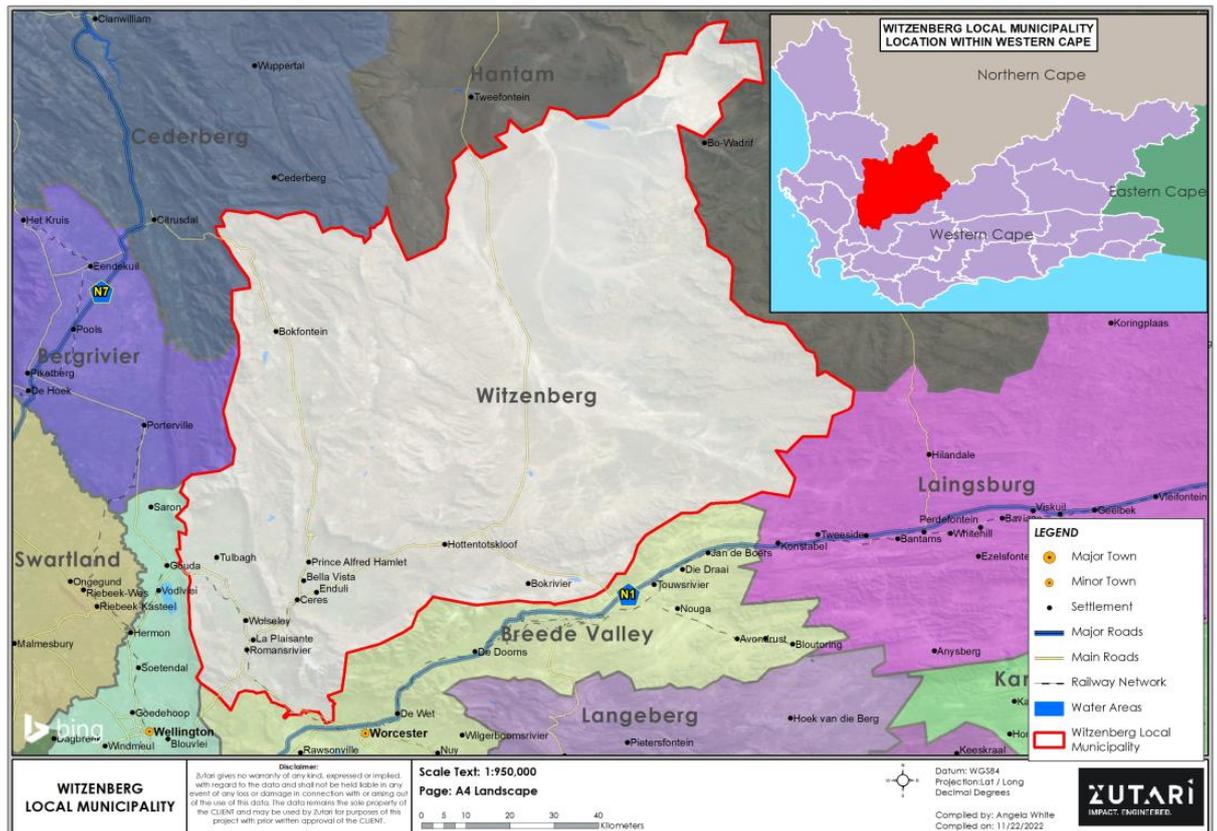


Figure 1.

WLM is the eastern neighbour of Drakenstein, Berg Rivier and Cederberg Municipalities. It is an area noted for its fruit farming. The Witzenberg area host many industries, but the agriculture and agriculture related industries are the mainstream. Tourism is also a fast-growing industry in Witzenberg.

The municipality covers a total area of approximately 10 753km<sup>2</sup> and is the largest municipality of five in the district, making up half of its geographical area. The region is surrounded by three mountain ranges: the Obiqua Mountains to the west, the Winterhoek Mountains to the north and the Witzenberg Range to the east. Rural areas within the municipal boundary are Warm Bokkeveld, Koue Bokkeveld, Agter-Witzenberg and the northern portion of Breede River Valley (Het Land van Waveren). The municipality is responsible for basic service provision to the demarcated municipal area that includes the towns of Ceres, Tulbagh, Prince Alfred Hamlet, Wolseley and Op-die-Berg.

The main economic sectors are Agriculture, forestry and fishing (29.1%), finance, insurance, real estate and business services (22%), manufacturing (16.2%), wholesale and retail trade, catering and accommodation (10%), general government (8.4%), transport, storage and communication (8%), community, social and personal services (3.5%)

(<https://municipalities.co.za/overview/1211/witzenberg-local-municipality>, October 2022).

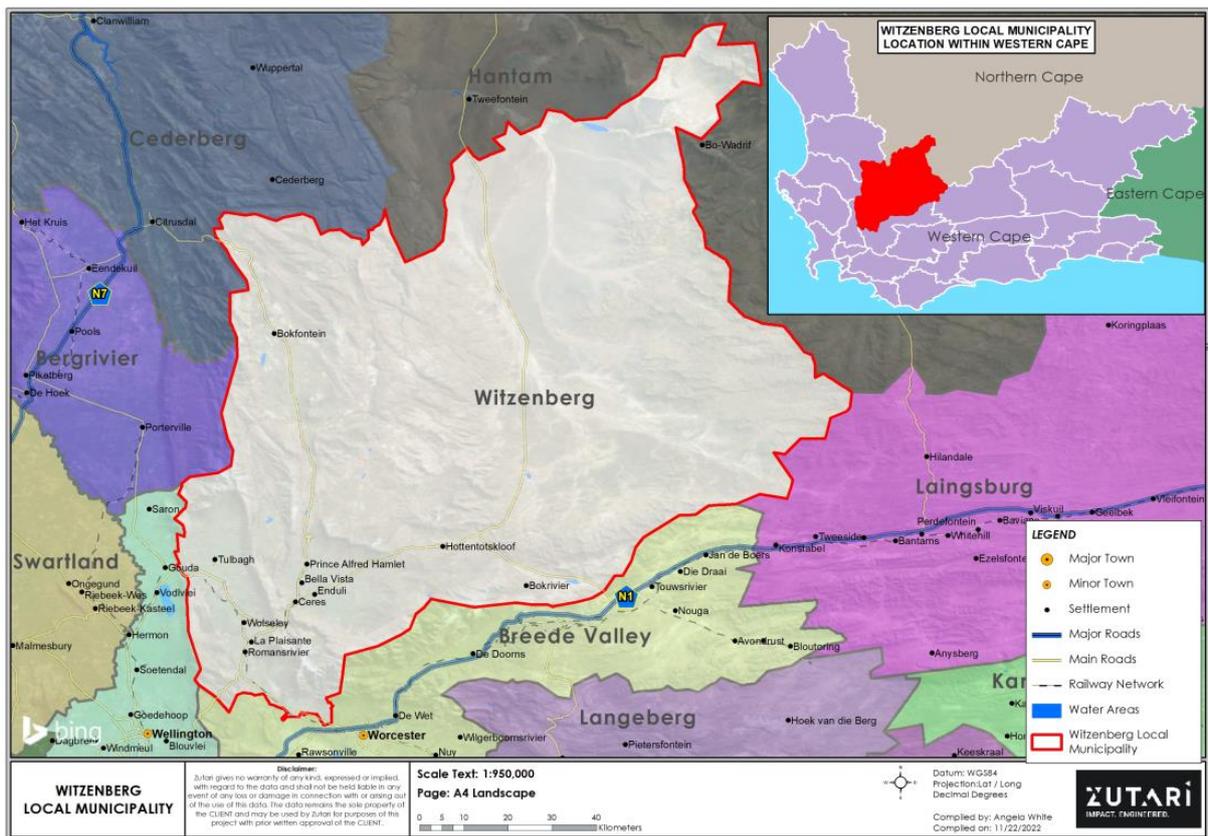


Figure 1: Cape Winelands District Municipality locality

### 3.2 Waste management facilities within the WLM

The municipality owns the following waste facilities (IWMP, 2021):

- Ceres landfill site (closed);
- Prince Alfred Hamlet landfill site (operational);
- Op-die-Berg landfill site (operational);
- Tulbagh landfill site (operational); and
- Wolseley landfill site (non-operational).

WLM currently has several waste management facilities accepting organic and other municipal solid waste. These are summarised in Table 2.

Table 2 Summary of waste management facilities

Waste Management Facility	Status	Waste accepted	Description
Prince Alfred Hamlet landfill site	Operational	<ul style="list-style-type: none"> <li>■ Garden waste</li> <li>■ General Waste</li> <li>■ Builders Rubble</li> </ul>	<ul style="list-style-type: none"> <li>■ WLM disposes garden waste, general waste, and builders rubble at the landfill site</li> <li>■ Green bags are provided, collected and then transported to landfill</li> <li>■ Plans to start on-site composting to sell to the farmers and community</li> <li>■ Will reach capacity in 2025.</li> </ul>

Waste Management Facility	Status	Waste accepted	Description
<b>Op-die-Berg landfill site</b>	Operational	<ul style="list-style-type: none"> <li>■ General waste</li> <li>■ Garden refuse</li> <li>■ Builder's rubble</li> </ul>	<ul style="list-style-type: none"> <li>■ Reached its capacity in 2022</li> <li>■ Daily compaction does not take place.</li> </ul>
<b>Tulbagh landfill site</b>	Non-Operational	<ul style="list-style-type: none"> <li>■ General waste</li> </ul>	<ul style="list-style-type: none"> <li>■ WLM is only allowed to dispose of waste on the current footprint up to 8m above National Ground Level.</li> <li>■ At the time of writing this report the site was not use due to legislative process due to DEADP</li> </ul>
<b>Wolseley landfill site</b>	Non-operational	<ul style="list-style-type: none"> <li>■ None</li> </ul>	<ul style="list-style-type: none"> <li>■ Has an operating licence but due to vandalism the site has been destroyed.</li> <li>■ Informal settlement blocking access roads and residing on the landfill.</li> </ul>

Some aerial photos of Prince Hamlet Landfill taken during the site visit conducted on 10 November 2022 are shown in Figure 2 to Figure 4.



**Figure 2 Aerial view of PA Hamlet Landfill**



Figure 3 Aerial view of PA Hamlet Landfill



Figure 4 Aerial view of PA Hamlet Landfill

## 4 Waste characterisation

A Waste Characterisation and Brand Audit study undertaken by WAAI in March/April 2019 identified the fact that the municipality could easily and economically divert 85% of total waste from the landfill site (IWMP, 2021). The study concluded that the way to achieve that objective was for the WLM to

adopt a Zero Waste system including waste separation-at-source, especially organic waste separation at-source.

Around 475 tonnes are disposed of per month at the Prince Alfred Hamlet garden waste site. (Source – Witzenberg Waste Characterization)

The organic waste constitutes the largest proportion (approximately 40%) of total waste stream generated at WLM.

The separation-at-source of organic waste would reduce cross-contamination and improve the rate, quality and quantity of recyclables that can be diverted from landfill. The waste audit indicated that Organic Waste constituted the largest proportion (37%) of total waste stream. Please note that the 37% excludes garden waste. If garden waste is included, the actual total organic waste would be 40% of the total waste stream as mentioned above.

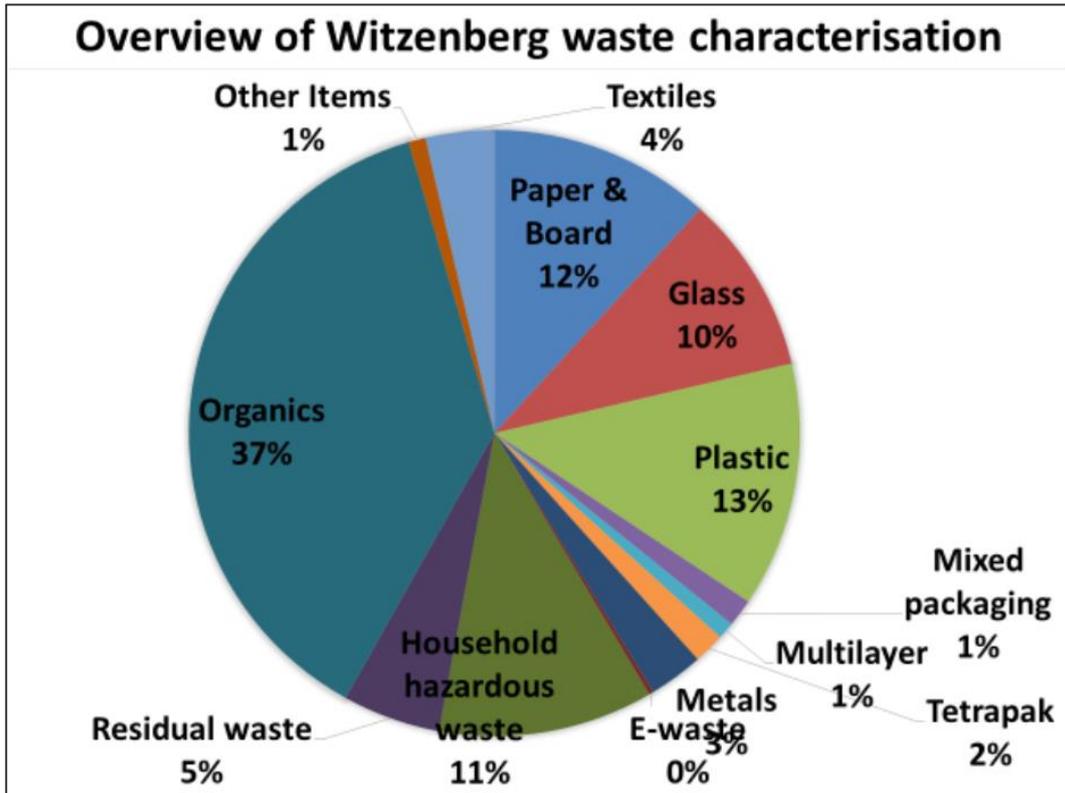
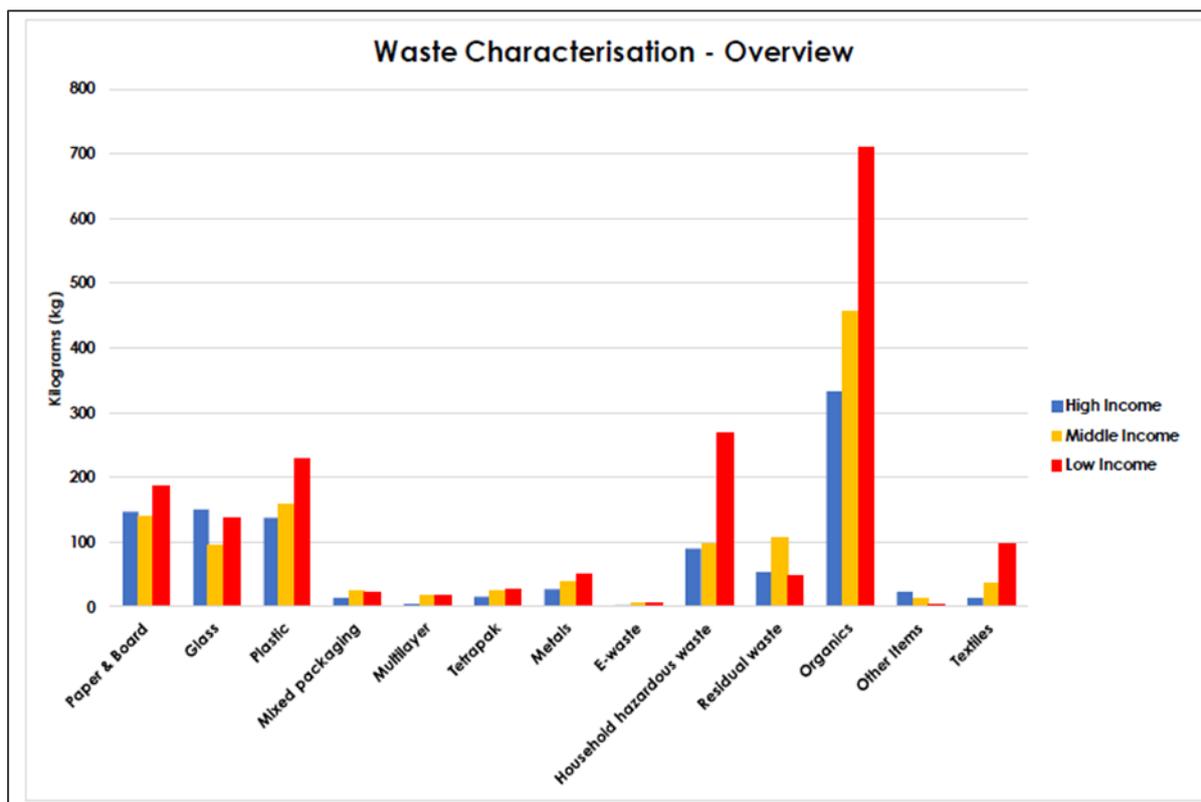


Figure 5: Waste Characterisation study results (IWMP, 2021)

The results from the waste characterisation study indicate that there is a significant portion of recyclables and organic waste within the WLM waste stream that can be diverted from landfills.

The graph below provides an overview of the character of the waste for the areas sampled in the High-, Middle- and Low-Income areas in the Main Categories.



Most notable in the graph is the high organic waste generated in the low-income household areas. The food-waste was observed to be mostly processed or prepared (as opposed to raw food waste). Most of the food-waste was left-over cooked food or fruit and vegetable peelings, and sometimes whole fruits and vegetables which were probably expired over-purchased products. It was very seldom that food in its original packaging was thrown away – if there was any, it was from the high-income samples.

## 5 Organic waste management

### 5.1 Background to organic waste management within the WLM

WLM does not currently divert any organic waste from its landfill and garden and food waste are taken to the PA Hamlet landfill site, except the pilot sites in Tulbagh where a 4-Bag- separate at source system is in used for the Zero Waste to Landfill Pilot Project that commenced in 2019.

All garden waste is taken to PA Hamlet landfill by means of a green bag collection system. Residents place garden waste in a green which is then collected together with domestic waste and transported to the PA Hamlet landfill where it is disposed of with other waste.

### 5.2 Current organic waste generation

The Integrated Waste Management Plan (IWMP) 2021 (compiled by Delta BEC) provides the following data on organic waste.

**Table 3: Waste generation and diversion figures as per the IWMP**

Year	Municipal			Commercial & Industrial			Organics		
	Generated	Diverted	%	Generated	Diverted	%	Generated	Diverted	%
2018	5316	0	0	2411	2391	99	4246	0	0

<b>2019</b>	8540	2453	29	0	0	0		0	0
<b>2020 (Jan-July)</b>	5588	1102	20	0	0	0		0	0

From the above table the estimated percentage (%) of organics were calculated as shown in the Table 4 below.

**Table 4: Percentage organics in the waste stream**

Year	Total	Ave/month	Organics	Ave/month	% Organics
<b>2018</b>	7727	644	4246	354	55%
<b>2019</b>	8540	712	3054	255	36%
<b>Jan 2020 - July 2020</b>	5588	798	1778	254	32%

The figure for 2022 were obtained from the WLM and are summarised in the table below.

**Table 5: Organics/greens to landfill (2022)**

Landfill							
Month	PA Hamlet		Op die Berg		Total (tonnes)	Total organics (tonnes)	% Organics
	Organic (tonnes)	General (tonnes)	Organic (tonnes)	General (tonnes)			
<b>January</b>	293,1		51,2	325,9	670,2	344,3	51%
<b>February</b>	318,4		155,7	768,7	1242,7	474,0	38%
<b>March</b>	334,2		155,1	764,2	1253,5	489,3	39%
<b>April</b>	344,3		77,7	321,2	743,2	421,97	57%
<b>May</b>	311,4		53,5	327,2	692,1	364,9	53%
<b>June</b>	298,1		4,6	291,4	594,1	302,7	51%
<b>July</b>	285,8			312,2	598,0	285,8	48%
<b>August</b>	275			384,8	659,8	275,0	42%
<b>September</b>	305,9			389,7	695,6	305,9	44%
<b>October</b>	293,7		118,5	659,4	1071,5	412,19	38%
<b>Total</b>	<b>3059,7</b>	<b>0</b>	<b>616,3</b>	<b>4544,67</b>	<b>8220,6</b>	<b>3675,9</b>	<b>45%</b>
<b>Ave/month</b>	<b>306,0</b>		<b>61,6</b>	<b>454,467</b>	<b>822,1</b>	<b>367,6</b>	<b>45%</b>

From the above it can be concluded that approximately 45% or 366 tonnes of the current waste stream going to the two landfills consist of greens /garden waste.

