Western Cape Government
Environmental Affairs and Development Planning

Addendum C: Developing a Generic Organic Waste Diversion Plan

March 2020

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1. Introduction and motivation for the diversion of Organic Waste

The Draft National Norms and Standards for Organic Waste Composting (2019), defines organic waste as 'waste of biological origin which can be broken down, into its base compounds by micro-organisms and other living things and/or by other forms of treatment. In South Africa, organic waste mainly originates from households, while the rest comes from agriculture, forestry, alien clearing, municipal solid waste and commercial or industrial solid waste. A large percentage is also generated from sewage treatment plants. Sewage sludge will however not be addressed within the Provincial Organic Waste Strategy (2020) but can be included as an additive feedstock in any of the prescribed waste to energy beneficiation technologies. Organic waste types generated nationwide include garden waste, food waste (including abattoir waste), wood waste, sewage sludge and industrial organic wastes (e.g. paper mill sludge, meat processing waste, brewery wastes, and textile mill fibres).

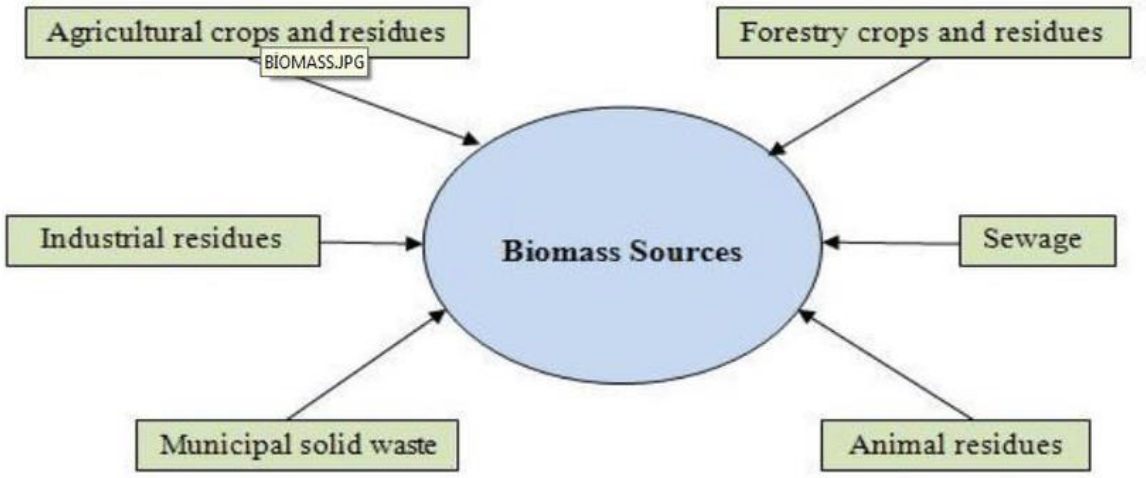


Figure 1: The various sources of organic waste (Source: Draft Norms and Standards for Organic Waste Treatment, 2017)

What are the key sources of the organic waste fraction in your municipality?

Are any of these waste types generated in your municipality?

The diagram below gives an indication of the Organic Waste fraction of municipal solid waste in the Western Cape.