Other organic waste streams identified in the WLM are the following:

- **Agricultural waste:** In the WLM, the agricultural waste from farms is reportedly either used as animal feedstock, for home composting or it is taken to the nearest landfill site (IWMP, 2021).
- **Sewage sludge:** Sewage sludge is a key hazardous waste type generated from wastewater treatment works (WWTW) plants. The table below provides the mass of the sludges generated at the WWTW plants in the WLM as well as the current disposal method (IWMP, 2021).

**Table 6: WWTW waste sludge generation**

WWTW Name	Effluent sources	Sludge mass (t/m) 2019	Disposal/ current applications
<b>Ceres</b>	Residential and Industrial	70.1	Disposal to landfill site
<b>Wolseley</b>	Residential	8.1	Disposal in sludge dams
<b>Tulbagh</b>	Residential	T1= 2.2 T2= 4.5	Disposal to landfill site
<b>ODB</b>	Residential	1.1	Disposal to landfill site

THE WLM has developed their own Draft OWDP compiled by Messrs Johnny Jacobs and Joseph Barnard from WLM and Juandrey Saunders from DFFE.

Based on the waste characterisation mentioned in the report, organic waste is largest waste fraction for the three demographics sampled. Mixed food waste, mostly cooked or processed foods is by far the largest waste component based on the graphs in the report with garden waste one of the other prominent waste types base on the characterisation done. The report is included as Appendix A to this report.

Based on the waste craterisation done by the WLM it would appear that the organic fraction is approximately 40% - 50% of the total waste stream without considering garden waste. Note that only the graphs were shown in the reports and that the estimates are based on a visual assessment of the graphs. It can therefore be assumed that the total organic waste fraction of the waste stream is approximately 65% -75% of the total waste stream. These figures can be refined based on the actual figures of the waste characterisation done.

■ **Abattoir waste**

There are no abattoirs in the WLM.

## 6 Gap Analysis

The table below provides a Gap analysis of Organic waste Management/ Practices/ Requirements within WLM that require further investigation.

**Table 7: Gap analysis**

Item no.	Objective / Target	Current state	Gaps	Actions required to address Gaps
1.	Legislative compliance i.t.o. National Waste Management Strategy, GNR 636, NNS for Organic Waste composting as a minimum requirement	Although pilot projects are being implemented for separation at source, all collected organic waste ends up at the landfill sites.	<ul style="list-style-type: none"> <li>■ Pilot separation at source projects are not being converted into practical manageable collection systems.</li> <li>■ Insufficient green waste disposal facilities for the public available within WLM</li> </ul>	<p>Pilot projects should be evaluated and if feasible, be converted to manageable collections systems.</p> <p>Establish green waste disposal facilities and identify private sector facilities that could be utilised.</p>
2.	Implement By-Laws regarding management of organic waste. Implement system whereby organic waste can be separated at source	The Integrated Waste Management By-Laws is not aligned to the current national and provincial legislation and priorities.	During the compilation of the of waste management related by-laws, the aspects addressed in the NWS as well as the provincial model by law, needs to be adapted.	Finalise updating the waste bylaw in terms of priorities and initiate legislative process.
3.	Inadequate information regarding organic and garden waste generators, quantities generated and current methods of treatment/disposal	Garden waste is disposed of at the PA Hamlet and Op-die-berg landfills where records are kept of loads entering the facilities. The waste data and quantities are submitted for the landfill and the waste calculator used as there are no weighbridges. No data is kept of private generators such as restaurants', fruit industry, hotels etc.	Limited record of garden waste disposal at landfills. No records of organic waste generators such as agriculture, abattoirs, hospitality industry etc.	<ul style="list-style-type: none"> <li>■ Registering of waste generators and transporters in the municipality. This will improve data capturing at waste sites. Moreover, it will enable a clearer indication of the amount of diversion that can take. place in WLM.</li> <li>■ It will enable the municipality to evaluate organic waste management system requirements in greater detail.</li> </ul>

Item no.	Objective / Target	Current state	Gaps	Actions required to address Gaps
4.	Organic waste stream prevention strategies	No formal organic waste stream prevention strategies.	The need for formal organic waste stream prevention strategies as they will favour and encourage separation at source, identifies a treatment option and creates an enabling environment.	<p>Prevention strategies for organic waste stream should be put in place such as the following:</p> <ul style="list-style-type: none"> <li>■ Separation at source strategy.</li> <li>■ Proper collection plan.</li> <li>■ Training, Education and Awareness Campaign.</li> </ul>
5.	Implement a phased approach to manage, process, treat and reduce organic waste to landfill considering the provincial targets	There is no organic waste management system in place in WLM.	The need for a phased approach is required which is aligned with provincial targets.	<ul style="list-style-type: none"> <li>■ WLM must pursue a multi-pronged approach to organic waste diversion that will manage, treat, and reduce organic waste to landfill.</li> <li>■ The recommended phased approach may include the following: <ul style="list-style-type: none"> <li>■ Separation at source roll out for a phased 2-bag separation at source programme.</li> <li>■ Implementation and encouraging incentives for separation of garden waste along with enforcement of the amended by-law as a last resort.</li> </ul> </li> <li>■ Treatment of Organic Waste</li> <li>■ Improvement of waste data capturing and reporting.</li> <li>■ Training, Education and Awareness Campaign focused on Separation at Source and organic waste.</li> <li>■ Monitoring and Measuring</li> </ul>

Item no.	Objective / Target	Current state	Gaps	Actions required to address Gaps
6.	Adequate budgets for human resources	<ul style="list-style-type: none"> <li>▪ Insufficient budget for upcoming waste management projects.</li> <li>▪ Vacancies in the Solid Waste and Landfill Management staff structure.</li> </ul>	<p>There is a need to explore funding mechanism as there are many proposed projects that cannot be funded only by the Waste and Landfill Management Department.</p> <p>Vacancies in the Solid Waste and Landfill Management staff structure.</p>	<ul style="list-style-type: none"> <li>▪ WLM must ensure that there is sufficient provision in the capital and operational budget for upcoming waste management projects.</li> <li>▪ Review staff structure and requirements to fill vacant positions with suitable qualified and experienced staff.</li> </ul>
7.	Infrastructure to divert organics such as composting facilities	Transfer stations equipped to recover and separate waste	Insufficient infrastructure	Plan for infrastructure to divert organics such as a composting facility at PA Hamlet landfill site
8.	Communicating strategies to the various communities whilst respecting the diversity and uniqueness of each community	No communication since there is no strategy – to be updated	No communication since there is no strategy – to be updated	<ul style="list-style-type: none"> <li>▪ Finalise first version of this plan and update accordingly.</li> <li>▪ Development of a communication strategy which includes engagement and awareness with generators is required to be developed</li> </ul>

## 7 Options available for beneficiation of organic waste

Once the existing options have been identified additional options will be assessed to determine the viability for the Municipality. These options are discussed in Table 8 below.

**Table 8: Implementation plan**

Municipal Options	Requirements – Infrastructure / Actions	Possible constraints	Possibility of implementing	Mode of implementation	Budget required	Actions required	Implementation timeframe Short: 1-2 years Medium: 2-5 years Long term: 5 – 10 years
<b>Separation of Organics</b>							
<ul style="list-style-type: none"> <li><b>Separation at source - Residential</b></li> </ul>	Wet & Dry separation	Budget - cost of bags Public commitment	Limited due to human nature				
<ul style="list-style-type: none"> <li><b>Separation at source - Commercial</b></li> </ul>	Wet & Dry separation	Participation of commercial entities	Good	Through By-laws and incentives such as discount on rates depending on participation  Additional vehicle to service commercial	None		
<ul style="list-style-type: none"> <li><b>Mechanical biological separation</b></li> </ul>	Decanter to separate solid and liquid waste	Budget and location Need back-up equipment for failures	Possible		R5.5 mil	Investigate the feasibility of this option	
<b>Public drop-off facility</b>	Public garden waste disposal facilities	Legislative and budget constraints	Possible	Basic assessment, design, construction	TBD	Facility constructed at Wolseley. Tender process for Tulbagh, Bella-Vista & PAH under way.	Medium to long term
<b>Separate garden waste from general waste at landfill</b>	Dedicated area on landfill for disposal of garden waste	Limited airspace	Good	Adequate landfill personnel to ensure separate disposal	Additional personnel TBD	Budget for additional personnel	Short term
<b>Shredding/Chipping of Garden Waste</b>	Personnel and appropriate equipment	Budget	Good		R1,5 mil	Budget for additional personnel and equipment	Medium
<ul style="list-style-type: none"> <li><b>Own use</b></li> </ul>	None	None					
<ul style="list-style-type: none"> <li><b>Sell off to users</b></li> </ul>	Advertise the chipped garden waste	Municipal financial management	Good	Adequate planning by Municipality	None	Adequate planning by Municipality	Medium
<b>Composting</b>							
<ul style="list-style-type: none"> <li><b>Municipality on landfill</b></li> </ul>	Dedicated area on landfill for disposal of garden waste and organics. Area to be adequate space required for compost windrows	Appropriate personnel and equipment Possible legislative requirements	Limited				
<ul style="list-style-type: none"> <li><b>Municipality on alternative land</b></li> </ul>	Suitable land, licensing and operational requirements	Legislative and budget constraints	Limited				
<ul style="list-style-type: none"> <li><b>External Composting</b></li> </ul>	Composting company within the municipal area, Lumbri is mentioned in the draft WLM OWDP.	Procurement / competitive bidding	Possible	Engage with private company  Offset airspace saving to cost of paying someone to compost	None	Engagement from municipality with private company	Medium

<ul style="list-style-type: none"> <li><b>Home composting</b></li> </ul>	Provide households with equipment (such as composting bins) and/or knowledge on composting techniques	Budget Lack of public commitment	Limited	Public awareness and training	R 200 000p/a	Development of a communication strategy which includes engagement and awareness with generators should be developed and implemented	
<b>Bio digestion</b>							
<ul style="list-style-type: none"> <li><b>Internal</b></li> </ul>	Biodigester	Legislative and budget constraints	Limited				
<ul style="list-style-type: none"> <li><b>External</b></li> </ul>	Separation of organics and garden waste  Bio 2 watt has equipment that can be placed at landfill to separate organics	Procurement / competitive bidding	Good	Engagement with companies doing bio digestion	Depending on procurement process	Engagement with companies doing bio digestion	Medium

## 7.1 Summary of infrastructure requirements to meet targets

At this stage the WLM seems to favour separation at source as the preferred alternative to deal with various waste fractions. Although the pilot 4-Bag- separate at source system seems to be working it is recommended that this be reconsidered due to cost requirements (4 bags / household) as well as the overall participation from communities. Separating waste into four waste streams may prove to be cumbersome. It is suggested that a two-bag system be investigated with the separation of wet and dry waste. This system will also not be effective in all communities.

A number of areas already separate greens waste into green bag which is currently taken to the landfill for disposal. Areas should be identified on to landfill where green can be disposed of separately from the other waste streams for processing.

The municipality should engage with Lumbri on a possible way forward regarding composting of the waste on-site or off-site and if composting offsite is proposed, the cost implication of logistics to get garden waste to a specific premises should be calculated to determine the feasibility.

Bio2watt (private company) should be engaged to determine the feasibility of separating the organic fraction from the collected waste stream for processing in biodigesters.

## 7.2 Summary of budgetary requirements

The WLM needs to agree on a feasible way forward regarding the separation of organic from the waste streams as well as the processing of greens and other organics.

At this stage the budget requirements cannot be estimated until discussion have been held with the composting and organic processing companies and the logistics has been finalised regarding collection, pre-processing and processing of organic and greens waste streams.

The above will also have to be discussed and agreed with the communities through a proper communication strategy.

## 7.3 Implementation Plan

The detailed implementation plan will be updated once the feasibility regarding the various methods of collection, pre-processing and processing has been finalised and agreed upon.

## 7.4 Communication plan

A communication strategy should be developed to discuss the possible implementation scenarios with the various communities, once the feasibilities have been determined.

The establishment of a Monitoring Committee should be developed with members of the municipality to monitor and manage the progress of the OWDP. The committee should meet annually to establish compliance to the OWDP, progress to meet the national targets, verify calculations and reporting to the Department and IPWIS through an established monitoring and evaluation system to monitor progress. Annual reports must be sent to the Department, accompanied by graphic representations of percentages diverted.

## 8 Conclusion

The draft OWDP as compiled by the WLM needs to be replaced by this plan which incorporates most of the aspects from the draft OWDP. This plan should be upgraded to reflect the various suggested feasibilities and communication strategies required to formalise this plan. Once the go forward options have been decided on, the potential diversion rates can be determined.

# Appendix A: Draft OWDP compiled by the WLM

# WITZENBERG MUNICIPALITY



**DRAFT**

## **ORGANIC WASTE DIVERSION PLAN**

**COMPILED BY:**

**JOHNNY JACOBS**

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**JUANDREY SAUNDERS (DEFF)**

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## **1. INTRODUCTION**

### **1.1 GENERAL DESCRIPTION**

Witzenberg Municipality is the eastern neighbour of Drakenstein, Berg Rivier and Cederberg Municipalities. It is an area noted for its fruit farming. The Witzenberg area host many industries, but the agriculture and agriculture related industries are the main stream. Tourism is also a fast growing industry in Witzenberg.

The Witzenberg Municipality was established in December 2000 through the amalgamation of the former municipalities and towns of Ceres, Wolseley, Tulbagh, Prince Alfred Hamlet and Op-die-Berg.

### **1.2 POPULATION STATUS QUO AND WASTE DISPOSAL FACILITIES.**

The 2011 census has indicated that Witzenberg Municipality is home to some 115,950 residents of which approximately 46% are non-urban residents. The main towns are Ceres (pop. 38169), Tulbagh (pop. 10304), Wolseley (pop. 13932), Prince Alfred Hamlet (pop. 7450) and Op-die-Berg (pop. 1757). These figures mentioned might increase due to socio-economic constrains.

Witzenberg Municipality has operating licences for four landfills, but one of these sites has been completely vandalised and is currently not operational. Another had reached capacity and was rehabilitated.

The community of Op-die-Berg located in the Koue- Bokkeveld has its own communal landfill where trenching is used as operational method. The remainder of Witzenberg's Municipal Solid Waste is disposed at the Tulbagh landfill and ODB landfill where area filling is practised and garden waste is disposed at the Prince Alfred Hamlet site.

None of these sites is equipped with a weighbridge, but data is submitted monthly by the Municipality to the provincial Integrated Pollution and Waste Information System (IPWIS).

## **2. STATUS QUO OF WASTE STREAMLINES IN WITZENBERG**

Our main waste streamline is domestic/households waste which contains a large percentage of organic which includes food waste. Organic waste is a problem in landfills as it takes up airspace on landfills, produces methane gas and leachate which contaminate the ground of the landfill. Containment barriers for the contamination caused can be a financial strain for municipalities that are struggling financially. Our garden waste also contributes to organic waste which increases the percentage of our organics.

Presently, Witzenberg Municipality does not have a procedure in place for the diversion of organic waste and that is the reason for compiling and implementing an organic diversion plan for our municipality. A successful implementation of the Witzenberg Organic Diversion Plan will call for local residents within the Witzenberg Municipal boundaries to be aware and concerned that waste issues is an essential component for creating a healthy environment where they can benefit from it. They should be empowered to play their specific role in the development and implementation of the waste management initiatives. Witzenberg Municipality also wants to comply with the targets set by the Western Cape Department of Environmental Affairs and Development Planning (*DEA:DP*) to ban the organic waste to the landfill with 50% by 2022 and 100% organic waste ban from landfills by 2027.

## **3. LEGISLATIVE FRAMEWORK**

The development of the National Waste Management Strategy (NWMS) in 2011 was a great tool in aiding the implementation of National Environmental Management: Waste Act No. 59 of 2008 (NEMWA: 2008). In 2003 the Department of Environment, Forestry and Fisheries has developed a National Organic Waste Composting Strategy to aid the diversion of organic waste from landfills through composting due to airspace at landfill sites is big concern in South-Africa. More can still be done in the field of organic waste diversion.

According to The National Norms and Standards for Organics Waste Composting draft of 2019 “the diversion of organic waste from landfill promotes the achievement of comprehensive and sustainable management of environmental resources and contributes to upholding of the constitutional right of all South Africans to an environment that is not harmful to human health or well-being. Although the norms

and standards for composting is not finalized yet, composting facilities only need to comply with the requirements of these norms and standards if they have the capacity to process organic waste, in excess of 10 tonnes per day.

### **NEM: WA National Norms and Standards for Organic Waste Composting**

These norms and standards apply to organic waste composting facilities that have the capacity to process more than 10 tonnes of compostable organic waste per day. These facilities are required to comply with the norms and standards without a need for a waste management licence as required by the NEM: WA.

### **The Constitution of the Republic of South Africa, Act 108 of 1996**

Chapter 2, the Bill of Rights, Section 24 states: “Everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures that prevent pollution and ecological degradation promote conservation; and secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development”

### **National Environmental Management Act 107 of 1998**

S 2. National Environmental Management Principles are provided 4 (iv) that waste should be avoided or, where it cannot be avoided altogether, should be minimised, reused or recycled wherever possible. 28. Duty of care and remediation of environmental damage states: (1) Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. Municipalities and all generators of organic waste are obligated to minimise this waste type. They are also obligated to rectify any environmental damage caused by poor organic waste management practices in S28.

## **The National Environmental Management: Waste Act, No. 59 of 2008 (NEM: WA) and the National Environmental Management: Waste Amendment Act 26 of 2014**

Both these Acts stipulate controls for the management and recording of waste, including the issuing of licences.

11 (4) (a) each municipality must submit its integrated waste management plan to the MEC for endorsement. This clause compels any holders of waste to minimize and compels large generators of waste e.g. municipalities to implement waste minimization methods to reduce waste to landfill. These Acts obligate municipalities to develop waste management plans inclusive of plans to divert organics.

## **The National Waste Management Strategy (DEA, 2011) and Draft National Waste Management Strategy (DEA, 2019)**

The National Waste Management Strategy places the responsibility (role) on the Municipality (with National and Provincial support in certain cases) to educate, provide vessels (bins), collect, process and dispose (composting facility) of organic waste. Municipalities must make provision in their IWMP or waste management strategy to manage green waste when generated in large quantities. Target to minimise waste to landfill by 25% by 2016. Potential measures to reduce waste with Goal 1 being the most relevant to the reduction and diversion of food waste from landfill through promoting the minimisation, reuse, recycling and recovery of waste. The DEA is currently revising the 2011 NWMS. The Draft 2018 NWMS has three strategic goals to drive an improvement in waste management in South Africa: 1. Waste minimisation; 2. Effective and sustainable waste services; and 3. Awareness and compliance. The draft NWMS (DEA, 2019) encourages the diversion of organic waste from landfill through composting and the recovery of energy as well as increasing technical capacity and innovation for the beneficiation of waste by means of strategic goal 1.

## **the National Waste Information Regulations (13 August 2012, GNR 625, 2012)**

Section 5 (1) & (2) deals with the registration of people on the South African Waste Information System ("SAWIS") Section 8 deals with the reporting or submission of information. Annexure 1: List of persons conducting the following activities must register on the SAWI/IPWIS in terms of regulation 5: Recovery or recycling of waste (b), (c) (e) Treatment of waste (g)

Annexure 2: Reporting requirements in terms of regulation 8 (1)

Annexure 3: General Waste types for reporting to the SAWIS, requires the reporting of garden waste as follows:

Level 1 General Waste types (GW)

Level 2 Major Waste Type: Organic GW20

Level 3 Specific Waste type: Garden Waste (01)

Garden Waste must be reported under GW2001

The National regulations require the registration and reporting of organic waste and garden waste to SAWIS.

### **The National Organic Waste Composting Strategy: Final Strategy Report April 2013**

This strategy assists in providing a direction and clear, structured planning towards a common goal viz. to ensure (where viable) that organic waste generated within South Africa is diverted from landfill sites. Goal 5 in the strategy aims to incorporate composting into municipal planning, responsibilities and create roles for the private sector.

### **The Municipal Systems Act (Act 32 of 2000)**

This policy outlines the role and responsibilities of local governments as to:

- Provide democratic and **accountable** government for local communities;
- Ensure the provision of services to communities in a **sustainable** manner;
- Promote **social** and economic development;
- Promote a safe and healthy **environment**;
- Encourage the **involvement** of communities and community organisations in the matters of local government, and
- Strive, within its financial and administrative capacity, to achieve the objectives above.

These responsibilities indicate a need for an environmentally educated work force (accountable) as well as an environmentally educated public (involvement).

DRAFT

#### 4. STATUS QUO OF ORGANIC WASTE

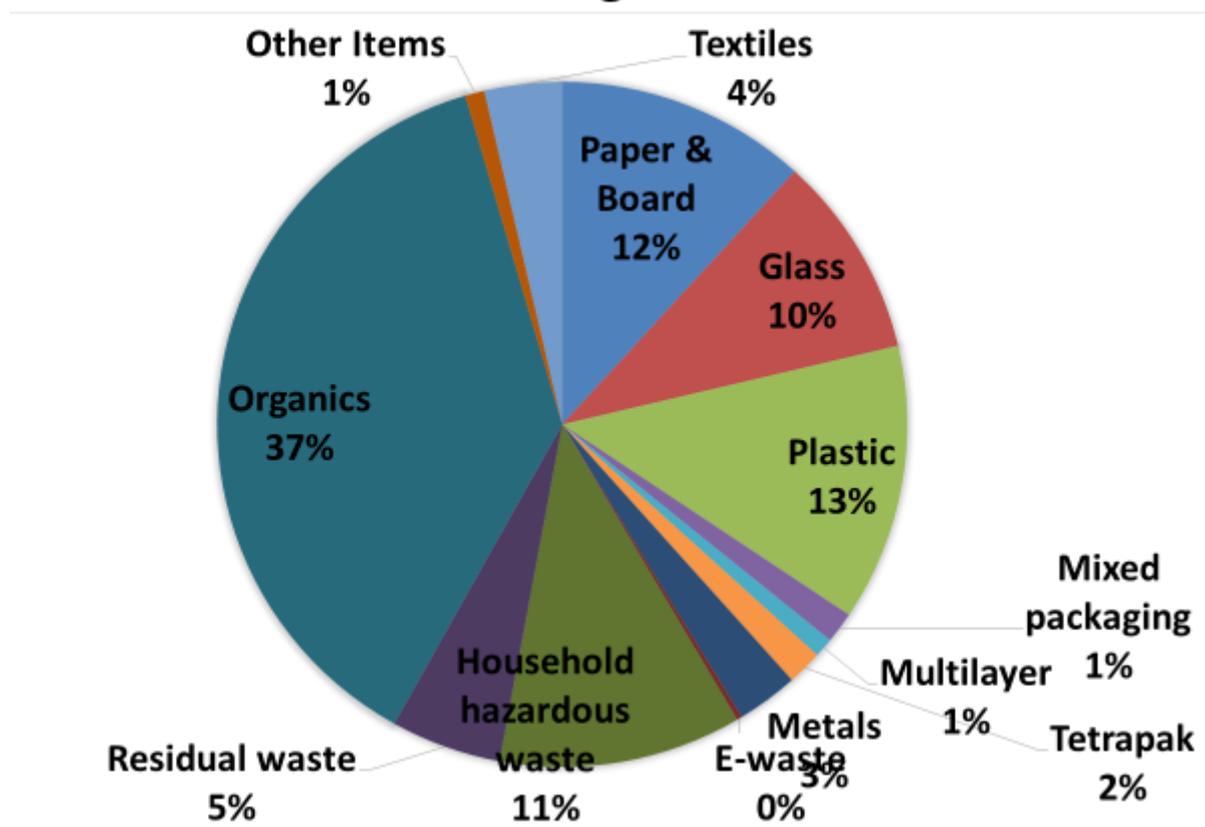
A Waste Characterisation and Brand Audit study undertaken by WAAI in March/April 2019 identified the fact that the municipality could easily and economically divert 85% of total waste from the landfill site. The study concluded that the way to achieve that objective was for the Witzenberg Municipality to adopt a Zero Waste system including waste separation-at-source, especially organic waste separation at-source.

Around 475 tonnes are disposed of per month at the Prince Alfred Hamlet garden waste site. (Source – Witzenberg Waste Characterization)

The organic waste constitutes the largest proportion (approximately 40%) of total waste generated at Witzenberg Municipality.

The separation-at-source of organic waste would reduce cross-contamination and improve the rate, quality and quantity of recyclables that can be diverted from landfill. The waste audit indicated that Organic Waste constituted the largest proportion (37%) of total waste. Please note that the 37% excludes garden waste. If garden waste is included, the actual total organic waste would be 40% of total waste.

#### Overview of Witzenberg waste characterisation



#### 4.1 WASTE CHARACTERISATION DATA AND ANALYSIS

The total waste sampled compared to the predetermined estimated sample size is as follows:

CLUSTER	AREA	SAMPLES REQUIRED (BAGS)	SAMPLE OBTAINED BAGS	TOTAL WEIGHT (KG)	AVERAGE WEIGHT PER BAG (KG)
1	NDULI	100	95	514.2	5.41
	CERES	200	182	828.65	4.55
2	BELLA VISTA	180	181	814.4	4.5
	PA HAMLET	100	100	416.8	4.17
	OP DIE BERG	20	<b>INCLUDED WITH PA HAMLET</b>		
3	TULBAGH	150	176	688.4	3.91
	WOLSELEY	200	202	841	4.16
<b>TOTAL WASTE SAMPLED (KG)</b>				<b>4103.09</b>	

#### 4.1.1 CATEGORIES OF WASTE

A total of 4103.09 kilograms of waste was characterised into the following categories:

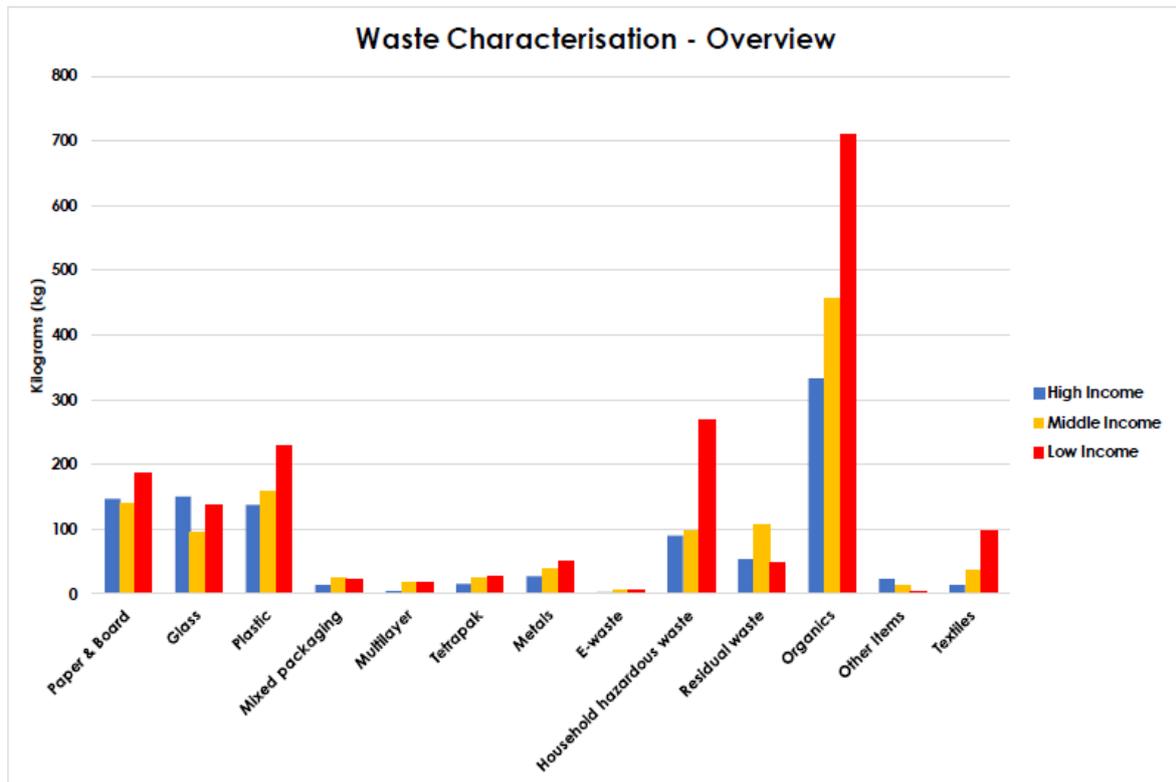
MAIN CATEGORIES	SUB CATEGORIES
PAPER & CARDBOARD	CARDBOARD
	MAGAZINE
	WHITE PAPER
	OTHER
GLASS	GLASS
PLASTIC	PLASTIC
	PE (1)
	HDPE (2)
	PVC (3)
	LDPE (4)
	PP (5)
	PS (6)
	OTHER (7)
MIX PACKAGING	MIXED PACKAGING
MULTI LAYER	SNACKPACKS
TETRAPAK	TETRAPACKS
METALS	ALUMINIUM AND STEEL
E-WASTE	E WASTE
HOUSEHOLD HAZARDOUS WASTE	PHARMACEUTICALS

	FLUORESCENT BULBS
	NAPPIES/SANITARY PRODUCTS
	GARAGE WASTE
	BATTERIES
RESIDUAL WASTE	REMAINDING WASTE FRACTION
ORGANICS	MEAT
	MIXED FOOD
	FRUIT & VEG
	DAIRY
	STARCHES
	LIQUIDS
	GARDEN WASTE
OTHER ITEMS	OTHER ITEMS
TEXTILES	CLOTHING AND SHOES

#### 4.1.2 CATEGORY OF WASTE PER AREA SAMPLED

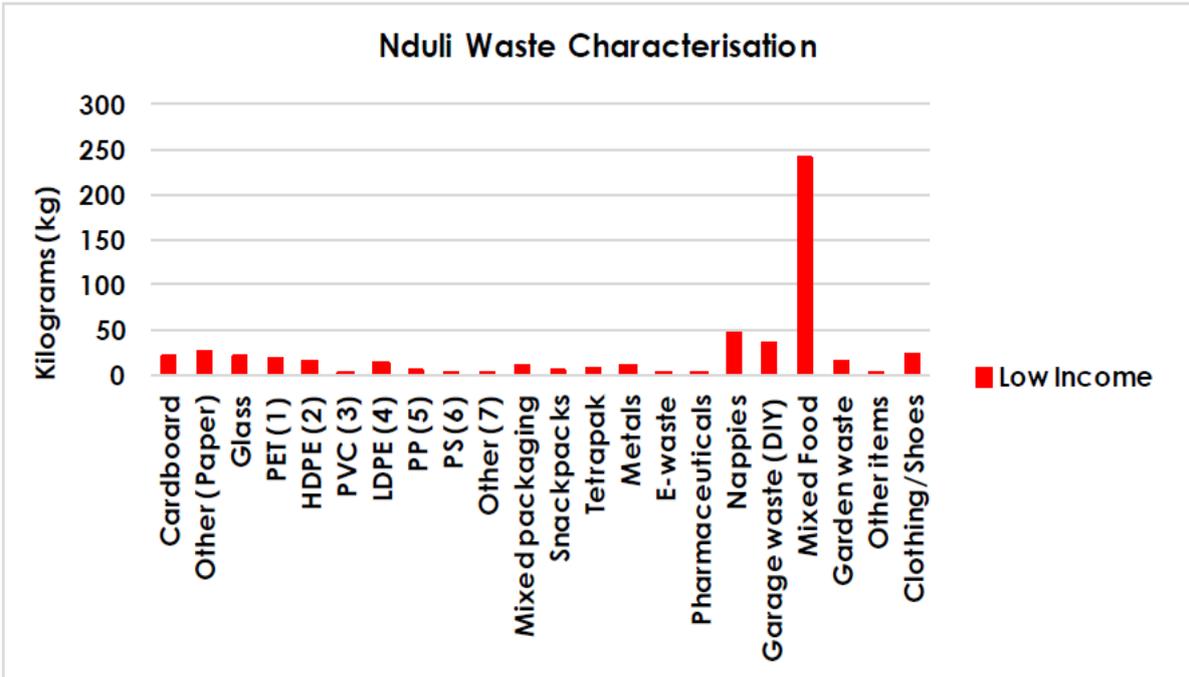
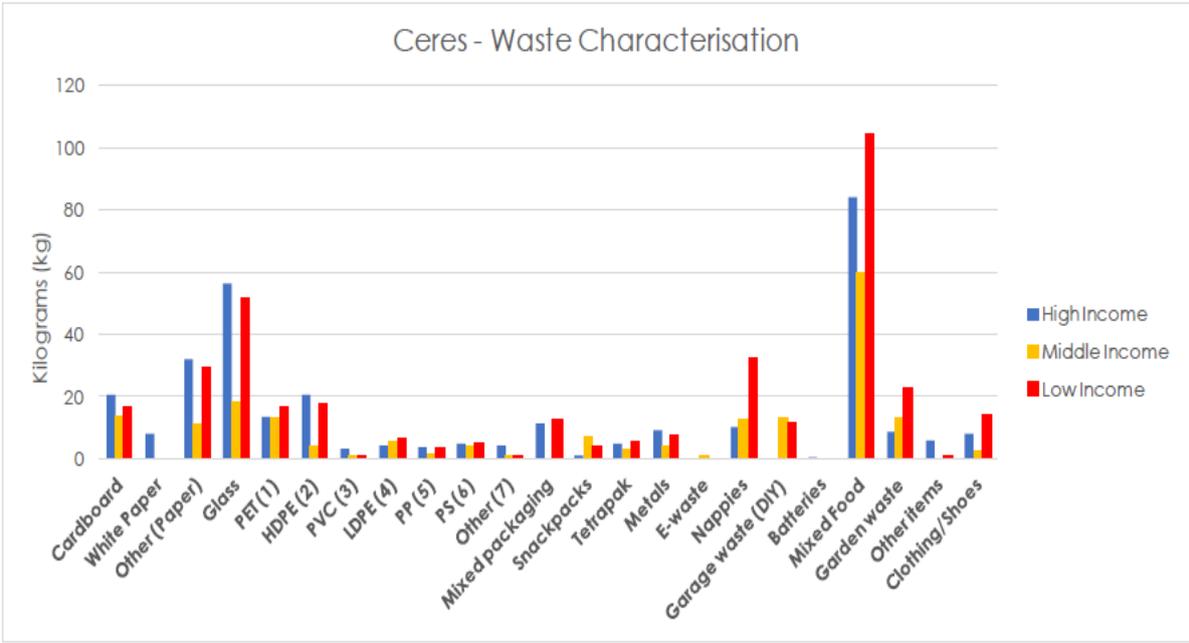
The same colour codes used to identify the high, middle, and low income groups have been carried through to the analyses phase for ease of reference.

The graph below provides an overview of the character of the waste for the areas sampled in the High, Middle and Low Income areas in the Main Categories.

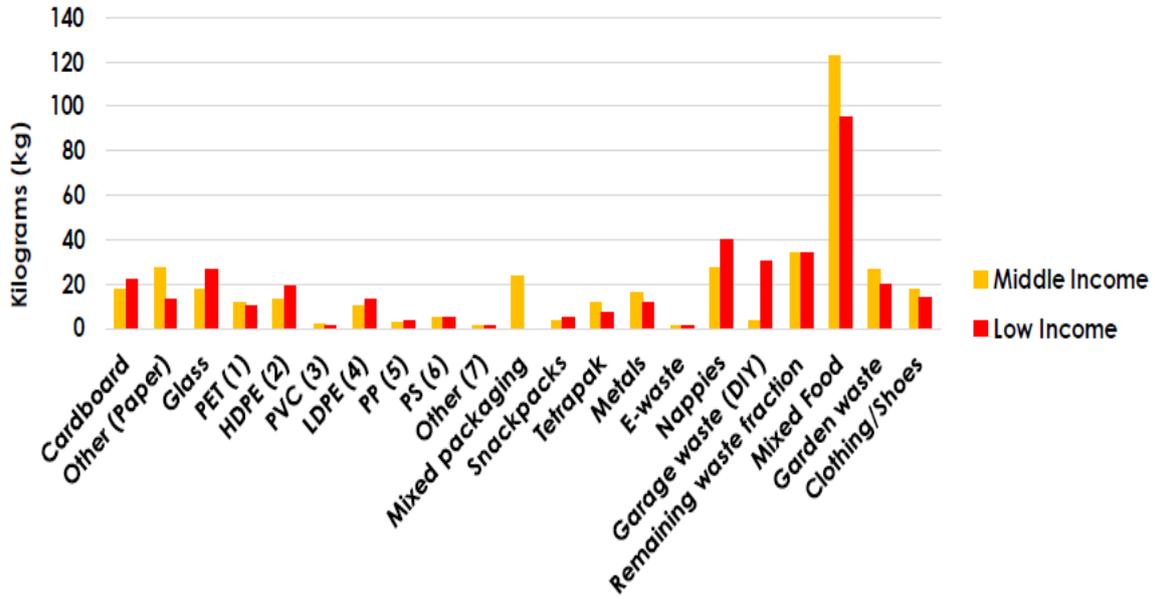


Most notable in the graph is the high organic waste generated in the Low Income household areas. The food-waste was observed to be mostly processed or prepared (as opposed to raw food waste)

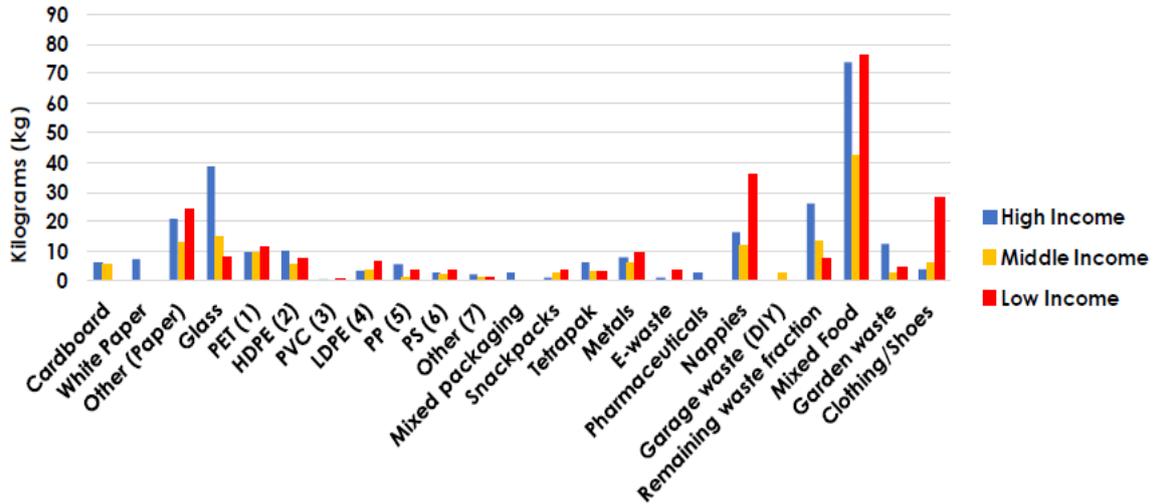
Household hazardous waste was predominantly made up of nappies or diapers. However, we observed a carrier bag full of epi-pens to administer insulin. This appeared to be from a pharmacy or healthcare practitioner rather than from a household.