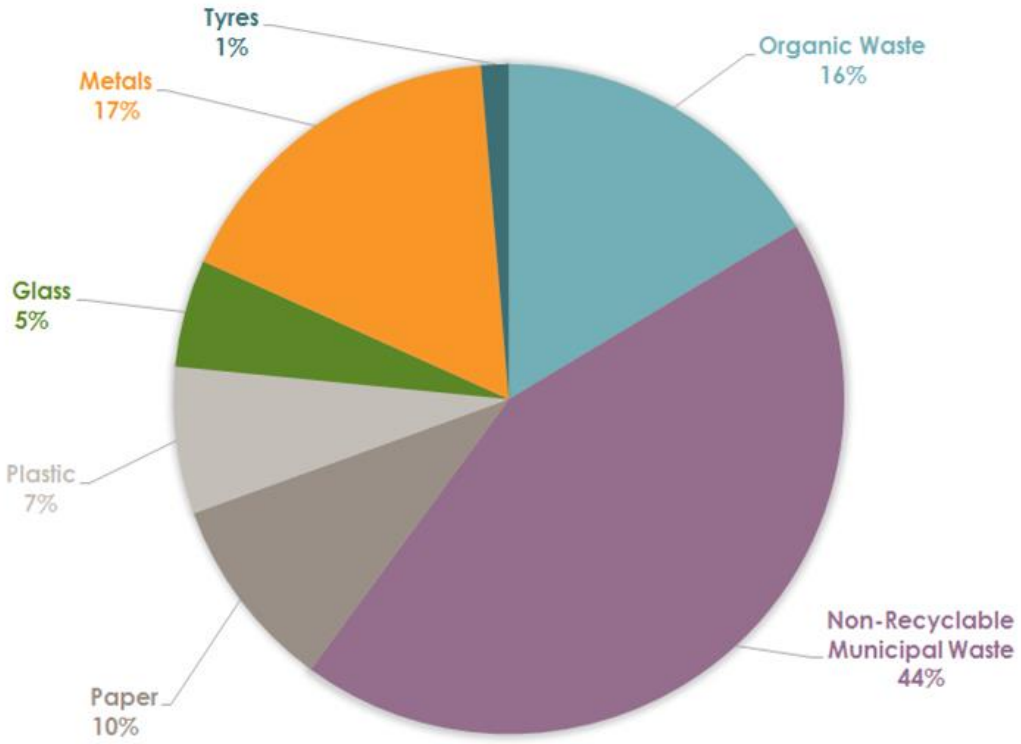


Figure 2: Municipal Solid Waste (MSW) WC – 3.8 mil tonnes, 2011

What is the organic portion of the waste stream in your municipality?

1.1 Current organic waste management practices

- Organic waste is problematic as it occupies too much landfill airspace, contributes towards the greenhouse gas emissions and produces leachate which contaminates ground waste. Expensive containment barriers are needed to mitigate groundwater contamination which is problematic for cash stripped municipalities.
- The fact that many existing landfills in the Western Cape do not meet regulated operational requirements exacerbates the environmental impacts.
- The provincial policy is to ban 50% of organic waste from landfill by 2022 and a complete landfill ban of organic waste by 2027.
- All licenses issued by the department are also being amended and municipalities are now obligated to submit organic waste diversion plans.

An organic waste diversion plan will ensure that the waste type is appropriately beneficiated locally or within the district municipality.

1.2 Organic waste diversion plan requirements for waste licenses issued

1) **Provide a status quo of Organic waste**
    - Sources
    - Volumes disposed at municipal waste disposal facility
    - Current organic waste diversion rate.
    - Current procedures for diversion from waste disposal facility