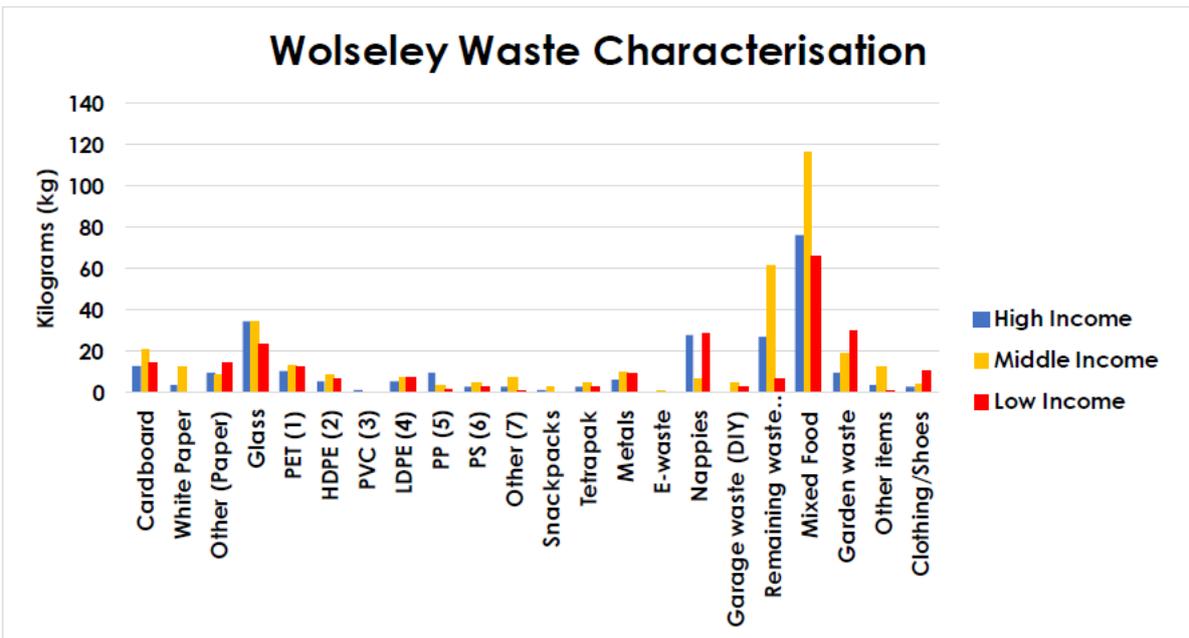
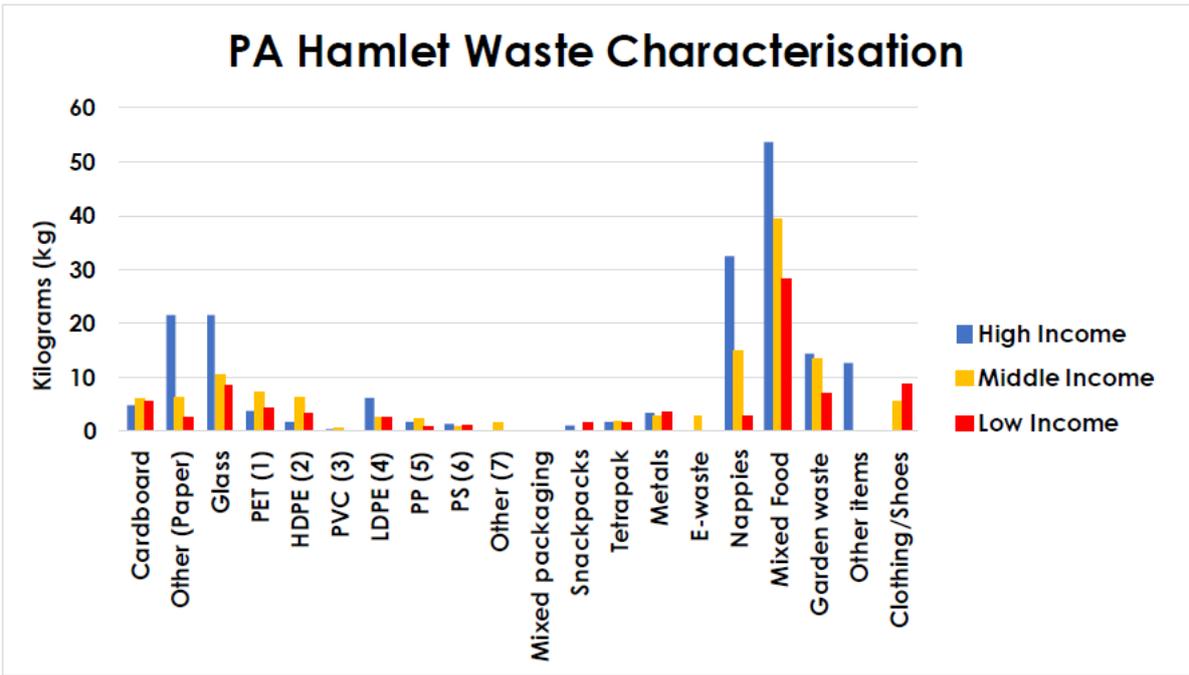


## Bella Vista Waste Characterisation



## Tulbagh Waste Characterisation





Most of the food-waste was left-over cooked food or fruit and vegetable peelings, and sometimes whole fruits and vegetables which were probably expired over-purchased

products. It was very seldom that food in its original packaging was thrown away – if there was any, it was from the High Income samples.

## **5. ORGANIC WASTE DIVERSION OPTIONS**

### **5.1 GREEN BAG SYSTEM**

An effective method of reducing organic waste, and specifically garden waste, in the residential waste stream destined from landfill, is by separate collection of garden waste from residents and businesses. With this system, residents are given a separate bag in which to place their household organic waste and this gets collected by the municipality. The collected bags are taken to PA Hamlet landfill site for treatment. The bags are green to differentiate them at the landfill or composting facility. A green bag system is already operated at Witzenberg Municipality.

### **5.2 CHIPPING AND COMPOSTING**

Composting is the most widely used treatment method for source separated garden and food waste, and would be the preferred treatment method for a municipality the size of Witzenberg.

Composting involves the aerobic decomposition of organic matter and although carbon dioxide is also produced during this decomposition process, no methane is produced. Composting of organic material is therefore environmentally more beneficial than direct landfilling, even if the compost is afterwards landfilled.

Composting of organic waste at a centralized Municipal composting facility would require a minimum of 350 tonnes of garden waste per month (4 200 per annum) to achieve financial sustainability. Although this is an approximate number that depends on a range of factors, the bottom line is that looking at the expected generation volumes in the previous chapter, Witzenberg Municipality does have the required volumes to justify the capital contribution required to develop a central composting plant. It is therefore recommended that the garden waste arriving at the Witzenberg Municipality facilities be mechanically chipped and composted at the landfill sites.

Effective composting requires garden waste to ideally be chipped within one week of being off-loaded to reduce the abrasiveness of the dry garden waste on the chipper's mechanicals, thereby reducing maintenance costs and to produce chipped material that can still be composted. Although all dry materials are important carbon contributors for compost, it is equally important to include enough freshly chipped green material to provide the nitrogen required for organism growth to oxidize the carbon and produce quality compost.

Composting through chipping of garden waste is suitable or ideal organic waste diversion option for Witzenberg Municipality. Where material is too dry and is not enough green material is available to mix in with it, the material needs to be chipped and stockpiled separately as wood chips or mulch for collection by the public. A private composter, Lumbri will be consulted on possible co-operation.

### **5.3 HOUSEHOLD COMPOSTERS**

Home composting in South Africa has traditionally been practiced for the purpose of having an inexpensive and reliable source of compost for the garden. Most recently, the realization that composting is a means of conserving resources, saving landfill airspace and the recycling of organic matter, has become the driving force for composting under individuals as well as clubs/associations. Composting at the home reduces the amount of waste in the residential waste stream and represents probably the only feasible means of composting kitchen waste.

Home composting bins would be beneficial to Witzenberg Municipality for diverting organic waste from landfills. By budgeting for and providing home composting bins to the interested households, the Witzenberg Municipality can encourage households to use kitchen scraps and household organic waste to make compost at home.

### **5.4 MECHANICAL BIOLOGICAL TREATMENT**

Mechanical Biological Treatment (MBT) is a well proven method internationally for removing organics from municipal waste stream by using a combination of mechanical equipment and manual labour. It has many possibilities and associated technologies but due to the relatively low volume of organic waste generated within the Witzenberg Municipality, this option would not viable for the Municipality.

### 5.5 4-BAG SEPARATION-AT-SOURCE MODEL

A 4-Bag separation-at-source model was implemented in the pilot project. In addition to the leaflets and charts, each household was provided with the following bags for separation-at-source:

<b>Compostable bags and caddie container for separation-at-source of organic waste</b>	<b>Green bags for separation-at-source of garden waste</b>	<b>Clear recycled bags for separation-at-source of recyclables e.g. plastic, glass, paper, etc.</b>	<b>Black bags for separation-at-source of other / residual waste</b>
			

### SEPARATION-AT-SOURCE FINDINGS

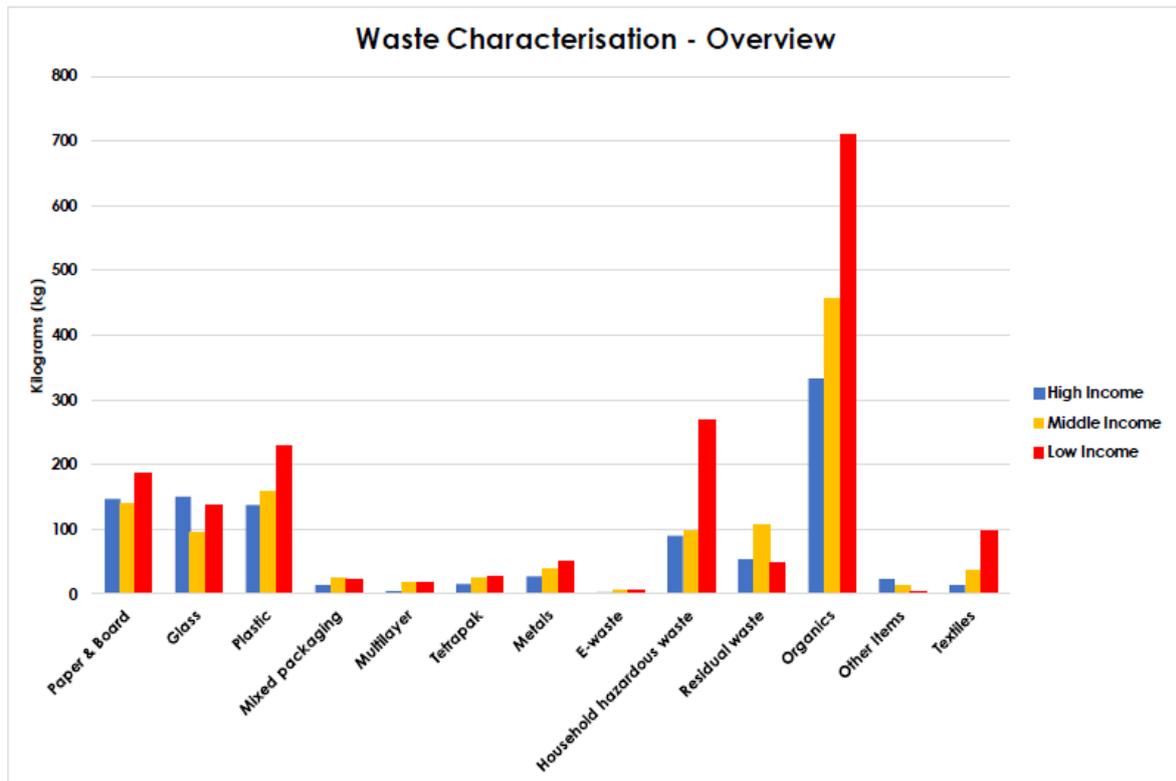
The separation-at-source exercise generated interesting information about the waste separated. Provided below are the following data:

- 1) Number of compostable, green, recyclable and black bags collected per week
- 2) Weight (kgs) of each category of waste collected per week
- 3) Number of food bags collected per week per area
- 4) Weight (kgs) of food bags collected per week per area
- 5) Number of recyclables bags collected per week per area
- 6) Weight (kgs) of recyclable bags collected per week per area
- 7) Number of garden waste bags collected per week per area
- 8) Weight (kgs) of garden waste bags collected per week per area

9) Number of black bags collected per week per area

10) Weight (kgs) of black waste bags collected per week per area

## SUMMARY AND CONCLUSIONS



The Zero Waste to Landfill Pilot Project was undertaken successfully to the satisfaction of the Witzenberg Municipality.

Based on the Pilot Project outcomes there is sufficient empirical evidence to prove the following:

- 1) Separation-at-source, especially of organic waste, is practical and feasible at Witzenberg Municipality
- 2) At least 85%, of what is currently regarded as waste, can be recycled and diverted away from landfill. The key to achieving 85% diversion is separation-at-source of organic waste.
- 3) The organic waste component in mixed waste results in cross-contamination; reduces the recycling efficiency, quality and quantity. Organic waste is the largest cause of health and environmental problems in landfills.

## **6. IMPLEMENTATION AND AWARENESS**

When the recommendation of this plan is approved by the Witzenberg Municipality it would be crucial to inform the public to shift their minds to the diversion of organic waste from landfills. Meetings must be held with stakeholders who are identified by the municipality to be part of the project.

Training and workshops from Human Resources side to recruit participants to aid in the awareness and education schedules of the project.

Witzenberg Municipality already has Waste Ambassadors that does Waste Management Awareness and Education sessions inside communities. An Organic Waste Diversion Forum can also be established to drive the diversion of organic waste where all local composters comes together and discuss the progress on organic waste diversion strategies. Waste Ambassadors will be handing out pamphlets' and posters door to door, supermarkets, and malls. They should also be handing out the surveys to determine the interest in composting. While they are busy with awareness, the important thing is that they know what the awareness is about if there should be any question or if public require explanations that is why the training/ workshops is key to the participants.

## **7. CONCLUSION**

The Witzenberg Municipality does not currently divert any organic waste from its landfill and garden and food waste get taken to the PA Hamlet landfill site, except the pilot sites in Tulbagh where a 4-Bag- separate at source system is in used for the Zero Waste to Landfill Pilot Project that commenced in 2019. An investigation must be launched to expand the separation at source model.

The Western Cape D:EA&DP made it a condition in most of the provincial waste licences that organic waste diversion plans to be developed for landfill in the province. This also applies for landfills issued with closure licences that specifically only receive garden waste and builder's rubble like some of the landfills in Witzenberg Municipality.

Through the implementation of a separation at source, chipping and composting facility Witzenberg Municipality can greatly assist the organic waste diversion from the regional landfill which also be required an Organic Waste Diversion Plan as part of its waste licence conditions.

All garden waste is taken to PA Hamlet landfill with a green bag collection system and it is recommended that the Witzenberg Municipality investigate chipping & composting at the PA Hamlet landfill.

In diversity there is beauty  
and there is strength.

MAYA ANGELOU

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Draft Report

# Organic Waste Diversion Plan

Witzenberg Local Municipality

**Cape Winelands District Municipality**

Submission date: 2023/02/22

Document number: 1002325  
Revision: Draft Report Rev 2

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# 1 Introduction

## 1.1 Background

Zutari has been appointed by the Cape Winelands District Municipality (CWDM) in the Western Cape to assist with the developing an Organic Waste Diversion Plan (OWDP) on a District level as well for each of the Local Municipalities. This OWDP is compiled for the Witzenberg Local Municipality (WLM).

The CWDM comprises of the following municipalities:

- Drakenstein Local Municipality (DLM);
- Witzenberg Local Municipality (WLM);
- Stellenbosch Local Municipality (SLM);
- Breedevalley Local Municipality (BVLM); and
- Langeberg Local Municipality (LLM).

The Witzenberg Local Municipality comprises of the following main areas as per the municipal Integrated Waste Management Plan (IWMP):

- Ceres;
- Tulbagh;
- Wolseley;
- Prince Alfred Hamlet; and
- Op-die-Berg

This report is for the OWDP plan for the above mentioned local municipal areas and are being developed based on the principles and requirements of the National Waste Management Strategy (GN R. 56 of 28 January 2021) (NWMS) and the requirements of the Western Cape Department of Environmental Affairs and Development Planning (DEADP).

The NWMS has the concept of “circular economy” at its centre. Circular economy is an approach to minimising the environmental impact of economic activity by reusing and recycling processed materials to minimise: (a) the need to extract raw materials from the environment; and (b) the need to dispose of waste. The circular economy is built on innovation and the adoption of new approaches and techniques in product design, production, packaging and use. These principles need to apply to all waste streams including organic waste.

The NWMS is important in terms of facilitating the implementation of the National Environmental Management: Waste Act, Act 59 of 2008 (NEM:WA). NEM:WA aims to promote diversion of waste from landfill. Numerous regulations have followed to promote this, specifically the National Norms and Standards for Organic Waste Composting (R 561 of 25 June 2021).

The following requirements from the DEADP need to be fulfilled through the development of this OWDP:

- The OWDP’s timelines need to be under pressure for the municipalities to meet the 50% target for 2022.
- The department is concerned that data is not captured correctly or not reported correctly, especially with the interventions that are currently taking place in the LMs. The recording of all interventions for diversion will help show that 50% is being diverted.
- Private sector involvement and enforcing the by-laws on organic waste would make a big impact if reported on correctly.

Thus, the compilation of this OWDP has focused on these requirements for the WLM.

## 1.2 Objectives

The objective in the development of this OWDP is to meet the required legislative requirements of the DEADP's Provincial Organic Waste Strategy (March 2020) in line with "Addendum C: Developing an Organic Waste Diversion Plan" of the Strategy.

## 1.3 Scope of Works

This OWDP should provide the following as a minimum:

- Status Quo of organic waste sources and volumes disposed at the Municipal Waste Management Facilities (WMFs);
- Current diversion rates within the WLM;
- Annual targets to achieve 50% diversion rate by 2022 and 100% diversion rate by 2027; and
- Where required, diversion of organic waste from landfill to meet the licence conditions.

## 1.4 Organic Waste definitions

The Norms and Standards for Organic Waste Composting (GN 561 of 2021) provides the following definitions:

- **Organic waste:** means waste of biological origin which can be broken down, in a reasonable amount of time, into its base compounds by micro-organisms and other living things and/or by other forms of treatment.
- **Organics:** means both processed and unprocessed compostable organic waste.

For the purpose of this Plan, "*organic waste*" is regarded as waste which is produced by all waste generators served by municipal collection services for general municipal waste. The main categories of organic waste would include:

- **Food waste:** mix of cooked and raw leftovers after the preparation and consumption of human food originating from households/residential areas as well as from commercial activities, such as restaurants, canteens, bars, etc.
- **Greens or garden waste:** waste coming from maintaining private residential areas/gardens (households) as well as from Municipal public areas, such as parks, playgrounds, verges etc.
- **Industrial waste:** the mixture of different types of residues of raw vegetables/food waste and woody materials such as packaging. This can include organic waste streams from agro-industries, such as food and animal feed processing or the processing of agricultural products for other purposes.

## 1.5 Motivation for Organic Waste Diversion

The following are the overarching benefits of diverting organic waste from landfill:

- Reduced cost of landfill disposal.
- Landfill air space savings.
- Reduction in greenhouse gas emissions.
- Reduced possibility of environmental pollution from landfill management i.e., leachate generation and improved air quality impacts.

- Long term/future avoided costs and savings as a result of saved landfill airspace.
- Positive impact as a result of recovering a valuable resource (organics) and processing these to produce beneficial soil amendments (i.e., compost) or used for electricity generation (i.e., biogas).
- Practical application of a circular economy strategy to waste management which keeps organic materials in circulation at their highest value.

## 2 Review of legislation and by-laws

The following Legislative requirements and underlying principles will need to be considered when developing the strategy for organic waste management in WLM.

### 2.1 Legislative overview

Below is a summary of legislation applicable to the waste management in general which covers organic waste as well: compilation of the OWDS:

#### 2.1.1 Legislation applicable to waste management

- National Environmental Management: Waste Act (Act No. 59 of 2008) (NEMWA);
- The National Environmental Management Act (Act No. 107 of 1998);
- Environment Conservation Act (Act No. 73 of 1989);
- The National Environmental Management: Air Quality Act (Act No. 39 of 2004);
- Hazardous Substances Act (Act No. 5 of 1973);
- National Water Act (Act No. 36 of 1998);
- Municipal Systems Act (Act No. 32 of 2000);
- Municipal Finance Management Act (Act No. 56 of 2003)
- The South African Constitution (Act 108 of 1996);
- Health Act (Act 63 of 1977);
- Occupational Health and Safety Act (Act 85 of 1993);
- Municipal Structures Act (Act 117 of 1998);
- Mineral and Petroleum Resources Development Act (Act 28 of 2002); and
- National Treasury: GRAP 17 and 19 Compliance

#### 2.1.2 NEMWA regulations, norms and standards

- National Waste Information Regulations, R 625 (August 2012);
- National Waste Management Strategy (2020)(GN 56,28 January 2021),
- Waste Classification and Management Regulations R 634 (August 2013);
- National Norms and Standards for the Assessment of Waste for Landfill Disposal R 635 (August 2013);
- National Norms and Standards for Disposal of Waste to Landfill R 636 (August 2013);
- List of Waste Management Activities that have, or are likely to have a detrimental effect on the environment, R 921 (November 2013) (amended);
- National Norms and Standards for extraction, flaring for recovery of landfill gas, scrapping or recovery of motor vehicle, storage of waste R 924 - 926 (November 2013); and
- National Norms and Standards for the Remediation of Contaminated Land and Soil Quality R 331 (May 2014).

### 2.1.3 Other

- Minimum Requirements for Waste disposal by Landfill (DWAF 1998)

### 2.1.4 Legislation relevant to organic waste management

Legislation most relevant to the compilation of the OWDP for WLM is discussed below:

#### **National Organic Waste Composting Strategy (2013)**

The Final National Organic Waste Composting Strategy (NOWCS) Report was published by DEA (now DFFE) in 2013, with the aim to promote the diversion of organic waste from landfill through organic waste composting for soil beneficiation and other users through composting.

The NOWCS is based on five goals which seek to drive viable and sustainable change in response to legislation change, responsible waste handling and enhancing the use of organics in a circular system. The five goals and associated objectives are detailed in the NOWCS, including actions to be undertaken in order to realise each of these goals. Table 1 provides a summary of the five goals and associated objectives of the NOWCS.

**Table 1: Summary of NOWMS 2020 goals**

<b>Goals</b>	<b>Objectives</b>
<b>1. Review legal and regulatory requirements.</b>	The objectives of Goal 1 is to identify legislation and regulations that require modification in order to facilitate the legal registration of composting activities and facilities.
<b>2. Understand and facilitate feedstock sources and opportunities.</b>	Improving the monitoring of organic waste generation, disposal and treatment, as well as identifying both feedstock and product market opportunities
<b>3. Provide the necessary support structure and functions to implementing composting.</b>	The objective of Goal 3 is to consider necessary support structures and functions that would assist in the creation of opportunities, promoted and facilitated by legal enabling frameworks, and financial support and incentivization. Governmental synergies with the private sector and regionalization are also identified as necessary aspects requiring consideration.
<b>4. Undertake education, skills transfer and awareness.</b>	Enhancing public awareness and education campaigns and programmes regarding certain waste types is required in order to assist with not only separation at source, but diversion of organic waste from landfill, by means of potential home composting in urban/residential areas, as well as possible communal composting within the informal, lower-income areas.
<b>5. Incorporate composting into municipal planning, responsibilities and create roles for the private sector.</b>	This goal is about adapting the existing municipal structures to suit roles and responsibilities, including the use of IWMP's and Integrated Development Plans (IDP) and identification of private involvement, where necessary. Waste Management Officers will play a key role in planning and achieving the objectives of the NOWCS.

## **National Norms and Standards for Organic Waste Composting (GN 44762 of 2021)**

On 25 June 2021, the Ministry of Forestry, Fisheries and the Environment promulgated the National Norms and Standards for Organic Waste Composting under the NEMWA. An objective of the Norms and Standards is that organic waste composting will no longer require a waste management license under NEMWA.

The Norms and Standards seek to provide a national uniform approach relating to controlling the composting of organic waste at any facility that falls within the threshold, thereby ensuring that the best practice is always followed. The Norms and Standards are applicable to compostable organic waste and to organic composting facilities with the capacity to process in excess of 10 tonnes per day.

## **Provincial organic waste strategy**

Western Cape Government – DEADP released a Provincial Organic Waste Strategy in March 2020 which focusses on the following:

- Alignment with the principles of the waste hierarchy to address various aspects of organic waste
- Organic waste preventative strategies, making material available as a resource, develop the required infrastructure for recovery and to support the uptake and beneficiation of this resource
- Initiatives being implemented by the private sector and other agencies with a view of forming synergies with these entities working towards a fully integrated strategy
- Identification of possible policy instruments that can be applied by various organs of state to meet the 50% and 100% organic waste targets for 2022 and 2027 respectively.

## **2.2 Waste By-Laws**

### **2.2.1 Witzenberg Waste Management By-law**

Based on the IWMP, the Waste Collection by-laws were published in 2005, and make reference to the development of an 'integrated refuse management plan', the provision of waste management services, handling of recyclable waste, prohibitions in terms of waste management, handling different types of waste, and compliance and enforcement. According to the IWMP the WLM was updating the by-laws to aligned to the NEM:WA. Based on the WLM website, the updated bylaws have not been promulgated at the time of this report.

## 3 Status Quo of Waste Management

### 3.1 Background to Witzenberg Local Municipality

**WLM is a local municipality located within the CWDM, in Western Cape Province of South Africa. WLM was established in December 2000 through the amalgamation of the former municipalities and towns of Ceres, Wolseley, Tulbagh, Prince Alfred Hamlet and Op-die-Berg. The locality is shown in**

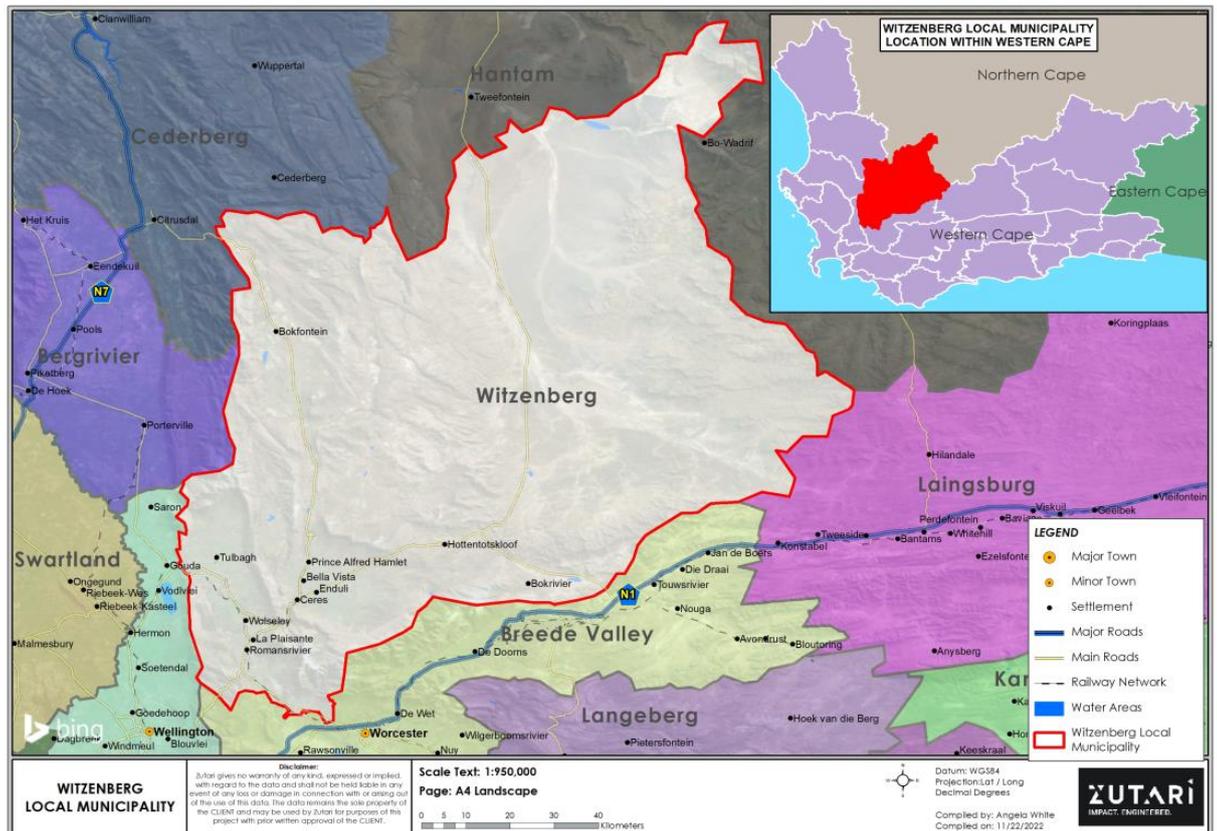


Figure 1.

WLM is the eastern neighbour of Drakenstein, Berg Rivier and Cederberg Municipalities. It is an area noted for its fruit farming. The Witzenberg area host many industries, but the agriculture and agriculture related industries are the mainstream. Tourism is also a fast-growing industry in Witzenberg.

The municipality covers a total area of approximately 10 753km<sup>2</sup> and is the largest municipality of five in the district, making up half of its geographical area. The region is surrounded by three mountain ranges: the Obiqua Mountains to the west, the Winterhoek Mountains to the north and the Witzenberg Range to the east. Rural areas within the municipal boundary are Warm Bokkeveld, Koue Bokkeveld, Agter-Witzenberg and the northern portion of Breede River Valley (Het Land van Waveren). The municipality is responsible for basic service provision to the demarcated municipal area that includes the towns of Ceres, Tulbagh, Prince Alfred Hamlet, Wolseley and Op-die-Berg.

The main economic sectors are Agriculture, forestry and fishing (29.1%), finance, insurance, real estate and business services (22%), manufacturing (16.2%), wholesale and retail trade, catering and accommodation (10%), general government (8.4%), transport, storage and communication (8%), community, social and personal services (3.5%)

(<https://municipalities.co.za/overview/1211/witzenberg-local-municipality>, October 2022).

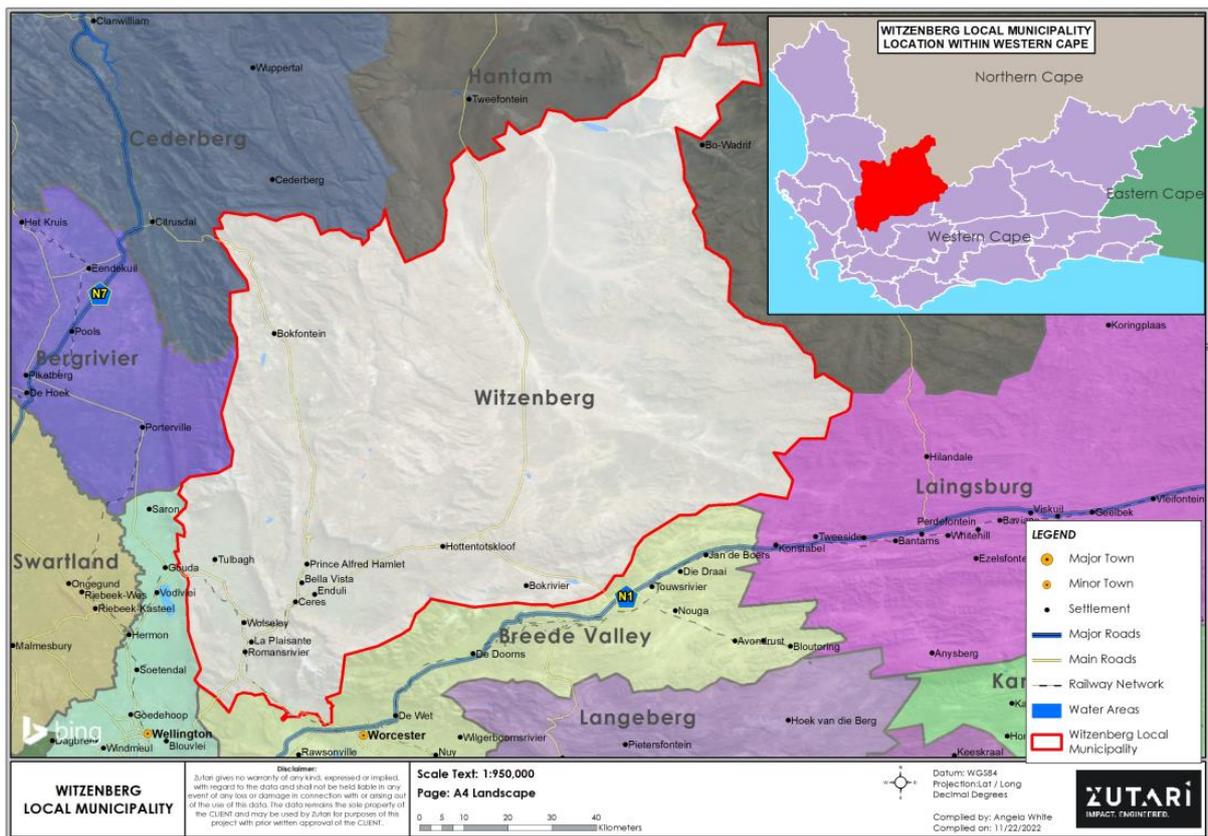


Figure 1: Cape Winelands District Municipality locality

### 3.2 Waste management facilities within the WLM

The municipality owns the following waste facilities (IWMP, 2021):

- Ceres landfill site (closed);
- Prince Alfred Hamlet landfill site (operational);
- Op-die-Berg landfill site (operational);
- Tulbagh landfill site (operational); and
- Wolseley landfill site (non-operational).

WLM currently has several waste management facilities accepting organic and other municipal solid waste. These are summarised in Table 2.

Table 2 Summary of waste management facilities

Waste Management Facility	Status	Waste accepted	Description
Prince Alfred Hamlet landfill site	Operational	<ul style="list-style-type: none"> <li>■ Garden waste</li> <li>■ General Waste</li> <li>■ Builders Rubble</li> </ul>	<ul style="list-style-type: none"> <li>■ WLM disposes garden waste, general waste, and builders rubble at the landfill site</li> <li>■ Green bags are provided, collected and then transported to landfill</li> <li>■ Plans to start on-site composting to sell to the farmers and community</li> <li>■ Will reach capacity in 2025.</li> </ul>

Waste Management Facility	Status	Waste accepted	Description
<b>Op-die-Berg landfill site</b>	Operational	<ul style="list-style-type: none"> <li>■ General waste</li> <li>■ Garden refuse</li> <li>■ Builder's rubble</li> </ul>	<ul style="list-style-type: none"> <li>■ Reached its capacity in 2022</li> <li>■ Daily compaction does not take place.</li> </ul>
<b>Tulbagh landfill site</b>	Non-Operational	<ul style="list-style-type: none"> <li>■ General waste</li> </ul>	<ul style="list-style-type: none"> <li>■ WLM is only allowed to dispose of waste on the current footprint up to 8m above National Ground Level.</li> <li>■ At the time of writing this report the site was not use due to legislative process due to DEADP</li> </ul>
<b>Wolseley landfill site</b>	Non-operational	<ul style="list-style-type: none"> <li>■ None</li> </ul>	<ul style="list-style-type: none"> <li>■ Has an operating licence but due to vandalism the site has been destroyed.</li> <li>■ Informal settlement blocking access roads and residing on the landfill.</li> </ul>

Some aerial photos of Prince Hamlet Landfill taken during the site visit conducted on 10 November 2022 are shown in Figure 2 to Figure 4.



**Figure 2 Aerial view of PA Hamlet Landfill**



Figure 3 Aerial view of PA Hamlet Landfill



Figure 4 Aerial view of PA Hamlet Landfill

## 4 Waste characterisation

A Waste Characterisation and Brand Audit study undertaken by WAAI in March/April 2019 identified the fact that the municipality could easily and economically divert 85% of total waste from the landfill site (IWMP, 2021). The study concluded that the way to achieve that objective was for the WLM to

adopt a Zero Waste system including waste separation-at-source, especially organic waste separation at-source.

Around 475 tonnes are disposed of per month at the Prince Alfred Hamlet garden waste site. (Source – Witzenberg Waste Characterization)

The organic waste constitutes the largest proportion (approximately 40%) of total waste stream generated at WLM.

The separation-at-source of organic waste would reduce cross-contamination and improve the rate, quality and quantity of recyclables that can be diverted from landfill. The waste audit indicated that Organic Waste constituted the largest proportion (37%) of total waste stream. Please note that the 37% excludes garden waste. If garden waste is included, the actual total organic waste would be 40% of the total waste stream as mentioned above.

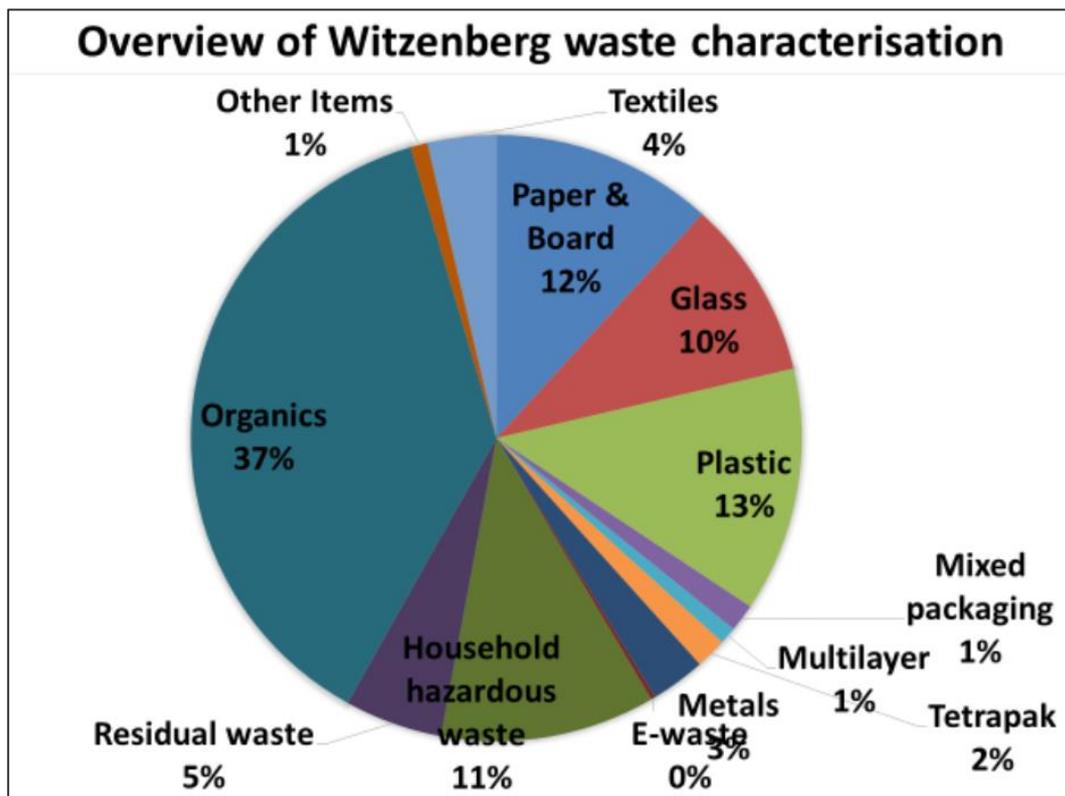
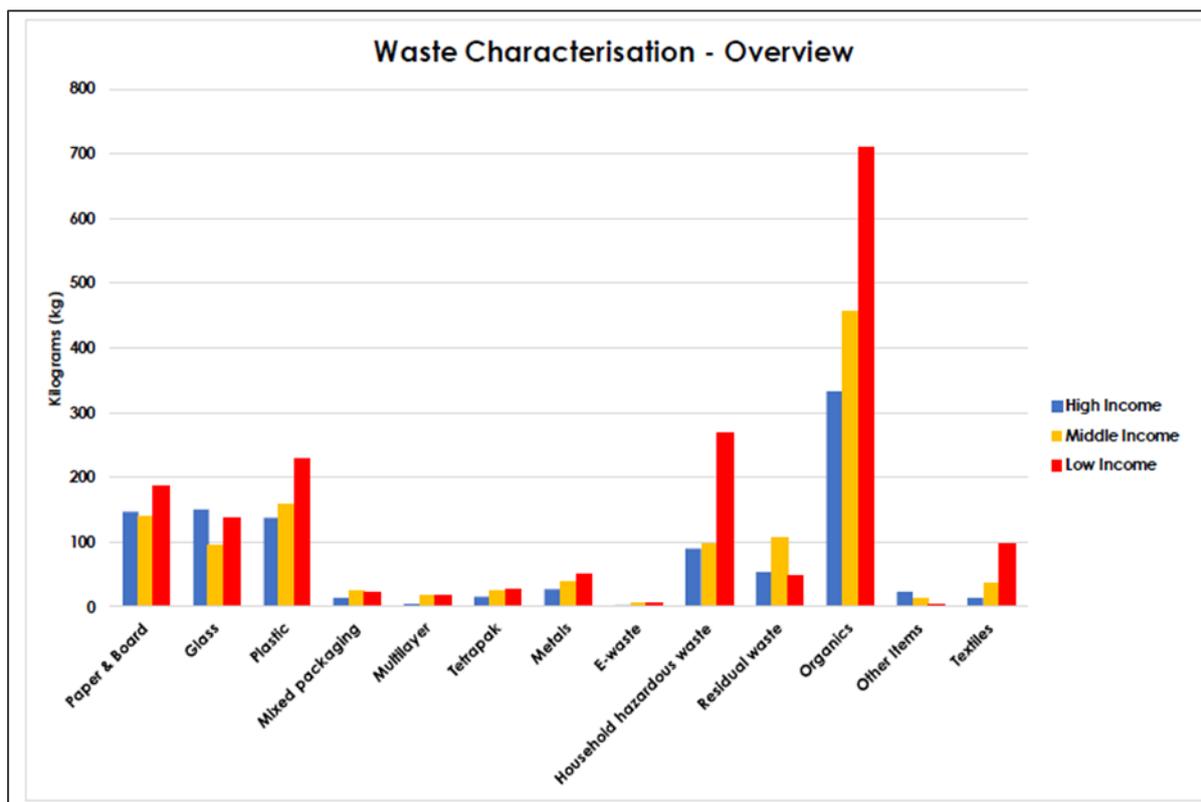


Figure 5: Waste Characterisation study results (IWMP, 2021)

The results from the waste characterisation study indicate that there is a significant portion of recyclables and organic waste within the WLM waste stream that can be diverted from landfills.