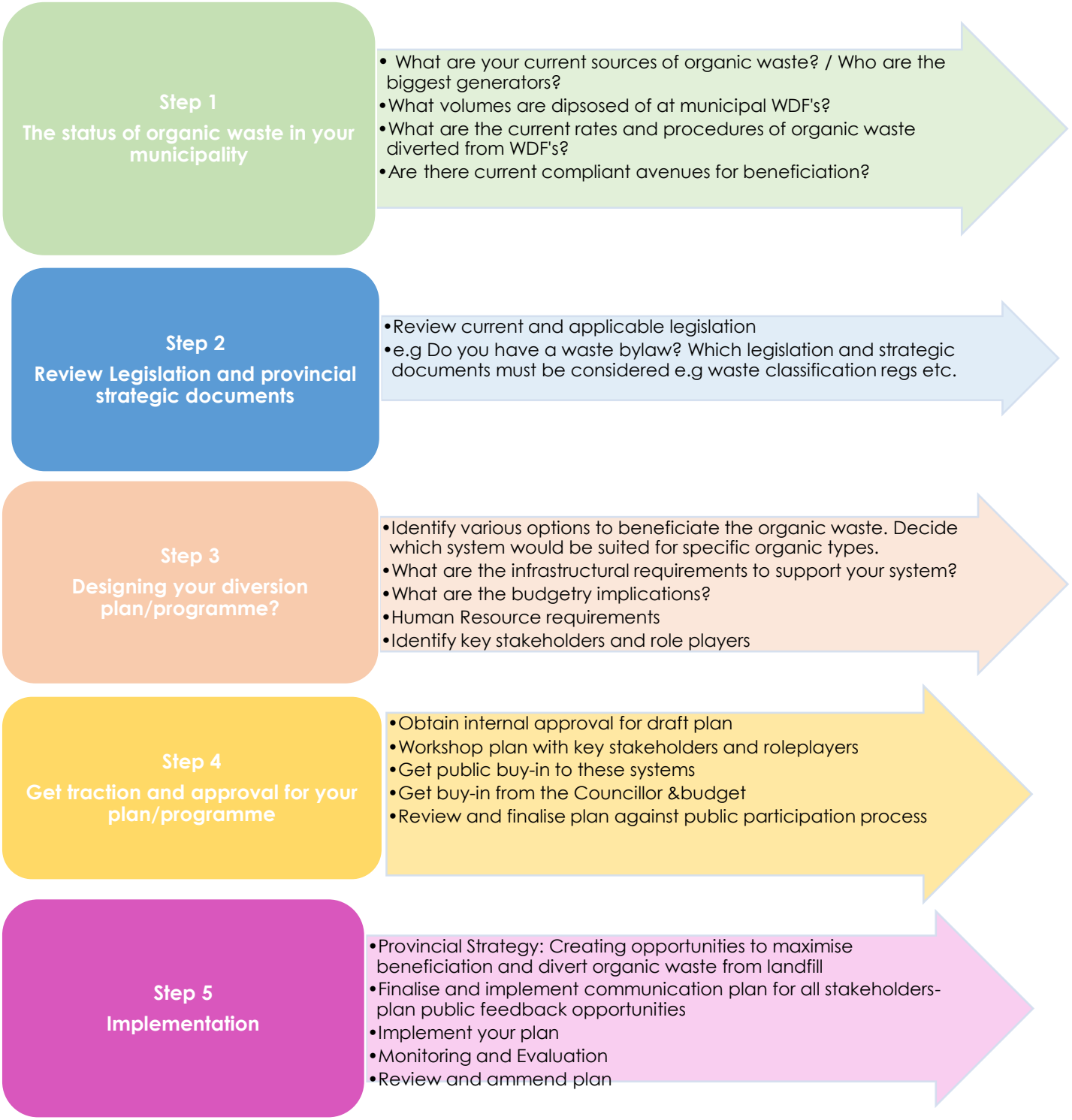
Verification of data is required/How will verification be achieved?

2) **Set annual targets and identify procedures that will be implemented to:**
    - Reach 50 % diversion by 2022
    - Reach 100 % diversion by 2027

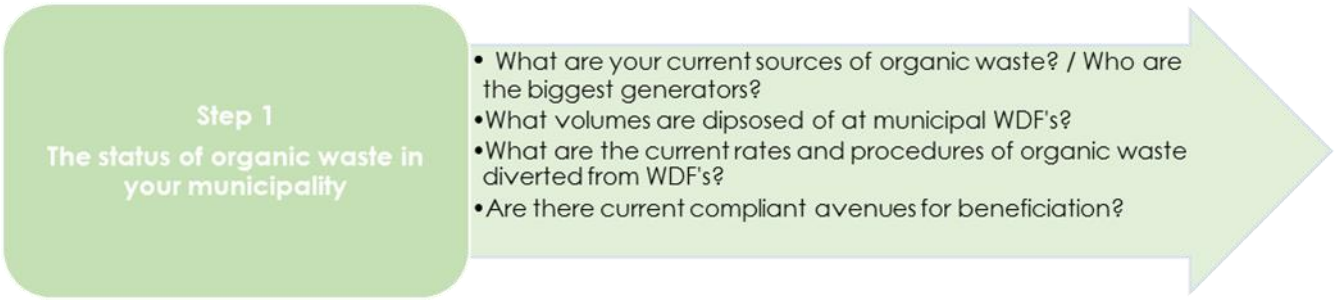
2. Designing your Organic Waste Diversion Plan

2.1 Key steps to follow when developing your plan

Below is an easy schematic on the way forward to start designing your Organic Waste Diversion Plan.