The graph below provides an overview of the character of the waste for the areas sampled in the High-, Middle- and Low-Income areas in the Main Categories.



Most notable in the graph is the high organic waste generated in the low-income household areas. The food-waste was observed to be mostly processed or prepared (as opposed to raw food waste). Most of the food-waste was left-over cooked food or fruit and vegetable peelings, and sometimes whole fruits and vegetables which were probably expired over-purchased products. It was very seldom that food in its original packaging was thrown away – if there was any, it was from the high-income samples.

## 5 Organic waste management

### 5.1 Background to organic waste management within the WLM

WLM does not currently divert any organic waste from its landfill and garden and food waste are taken to the PA Hamlet landfill site, except the pilot sites in Tulbagh where a 4-Bag- separate at source system is in used for the Zero Waste to Landfill Pilot Project that commenced in 2019.

All garden waste is taken to PA Hamlet landfill by means of a green bag collection system. Residents place garden waste in a green which is then collected together with domestic waste and transported to the PA Hamlet landfill where it is disposed of with other waste.

### 5.2 Current organic waste generation

The Integrated Waste Management Plan (IWMP) 2021 (compiled by Delta BEC) provides the following data on organic waste.

**Table 3: Waste generation and diversion figures as per the IWMP**

Year	Municipal			Commercial & Industrial			Organics		
	Generated	Diverted	%	Generated	Diverted	%	Generated	Diverted	%
2018	5316	0	0	2411	2391	99	4246	0	0

<b>2019</b>	8540	2453	29	0	0	0		0	0
<b>2020 (Jan-July)</b>	5588	1102	20	0	0	0		0	0

From the above table the estimated percentage (%) of organics were calculated as shown in the Table 4 below.

**Table 4: Percentage organics in the waste stream**

Year	Total	Ave/month	Organics	Ave/month	% Organics
<b>2018</b>	7727	644	4246	354	55%
<b>2019</b>	8540	712	3054	255	36%
<b>Jan 2020 - July 2020</b>	5588	798	1778	254	32%

The figure for 2022 were obtained from the WLM and are summarised in the table below.

**Table 5: Organics/greens to landfill (2022)**

Landfill							
Month	PA Hamlet		Op die Berg		Total (tonnes)	Total organics (tonnes)	% Organics
	Organic (tonnes)	General (tonnes)	Organic (tonnes)	General (tonnes)			
<b>January</b>	293,1		51,2	325,9	670,2	344,3	51%
<b>February</b>	318,4		155,7	768,7	1242,7	474,0	38%
<b>March</b>	334,2		155,1	764,2	1253,5	489,3	39%
<b>April</b>	344,3		77,7	321,2	743,2	421,97	57%
<b>May</b>	311,4		53,5	327,2	692,1	364,9	53%
<b>June</b>	298,1		4,6	291,4	594,1	302,7	51%
<b>July</b>	285,8			312,2	598,0	285,8	48%
<b>August</b>	275			384,8	659,8	275,0	42%
<b>September</b>	305,9			389,7	695,6	305,9	44%
<b>October</b>	293,7		118,5	659,4	1071,5	412,19	38%
<b>Total</b>	<b>3059,7</b>	<b>0</b>	<b>616,3</b>	<b>4544,67</b>	<b>8220,6</b>	<b>3675,9</b>	<b>45%</b>
<b>Ave/month</b>	<b>306,0</b>		<b>61,6</b>	<b>454,467</b>	<b>822,1</b>	<b>367,6</b>	<b>45%</b>

From the above it can be concluded that approximately 45% or 366 tonnes of the current waste stream going to the two landfills consist of greens /garden waste.

Other organic waste streams identified in the WLM are the following:

- **Agricultural waste:** In the WLM, the agricultural waste from farms is reportedly either used as animal feedstock, for home composting or it is taken to the nearest landfill site (IWMP, 2021).
- **Sewage sludge:** Sewage sludge is a key hazardous waste type generated from wastewater treatment works (WWTW) plants. The table below provides the mass of the sludges generated at the WWTW plants in the WLM as well as the current disposal method (IWMP, 2021).

**Table 6: WWTW waste sludge generation**

WWTW Name	Effluent sources	Sludge mass (t/m) 2019	Disposal/ current applications
<b>Ceres</b>	Residential and Industrial	70.1	Disposal to landfill site
<b>Wolseley</b>	Residential	8.1	Disposal in sludge dams
<b>Tulbagh</b>	Residential	T1= 2.2 T2= 4.5	Disposal to landfill site
<b>ODB</b>	Residential	1.1	Disposal to landfill site

THE WLM has developed their own Draft OWDP compiled by Messrs Johnny Jacobs and Joseph Barnard from WLM and Juandrey Saunders from DFFE.

Based on the waste characterisation mentioned in the report, organic waste is largest waste fraction for the three demographics sampled. Mixed food waste, mostly cooked or processed foods is by far the largest waste component based on the graphs in the report with garden waste one of the other prominent waste types base on the characterisation done. The report is included as Appendix A to this report.

Based on the waste craterisation done by the WLM it would appear that the organic fraction is approximately 40% - 50% of the total waste stream without considering garden waste. Note that only the graphs were shown in the reports and that the estimates are based on a visual assessment of the graphs. It can therefore be assumed that the total organic waste fraction of the waste stream is approximately 65% -75% of the total waste stream. These figures can be refined based on the actual figures of the waste characterisation done.

■ **Abattoir waste**

There are no abattoirs in the WLM.

## 6 Gap Analysis

The table below provides a Gap analysis of Organic waste Management/ Practices/ Requirements within WLM that require further investigation.

**Table 7: Gap analysis**

Item no.	Objective / Target	Current state	Gaps	Actions required to address Gaps
1.	Legislative compliance i.t.o. National Waste Management Strategy, GNR 636, NNS for Organic Waste composting as a minimum requirement	Although pilot projects are being implemented for separation at source, all collected organic waste ends up at the landfill sites.	<ul style="list-style-type: none"> <li>■ Pilot separation at source projects are not being converted into practical manageable collection systems.</li> <li>■ Insufficient green waste disposal facilities for the public available within WLM</li> </ul>	<p>Pilot projects should be evaluated and if feasible, be converted to manageable collections systems.</p> <p>Establish green waste disposal facilities and identify private sector facilities that could be utilised.</p>
2.	Implement By-Laws regarding management of organic waste. Implement system whereby organic waste can be separated at source	The Integrated Waste Management By-Laws is not aligned to the current national and provincial legislation and priorities.	During the compilation of the of waste management related by-laws, the aspects addressed in the NWS as well as the provincial model by law, needs to be adapted.	Finalise updating the waste bylaw in terms of priorities and initiate legislative process.
3.	Inadequate information regarding organic and garden waste generators, quantities generated and current methods of treatment/disposal	Garden waste is disposed of at the PA Hamlet and Op-die-berg landfills where records are kept of loads entering the facilities. The waste data and quantities are submitted for the landfill and the waste calculator used as there are no weighbridges. No data is kept of private generators such as restaurants', fruit industry, hotels etc.	Limited record of garden waste disposal at landfills. No records of organic waste generators such as agriculture, abattoirs, hospitality industry etc.	<ul style="list-style-type: none"> <li>■ Registering of waste generators and transporters in the municipality. This will improve data capturing at waste sites. Moreover, it will enable a clearer indication of the amount of diversion that can take. place in WLM.</li> <li>■ It will enable the municipality to evaluate organic waste management system requirements in greater detail.</li> </ul>

Item no.	Objective / Target	Current state	Gaps	Actions required to address Gaps
4.	Organic waste stream prevention strategies	No formal organic waste stream prevention strategies.	The need for formal organic waste stream prevention strategies as they will favour and encourage separation at source, identifies a treatment option and creates an enabling environment.	<p>Prevention strategies for organic waste stream should be put in place such as the following:</p> <ul style="list-style-type: none"> <li>■ Separation at source strategy.</li> <li>■ Proper collection plan.</li> <li>■ Training, Education and Awareness Campaign.</li> </ul>
5.	Implement a phased approach to manage, process, treat and reduce organic waste to landfill considering the provincial targets	There is no organic waste management system in place in WLM.	The need for a phased approach is required which is aligned with provincial targets.	<ul style="list-style-type: none"> <li>■ WLM must pursue a multi-pronged approach to organic waste diversion that will manage, treat, and reduce organic waste to landfill.</li> <li>■ The recommended phased approach may include the following: <ul style="list-style-type: none"> <li>■ Separation at source roll out for a phased 2-bag separation at source programme.</li> <li>■ Implementation and encouraging incentives for separation of garden waste along with enforcement of the amended by-law as a last resort.</li> </ul> </li> <li>■ Treatment of Organic Waste</li> <li>■ Improvement of waste data capturing and reporting.</li> <li>■ Training, Education and Awareness Campaign focused on Separation at Source and organic waste.</li> <li>■ Monitoring and Measuring</li> </ul>

Item no.	Objective / Target	Current state	Gaps	Actions required to address Gaps
6.	Adequate budgets for human resources	<ul style="list-style-type: none"> <li>▪ Insufficient budget for upcoming waste management projects.</li> <li>▪ Vacancies in the Solid Waste and Landfill Management staff structure.</li> </ul>	<p>There is a need to explore funding mechanism as there are many proposed projects that cannot be funded only by the Waste and Landfill Management Department.</p> <p>Vacancies in the Solid Waste and Landfill Management staff structure.</p>	<ul style="list-style-type: none"> <li>▪ WLM must ensure that there is sufficient provision in the capital and operational budget for upcoming waste management projects.</li> <li>▪ Review staff structure and requirements to fill vacant positions with suitable qualified and experienced staff.</li> </ul>
7.	Infrastructure to divert organics such as composting facilities	Transfer stations equipped to recover and separate waste	Insufficient infrastructure	Plan for infrastructure to divert organics such as a composting facility at PA Hamlet landfill site
8.	Communicating strategies to the various communities whilst respecting the diversity and uniqueness of each community	No communication since there is no strategy – to be updated	No communication since there is no strategy – to be updated	<ul style="list-style-type: none"> <li>▪ Finalise first version of this plan and update accordingly.</li> <li>▪ Development of a communication strategy which includes engagement and awareness with generators is required to be developed</li> </ul>

## 7 Options available for beneficiation of organic waste

Once the existing options have been identified additional options will be assessed to determine the viability for the Municipality. These options are discussed in Table 8 below.

**Table 8: Implementation plan**

Municipal Options	Requirements – Infrastructure / Actions	Possible constraints	Possibility of implementing	Mode of implementation	Budget required	Actions required	Implementation timeframe Short: 1-2 years Medium: 2-5 years Long term: 5 – 10 years
<b>Separation of Organics</b>							
<ul style="list-style-type: none"> <li><b>Separation at source - Residential</b></li> </ul>	Wet & Dry separation	Budget - cost of bags Public commitment	Limited due to human nature				
<ul style="list-style-type: none"> <li><b>Separation at source - Commercial</b></li> </ul>	Wet & Dry separation	Participation of commercial entities	Good	Through By-laws and incentives such as discount on rates depending on participation  Additional vehicle to service commercial	None		
<ul style="list-style-type: none"> <li><b>Mechanical biological separation</b></li> </ul>	Decanter to separate solid and liquid waste	Budget and location Need back-up equipment for failures	Possible		R5.5 mil	Investigate the feasibility of this option	
<b>Public drop-off facility</b>	Public garden waste disposal facilities	Legislative and budget constraints	Possible	Basic assessment, design, construction	TBD	Facility constructed at Wolseley. Tender process for Tulbagh, Bella-Vista & PAH under way.	Medium to long term
<b>Separate garden waste from general waste at landfill</b>	Dedicated area on landfill for disposal of garden waste	Limited airspace	Good	Adequate landfill personnel to ensure separate disposal	Additional personnel TBD	Budget for additional personnel	Short term
<b>Shredding/Chipping of Garden Waste</b>	Personnel and appropriate equipment	Budget	Good		R1,5 mil	Budget for additional personnel and equipment	Medium
<ul style="list-style-type: none"> <li><b>Own use</b></li> </ul>	None	None					
<ul style="list-style-type: none"> <li><b>Sell off to users</b></li> </ul>	Advertise the chipped garden waste	Municipal financial management	Good	Adequate planning by Municipality	None	Adequate planning by Municipality	Medium
<b>Composting</b>							
<ul style="list-style-type: none"> <li><b>Municipality on landfill</b></li> </ul>	Dedicated area on landfill for disposal of garden waste and organics. Area to be adequate space required for compost windrows	Appropriate personnel and equipment Possible legislative requirements	Limited				
<ul style="list-style-type: none"> <li><b>Municipality on alternative land</b></li> </ul>	Suitable land, licensing and operational requirements	Legislative and budget constraints	Limited				
<ul style="list-style-type: none"> <li><b>External Composting</b></li> </ul>	Composting company within the municipal area, Lumbri is mentioned in the draft WLM OWDP.	Procurement / competitive bidding	Possible	Engage with private company  Offset airspace saving to cost of paying someone to compost	None	Engagement from municipality with private company	Medium

<ul style="list-style-type: none"> <li><b>Home composting</b></li> </ul>	Provide households with equipment (such as composting bins) and/or knowledge on composting techniques	Budget Lack of public commitment	Limited	Public awareness and training	R 200 000p/a	Development of a communication strategy which includes engagement and awareness with generators should be developed and implemented	
<b>Bio digestion</b>							
<ul style="list-style-type: none"> <li><b>Internal</b></li> </ul>	Biodigester	Legislative and budget constraints	Limited				
<ul style="list-style-type: none"> <li><b>External</b></li> </ul>	Separation of organics and garden waste  Bio 2 watt has equipment that can be placed at landfill to separate organics	Procurement / competitive bidding	Good	Engagement with companies doing bio digestion	Depending on procurement process	Engagement with companies doing bio digestion	Medium

## 7.1 Summary of infrastructure requirements to meet targets

At this stage the WLM seems to favour separation at source as the preferred alternative to deal with various waste fractions. Although the pilot 4-Bag- separate at source system seems to be working it is recommended that this be reconsidered due to cost requirements (4 bags / household) as well as the overall participation from communities. Separating waste into four waste streams may prove to be cumbersome. It is suggested that a two-bag system be investigated with the separation of wet and dry waste. This system will also not be effective in all communities.

A number of areas already separate greens waste into green bag which is currently taken to the landfill for disposal. Areas should be identified on to landfill where green can be disposed of separately from the other waste streams for processing.

The municipality should engage with Lumbri on a possible way forward regarding composting of the waste on-site or off-site and if composting offsite is proposed, the cost implication of logistics to get garden waste to a specific premises should be calculated to determine the feasibility.

Bio2watt (private company) should be engaged to determine the feasibility of separating the organic fraction from the collected waste stream for processing in biodigesters.

## 7.2 Summary of budgetary requirements

The WLM needs to agree on a feasible way forward regarding the separation of organic from the waste streams as well as the processing of greens and other organics.

At this stage the budget requirements cannot be estimated until discussion have been held with the composting and organic processing companies and the logistics has been finalised regarding collection, pre-processing and processing of organic and greens waste streams.

The above will also have to be discussed and agreed with the communities through a proper communication strategy.

## 7.3 Implementation Plan

The detailed implementation plan will be updated once the feasibility regarding the various methods of collection, pre-processing and processing has been finalised and agreed upon.

## 7.4 Communication plan

A communication strategy should be developed to discuss the possible implementation scenarios with the various communities, once the feasibilities have been determined.

The establishment of a Monitoring Committee should be developed with members of the municipality to monitor and manage the progress of the OWDP. The committee should meet annually to establish compliance to the OWDP, progress to meet the national targets, verify calculations and reporting to the Department and IPWIS through an established monitoring and evaluation system to monitor progress. Annual reports must be sent to the Department, accompanied by graphic representations of percentages diverted.

## 8 Conclusion

The draft OWDP as compiled by the WLM needs to be replaced by this plan which incorporates most of the aspects from the draft OWDP. This plan should be upgraded to reflect the various suggested feasibilities and communication strategies required to formalise this plan. Once the go forward options have been decided on, the potential diversion rates can be determined.

# Appendix A: Draft OWDP compiled by the WLM

# WITZENBERG MUNICIPALITY



**DRAFT**

## **ORGANIC WASTE DIVERSION PLAN**

**COMPILED BY:**

**JOHNNY JACOBS**

**JOSEPH BARNARD**

**JUANDREY SAUNDERS (DEFF)**

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## **1. INTRODUCTION**

### **1.1 GENERAL DESCRIPTION**

Witzenberg Municipality is the eastern neighbour of Drakenstein, Berg Rivier and Cederberg Municipalities. It is an area noted for its fruit farming. The Witzenberg area host many industries, but the agriculture and agriculture related industries are the main stream. Tourism is also a fast growing industry in Witzenberg.

The Witzenberg Municipality was established in December 2000 through the amalgamation of the former municipalities and towns of Ceres, Wolseley, Tulbagh, Prince Alfred Hamlet and Op-die-Berg.

### **1.2 POPULATION STATUS QUO AND WASTE DISPOSAL FACILITIES.**

The 2011 census has indicated that Witzenberg Municipality is home to some 115,950 residents of which approximately 46% are non-urban residents. The main towns are Ceres (pop. 38169), Tulbagh (pop. 10304), Wolseley (pop. 13932), Prince Alfred Hamlet (pop. 7450) and Op-die-Berg (pop. 1757). These figures mentioned might increase due to socio-economic constrains.

Witzenberg Municipality has operating licences for four landfills, but one of these sites has been completely vandalised and is currently not operational. Another had reached capacity and was rehabilitated.

The community of Op-die-Berg located in the Koue- Bokkeveld has its own communal landfill where trenching is used as operational method. The remainder of Witzenberg's Municipal Solid Waste is disposed at the Tulbagh landfill and ODB landfill where area filling is practised and garden waste is disposed at the Prince Alfred Hamlet site.

None of these sites is equipped with a weighbridge, but data is submitted monthly by the Municipality to the provincial Integrated Pollution and Waste Information System (IPWIS).

## **2. STATUS QUO OF WASTE STREAMLINES IN WITZENBERG**

Our main waste streamline is domestic/households waste which contains a large percentage of organic which includes food waste. Organic waste is a problem in landfills as it takes up airspace on landfills, produces methane gas and leachate which contaminate the ground of the landfill. Containment barriers for the contamination caused can be a financial strain for municipalities that are struggling financially. Our garden waste also contributes to organic waste which increases the percentage of our organics.

Presently, Witzenberg Municipality does not have a procedure in place for the diversion of organic waste and that is the reason for compiling and implementing an organic diversion plan for our municipality. A successful implementation of the Witzenberg Organic Diversion Plan will call for local residents within the Witzenberg Municipal boundaries to be aware and concerned that waste issues is an essential component for creating a healthy environment where they can benefit from it. They should be empowered to play their specific role in the development and implementation of the waste management initiatives. Witzenberg Municipality also wants to comply with the targets set by the Western Cape Department of Environmental Affairs and Development Planning (*DEA:DP*) to ban the organic waste to the landfill with 50% by 2022 and 100% organic waste ban from landfills by 2027.

## **3. LEGISLATIVE FRAMEWORK**

The development of the National Waste Management Strategy (NWMS) in 2011 was a great tool in aiding the implementation of National Environmental Management: Waste Act No. 59 of 2008 (NEMWA: 2008). In 2003 the Department of Environment, Forestry and Fisheries has developed a National Organic Waste Composting Strategy to aid the diversion of organic waste from landfills through composting due to airspace at landfill sites is big concern in South-Africa. More can still be done in the field of organic waste diversion.

According to The National Norms and Standards for Organics Waste Composting draft of 2019 “the diversion of organic waste from landfill promotes the achievement of comprehensive and sustainable management of environmental resources and contributes to upholding of the constitutional right of all South Africans to an environment that is not harmful to human health or well-being. Although the norms

and standards for composting is not finalized yet, composting facilities only need to comply with the requirements of these norms and standards if they have the capacity to process organic waste, in excess of 10 tonnes per day.

### **NEM: WA National Norms and Standards for Organic Waste Composting**

These norms and standards apply to organic waste composting facilities that have the capacity to process more than 10 tonnes of compostable organic waste per day. These facilities are required to comply with the norms and standards without a need for a waste management licence as required by the NEM: WA.

### **The Constitution of the Republic of South Africa, Act 108 of 1996**

Chapter 2, the Bill of Rights, Section 24 states: “Everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures that prevent pollution and ecological degradation promote conservation; and secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development”

### **National Environmental Management Act 107 of 1998**

S 2. National Environmental Management Principles are provided 4 (iv) that waste should be avoided or, where it cannot be avoided altogether, should be minimised, reused or recycled wherever possible. 28. Duty of care and remediation of environmental damage states: (1) Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. Municipalities and all generators of organic waste are obligated to minimise this waste type. They are also obligated to rectify any environmental damage caused by poor organic waste management practices in S28.

## **The National Environmental Management: Waste Act, No. 59 of 2008 (NEM: WA) and the National Environmental Management: Waste Amendment Act 26 of 2014**

Both these Acts stipulate controls for the management and recording of waste, including the issuing of licences.

11 (4) (a) each municipality must submit its integrated waste management plan to the MEC for endorsement. This clause compels any holders of waste to minimize and compels large generators of waste e.g. municipalities to implement waste minimization methods to reduce waste to landfill. These Acts obligate municipalities to develop waste management plans inclusive of plans to divert organics.

## **The National Waste Management Strategy (DEA, 2011) and Draft National Waste Management Strategy (DEA, 2019)**

The National Waste Management Strategy places the responsibility (role) on the Municipality (with National and Provincial support in certain cases) to educate, provide vessels (bins), collect, process and dispose (composting facility) of organic waste. Municipalities must make provision in their IWMP or waste management strategy to manage green waste when generated in large quantities. Target to minimise waste to landfill by 25% by 2016. Potential measures to reduce waste with Goal 1 being the most relevant to the reduction and diversion of food waste from landfill through promoting the minimisation, reuse, recycling and recovery of waste. The DEA is currently revising the 2011 NWMS. The Draft 2018 NWMS has three strategic goals to drive an improvement in waste management in South Africa: 1. Waste minimisation; 2. Effective and sustainable waste services; and 3. Awareness and compliance. The draft NWMS (DEA, 2019) encourages the diversion of organic waste from landfill through composting and the recovery of energy as well as increasing technical capacity and innovation for the beneficiation of waste by means of strategic goal 1.

## **the National Waste Information Regulations (13 August 2012, GNR 625, 2012)**

Section 5 (1) & (2) deals with the registration of people on the South African Waste Information System ("SAWIS") Section 8 deals with the reporting or submission of information. Annexure 1: List of persons conducting the following activities must register on the SAWI/IPWIS in terms of regulation 5: Recovery or recycling of waste (b), (c) (e) Treatment of waste (g)

Annexure 2: Reporting requirements in terms of regulation 8 (1)

Annexure 3: General Waste types for reporting to the SAWIS, requires the reporting of garden waste as follows:

Level 1 General Waste types (GW)

Level 2 Major Waste Type: Organic GW20

Level 3 Specific Waste type: Garden Waste (01)

Garden Waste must be reported under GW2001

The National regulations require the registration and reporting of organic waste and garden waste to SAWIS.

### **The National Organic Waste Composting Strategy: Final Strategy Report April 2013**

This strategy assists in providing a direction and clear, structured planning towards a common goal viz. to ensure (where viable) that organic waste generated within South Africa is diverted from landfill sites. Goal 5 in the strategy aims to incorporate composting into municipal planning, responsibilities and create roles for the private sector.

### **The Municipal Systems Act (Act 32 of 2000)**

This policy outlines the role and responsibilities of local governments as to:

- Provide democratic and **accountable** government for local communities;
- Ensure the provision of services to communities in a **sustainable** manner;
- Promote **social** and economic development;
- Promote a safe and healthy **environment**;
- Encourage the **involvement** of communities and community organisations in the matters of local government, and
- Strive, within its financial and administrative capacity, to achieve the objectives above.

These responsibilities indicate a need for an environmentally educated work force (accountable) as well as an environmentally educated public (involvement).

DRAFT

#### 4. STATUS QUO OF ORGANIC WASTE

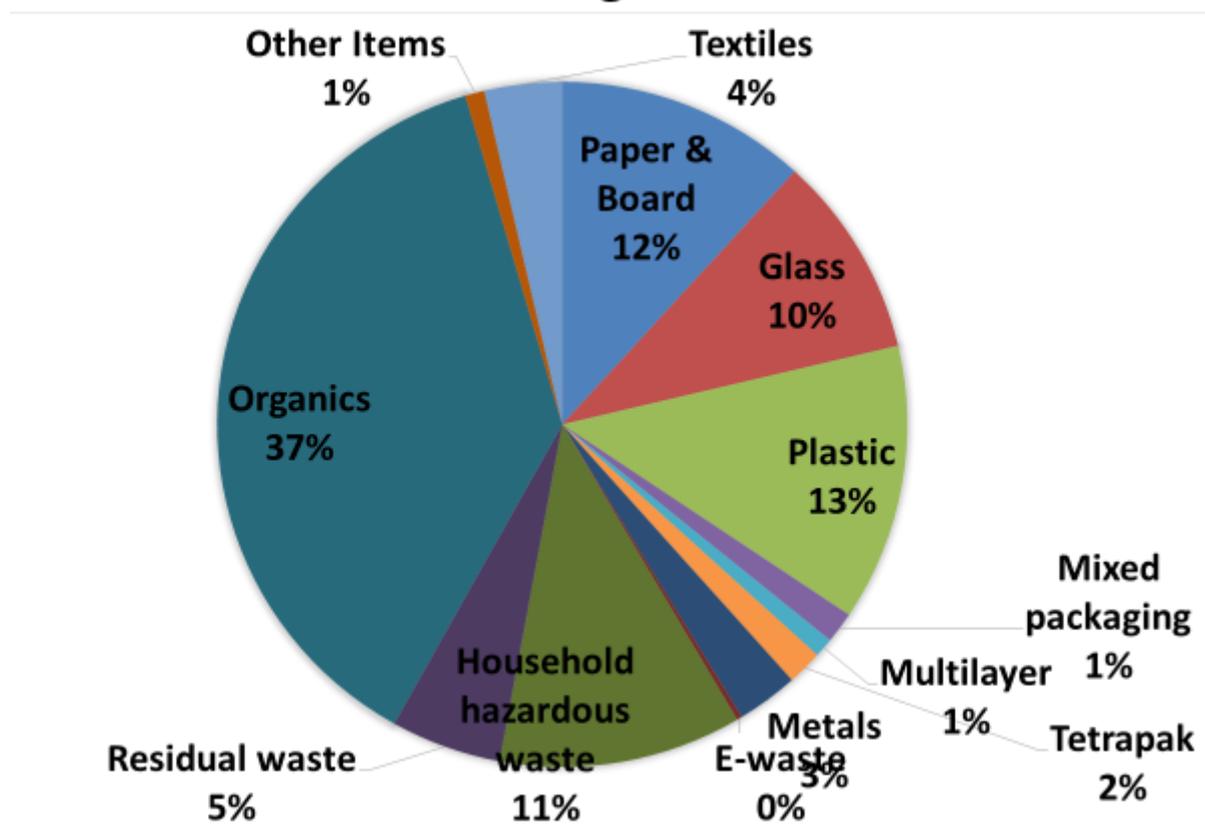
A Waste Characterisation and Brand Audit study undertaken by WAAI in March/April 2019 identified the fact that the municipality could easily and economically divert 85% of total waste from the landfill site. The study concluded that the way to achieve that objective was for the Witzenberg Municipality to adopt a Zero Waste system including waste separation-at-source, especially organic waste separation at-source.

Around 475 tonnes are disposed of per month at the Prince Alfred Hamlet garden waste site. (Source – Witzenberg Waste Characterization)

The organic waste constitutes the largest proportion (approximately 40%) of total waste generated at Witzenberg Municipality.

The separation-at-source of organic waste would reduce cross-contamination and improve the rate, quality and quantity of recyclables that can be diverted from landfill. The waste audit indicated that Organic Waste constituted the largest proportion (37%) of total waste. Please note that the 37% excludes garden waste. If garden waste is included, the actual total organic waste would be 40% of total waste.

#### Overview of Witzenberg waste characterisation



#### 4.1 WASTE CHARACTERISATION DATA AND ANALYSIS

The total waste sampled compared to the predetermined estimated sample size is as follows:

CLUSTER	AREA	SAMPLES REQUIRED (BAGS)	SAMPLE OBTAINED BAGS	TOTAL WEIGHT (KG)	AVERAGE WEIGHT PER BAG (KG)
1	NDULI	100	95	514.2	5.41
	CERES	200	182	828.65	4.55
2	BELLA VISTA	180	181	814.4	4.5
	PA HAMLET	100	100	416.8	4.17
	OP DIE BERG	20	<b>INCLUDED WITH PA HAMLET</b>		
3	TULBAGH	150	176	688.4	3.91
	WOLSELEY	200	202	841	4.16
<b>TOTAL WASTE SAMPLED (KG)</b>				<b>4103.09</b>	

#### 4.1.1 CATEGORIES OF WASTE

A total of 4103.09 kilograms of waste was characterised into the following categories:

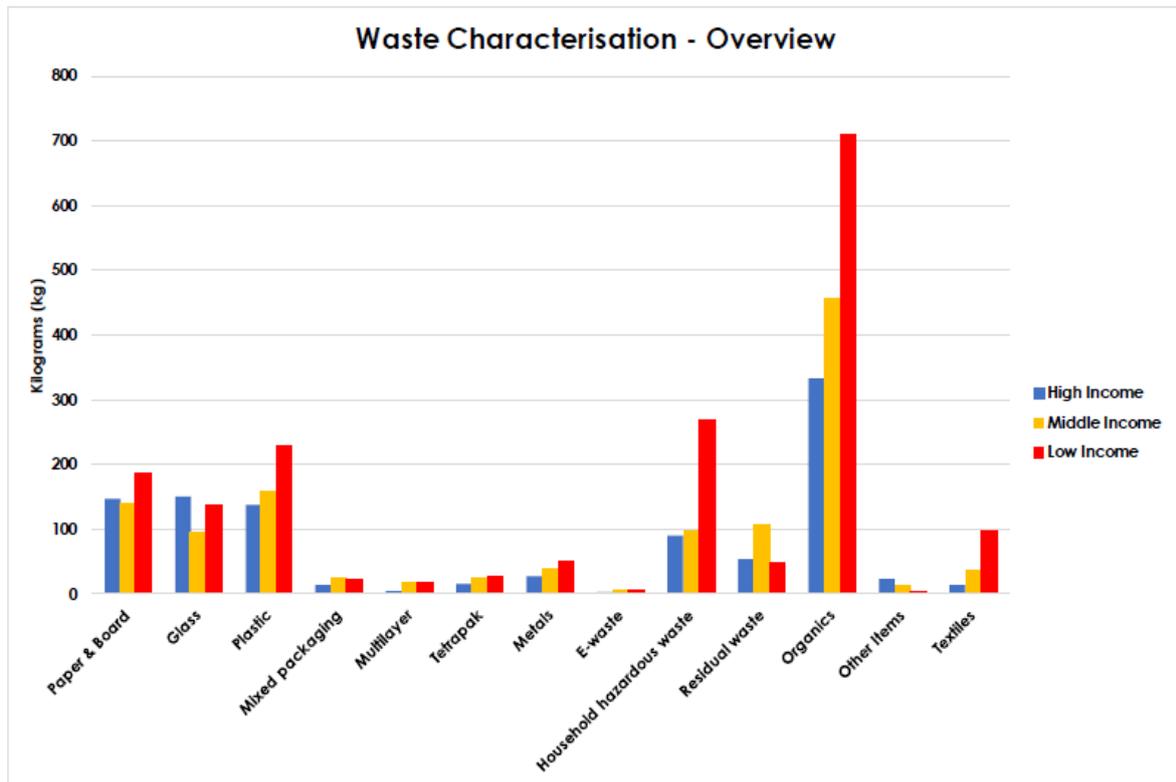
MAIN CATEGORIES	SUB CATEGORIES
PAPER & CARDBOARD	CARDBOARD
	MAGAZINE
	WHITE PAPER
	OTHER
GLASS	GLASS
PLASTIC	PLASTIC
	PE (1)
	HDPE (2)
	PVC (3)
	LDPE (4)
	PP (5)
	PS (6)
	OTHER (7)
MIX PACKAGING	MIXED PACKAGING
MULTI LAYER	SNACKPACKS
TETRAPAK	TETRAPACKS
METALS	ALUMINIUM AND STEEL
E-WASTE	E WASTE
HOUSEHOLD HAZARDOUS WASTE	PHARMACEUTICALS

	FLUORESCENT BULBS
	NAPPIES/SANITARY PRODUCTS
	GARAGE WASTE
	BATTERIES
RESIDUAL WASTE	REMAINDING WASTE FRACTION
ORGANICS	MEAT
	MIXED FOOD
	FRUIT & VEG
	DAIRY
	STARCHES
	LIQUIDS
	GARDEN WASTE
OTHER ITEMS	OTHER ITEMS
TEXTILES	CLOTHING AND SHOES

#### 4.1.2 CATEGORY OF WASTE PER AREA SAMPLED

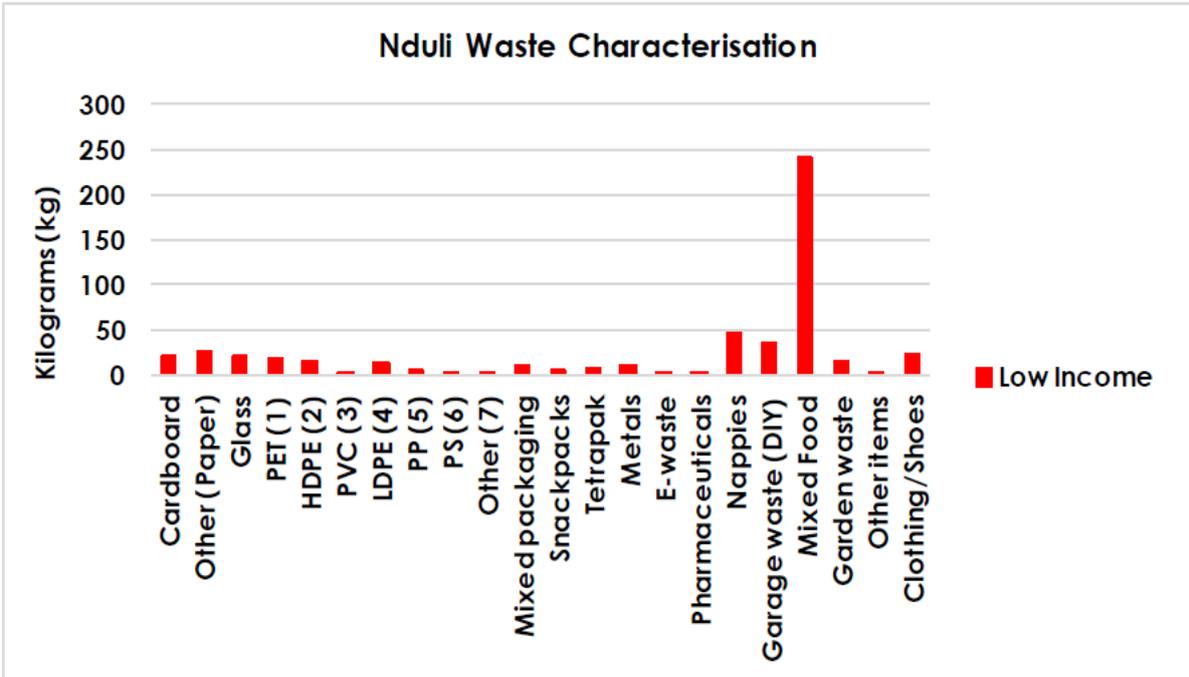
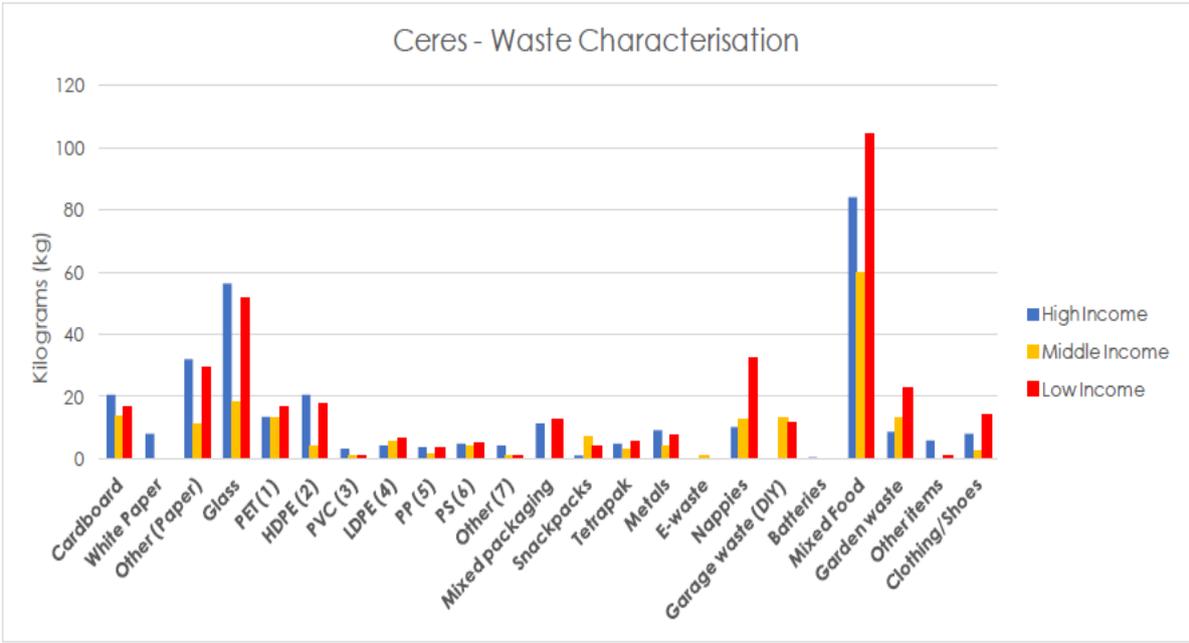
The same colour codes used to identify the high, middle, and low income groups have been carried through to the analyses phase for ease of reference.