2.1.1 Know the status of Organic Waste in your area

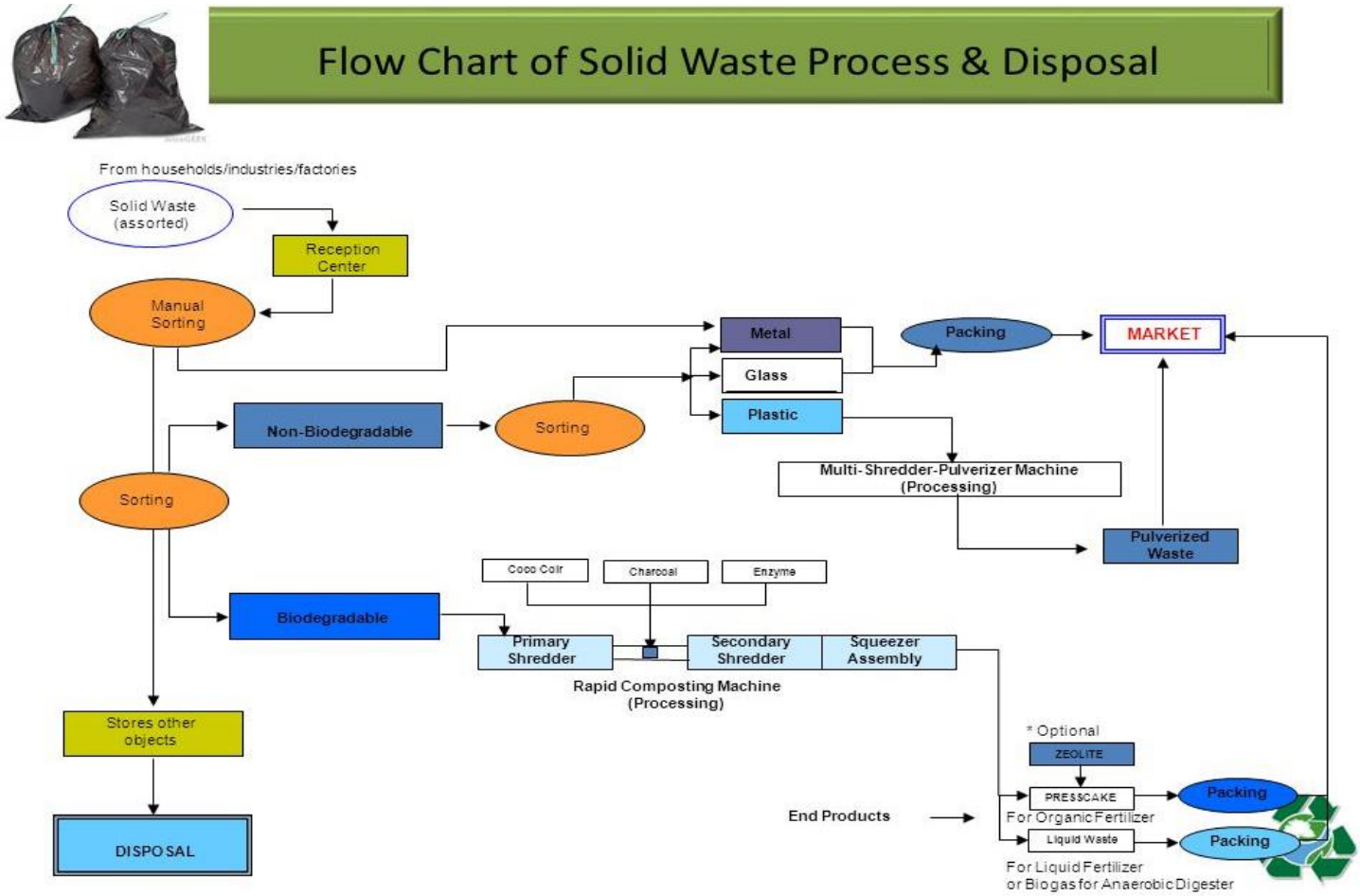


Determine current organic waste practices and initiatives. It is important to record all types of waste including organic waste that is being disposed of at your waste disposal facilities. Ensure that your staff are accurately recording waste quantities entering these facilities. It is imperative that you maintain accurate gate records of the various types of organic waste entering your site so that you can explore various beneficiation options for your plan. In most cases organic waste is comingled with other waste types and a waste characterisation study conducted at the disposal facility will shed light on the composition of your waste stream.