The graph below provides an overview of the character of the waste for the areas sampled in the High, Middle and Low Income areas in the Main Categories.

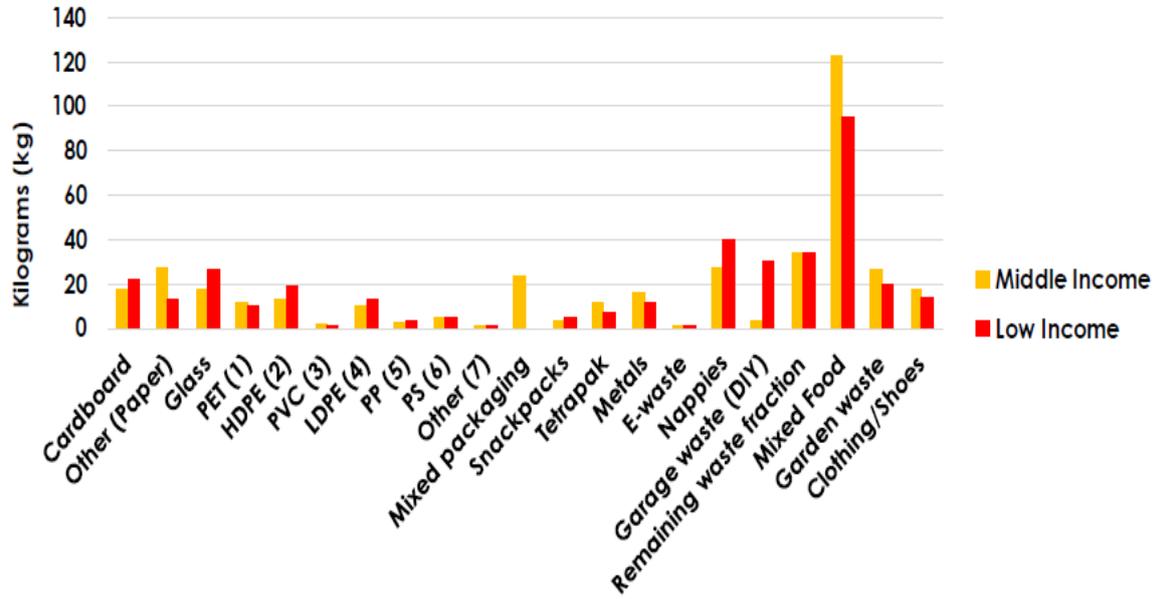


Most notable in the graph is the high organic waste generated in the Low Income household areas. The food-waste was observed to be mostly processed or prepared (as opposed to raw food waste)

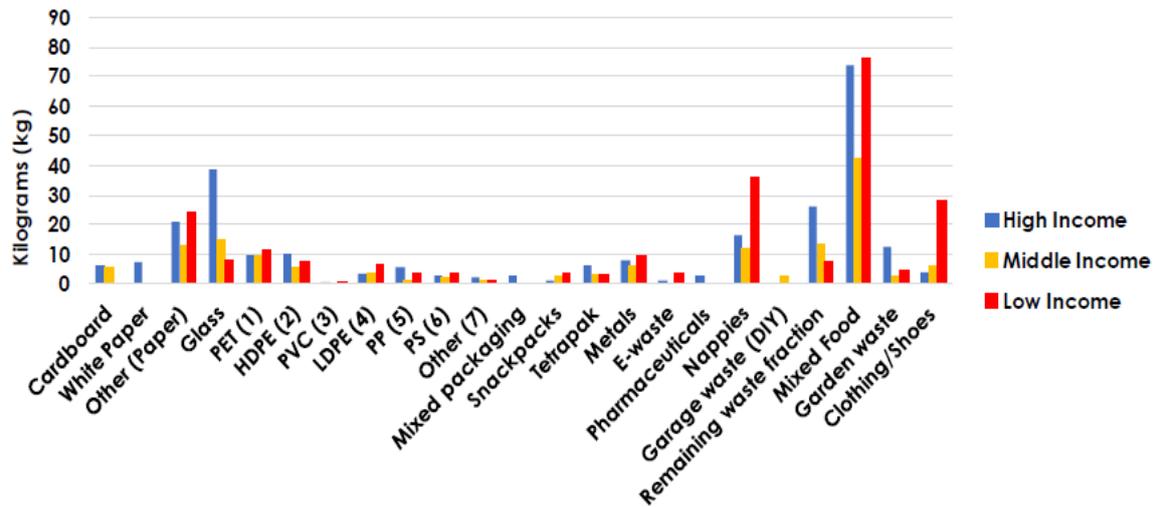
Household hazardous waste was predominantly made up of nappies or diapers. However, we observed a carrier bag full of epi-pens to administer insulin. This appeared to be from a pharmacy or healthcare practitioner rather than from a household.

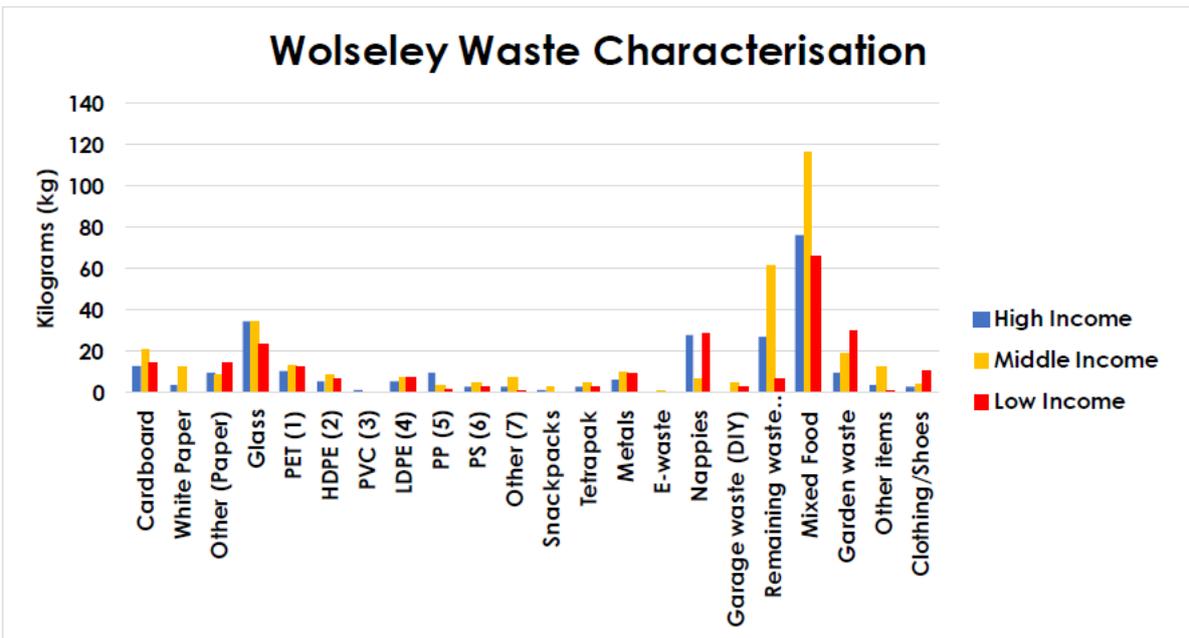
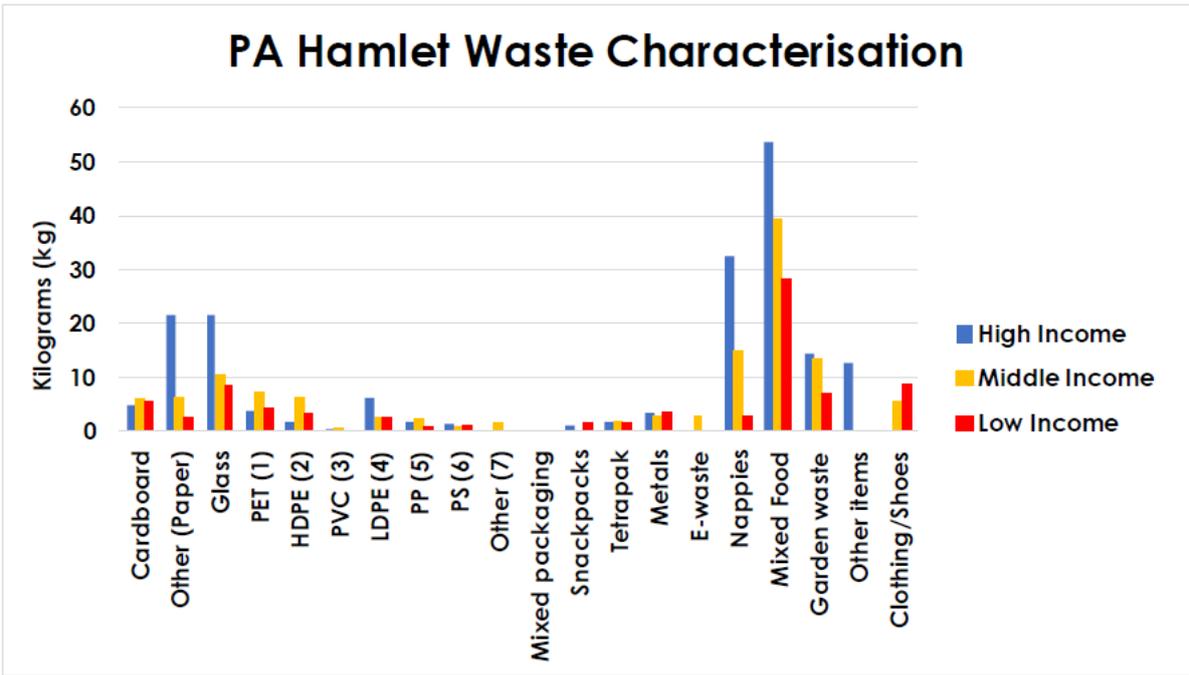


## Bella Vista Waste Characterisation



## Tulbagh Waste Characterisation





Most of the food-waste was left-over cooked food or fruit and vegetable peelings, and sometimes whole fruits and vegetables which were probably expired over-purchased

products. It was very seldom that food in its original packaging was thrown away – if there was any, it was from the High Income samples.

## **5. ORGANIC WASTE DIVERSION OPTIONS**

### **5.1 GREEN BAG SYSTEM**

An effective method of reducing organic waste, and specifically garden waste, in the residential waste stream destined from landfill, is by separate collection of garden waste from residents and businesses. With this system, residents are given a separate bag in which to place their household organic waste and this gets collected by the municipality. The collected bags are taken to PA Hamlet landfill site for treatment. The bags are green to differentiate them at the landfill or composting facility. A green bag system is already operated at Witzenberg Municipality.

### **5.2 CHIPPING AND COMPOSTING**

Composting is the most widely used treatment method for source separated garden and food waste, and would be the preferred treatment method for a municipality the size of Witzenberg.

Composting involves the aerobic decomposition of organic matter and although carbon dioxide is also produced during this decomposition process, no methane is produced. Composting of organic material is therefore environmentally more beneficial than direct landfilling, even if the compost is afterwards landfilled.

Composting of organic waste at a centralized Municipal composting facility would require a minimum of 350 tonnes of garden waste per month (4 200 per annum) to achieve financial sustainability. Although this is an approximate number that depends on a range of factors, the bottom line is that looking at the expected generation volumes in the previous chapter, Witzenberg Municipality does have the required volumes to justify the capital contribution required to develop a central composting plant. It is therefore recommended that the garden waste arriving at the Witzenberg Municipality facilities be mechanically chipped and composted at the landfill sites.

Effective composting requires garden waste to ideally be chipped within one week of being off-loaded to reduce the abrasiveness of the dry garden waste on the chipper's mechanicals, thereby reducing maintenance costs and to produce chipped material that can still be composted. Although all dry materials are important carbon contributors for compost, it is equally important to include enough freshly chipped green material to provide the nitrogen required for organism growth to oxidize the carbon and produce quality compost.

Composting through chipping of garden waste is suitable or ideal organic waste diversion option for Witzenberg Municipality. Where material is too dry and is not enough green material is available to mix in with it, the material needs to be chipped and stockpiled separately as wood chips or mulch for collection by the public. A private composter, Lumbri will be consulted on possible co-operation.

### **5.3 HOUSEHOLD COMPOSTERS**

Home composting in South Africa has traditionally been practiced for the purpose of having an inexpensive and reliable source of compost for the garden. Most recently, the realization that composting is a means of conserving resources, saving landfill airspace and the recycling of organic matter, has become the driving force for composting under individuals as well as clubs/associations. Composting at the home reduces the amount of waste in the residential waste stream and represents probably the only feasible means of composting kitchen waste.

Home composting bins would be beneficial to Witzenberg Municipality for diverting organic waste from landfills. By budgeting for and providing home composting bins to the interested households, the Witzenberg Municipality can encourage households to use kitchen scraps and household organic waste to make compost at home.

### **5.4 MECHANICAL BIOLOGICAL TREATMENT**

Mechanical Biological Treatment (MBT) is a well proven method internationally for removing organics from municipal waste stream by using a combination of mechanical equipment and manual labour. It has many possibilities and associated technologies but due to the relatively low volume of organic waste generated within the Witzenberg Municipality, this option would not viable for the Municipality.

### 5.5 4-BAG SEPARATION-AT-SOURCE MODEL

A 4-Bag separation-at-source model was implemented in the pilot project. In addition to the leaflets and charts, each household was provided with the following bags for separation-at-source:

<b>Compostable bags and caddie container for separation-at-source of organic waste</b>	<b>Green bags for separation-at-source of garden waste</b>	<b>Clear recycled bags for separation-at-source of recyclables e.g. plastic, glass, paper, etc.</b>	<b>Black bags for separation-at-source of other / residual waste</b>
			

### SEPARATION-AT-SOURCE FINDINGS

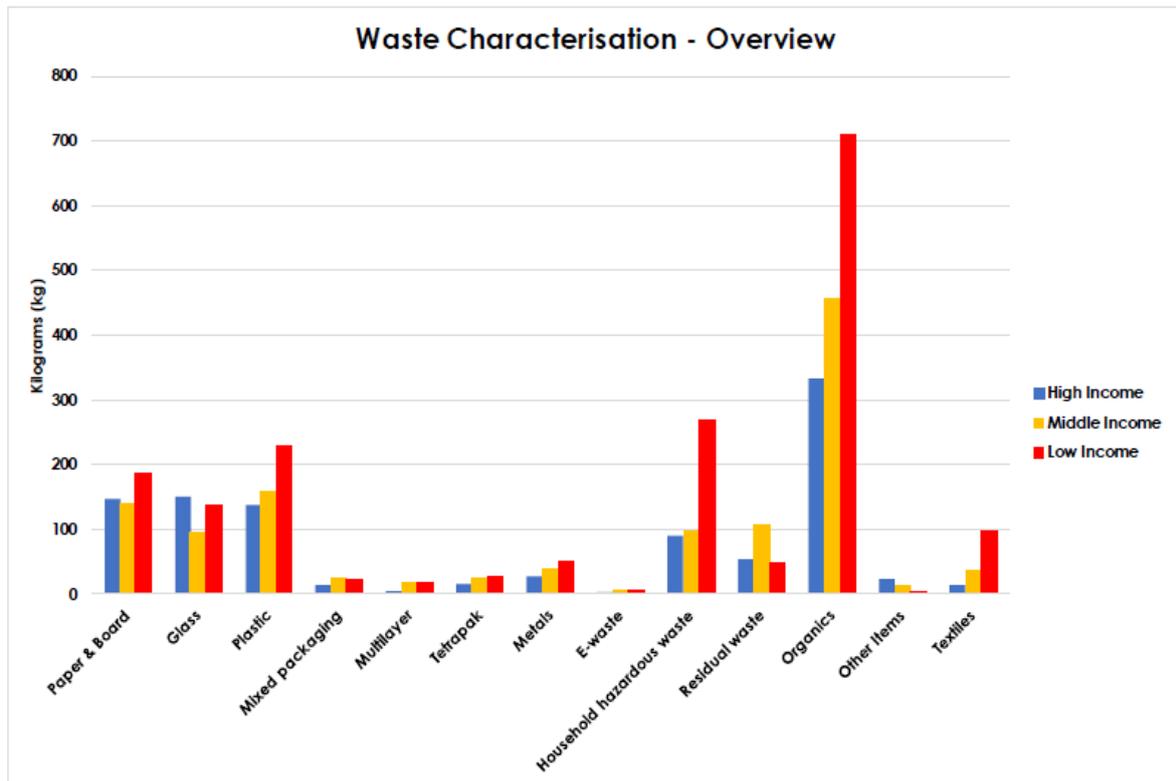
The separation-at-source exercise generated interesting information about the waste separated. Provided below are the following data:

- 1) Number of compostable, green, recyclable and black bags collected per week
- 2) Weight (kgs) of each category of waste collected per week
- 3) Number of food bags collected per week per area
- 4) Weight (kgs) of food bags collected per week per area
- 5) Number of recyclables bags collected per week per area
- 6) Weight (kgs) of recyclable bags collected per week per area
- 7) Number of garden waste bags collected per week per area
- 8) Weight (kgs) of garden waste bags collected per week per area

9) Number of black bags collected per week per area

10) Weight (kgs) of black waste bags collected per week per area

## SUMMARY AND CONCLUSIONS



The Zero Waste to Landfill Pilot Project was undertaken successfully to the satisfaction of the Witzenberg Municipality.

Based on the Pilot Project outcomes there is sufficient empirical evidence to prove the following:

- 1) Separation-at-source, especially of organic waste, is practical and feasible at Witzenberg Municipality
- 2) At least 85%, of what is currently regarded as waste, can be recycled and diverted away from landfill. The key to achieving 85% diversion is separation-at-source of organic waste.
- 3) The organic waste component in mixed waste results in cross-contamination; reduces the recycling efficiency, quality and quantity. Organic waste is the largest cause of health and environmental problems in landfills.

## **6. IMPLEMENTATION AND AWARENESS**

When the recommendation of this plan is approved by the Witzenberg Municipality it would be crucial to inform the public to shift their minds to the diversion of organic waste from landfills. Meetings must be held with stakeholders who are identified by the municipality to be part of the project.

Training and workshops from Human Resources side to recruit participants to aid in the awareness and education schedules of the project.

Witzenberg Municipality already has Waste Ambassadors that does Waste Management Awareness and Education sessions inside communities. An Organic Waste Diversion Forum can also be established to drive the diversion of organic waste where all local composters comes together and discuss the progress on organic waste diversion strategies. Waste Ambassadors will be handing out pamphlets' and posters door to door, supermarkets, and malls. They should also be handing out the surveys to determine the interest in composting. While they are busy with awareness, the important thing is that they know what the awareness is about if there should be any question or if public require explanations that is why the training/ workshops is key to the participants.

## **7. CONCLUSION**

The Witzenberg Municipality does not currently divert any organic waste from its landfill and garden and food waste get taken to the PA Hamlet landfill site, except the pilot sites in Tulbagh where a 4-Bag- separate at source system is in used for the Zero Waste to Landfill Pilot Project that commenced in 2019. An investigation must be launched to expand the separation at source model.

The Western Cape D:EA&DP made it a condition in most of the provincial waste licences that organic waste diversion plans to be developed for landfill in the province. This also applies for landfills issued with closure licences that specifically only receive garden waste and builder's rubble like some of the landfills in Witzenberg Municipality.

Through the implementation of a separation at source, chipping and composting facility Witzenberg Municipality can greatly assist the organic waste diversion from the regional landfill which also be required an Organic Waste Diversion Plan as part of its waste licence conditions.

All garden waste is taken to PA Hamlet landfill with a green bag collection system and it is recommended that the Witzenberg Municipality investigate chipping & composting at the PA Hamlet landfill.

In diversity there is beauty  
and there is strength.

MAYA ANGELOU

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