Identifying your main sources of organic waste in your respective towns. Knowing what portions are coming from households or industries and shops is necessary when developing your plan.

What is the current infrastructure and capacity to beneficiate the various types of organic waste in the various towns? Local beneficiation is always better as it reduces the transport costs e.g. Is there a chipper in the municipal area? Can all green waste be diverted to this site or can the chipper be transported between towns? Are their pig farmers willing to take separated food waste etc. Which organic waste type and quantity cannot be beneficiated. It is important to research all available treatment facilities/technologies in the region. These steps will identify where more infrastructure might be needed or even where it needs to be expanded. In most cases these facilities and technologies are privately owned and agreements between the municipality and these facilities are needed. (see the Department's infrastructural study for more info on current available infrastructure (the documents are available for all municipalities)

2.1.1.1 Conduct a waste flow exercise



2.1.1.2 Waste Characterisation

The Figure below is an example of results from a waste characterisation study from households and shows the percentage of the different waste streams from the sample size collected within the municipality.

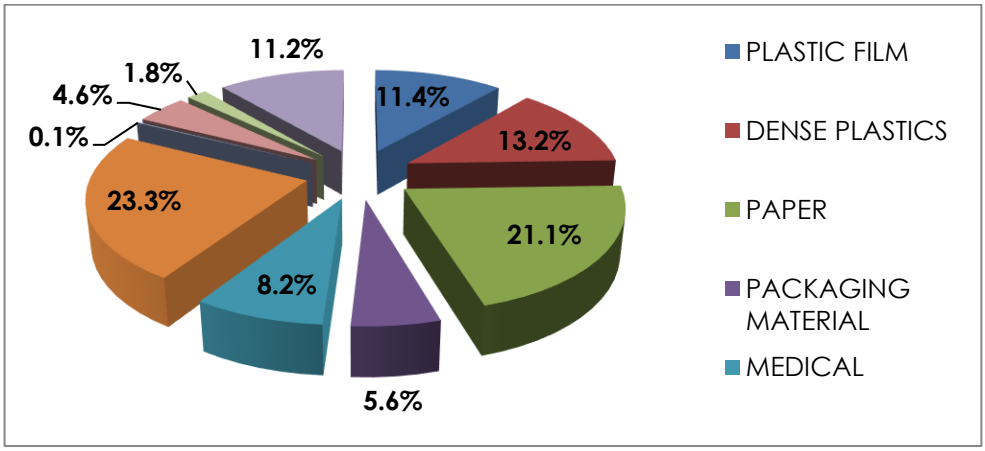


Figure 3: E.g. of results from a Municipal waste characterisation study from household's

2.1.1.3 Example of the Types of feedstock and Technologies

Types of feedstock and Treatment options					
Agriculture	**Mechanical**	**Chemical**	**Anaerobic**	**Aerobic**	**Thermal**
Manure	✓		✓	✓	✓
Mortalities	✓	✓	✓	✓	✓
Biomass: Lignocellulose (woody)					
Agricultural crop residue	✓	✓		✓	✓
Invasive plant species	✓	✓		✓	✓
Plantation residue	✓	✓		✓	✓
Sawmill residue	✓	✓		✓	✓
Processing:					
Abattoir waste	✓	✓	✓	✓	✓
Food Oils	✓	✓	✓	✓	✓
Organic fraction of (Municipal Solid Waste) MSW	✓	✓	✓	✓	✓
Restaurant waste	✓	✓	✓	✓	✓
Certified biodegradable bioplastics	✓	✓	✓	✓	✓
Food processing	✓	✓	✓	✓	✓
Sewage:					
Sludge	✓	✓	✓	✓	✓

(Source: Draft Norms and Standards for Organic Waste Treatment, 2017)

2.1.2 Example of Status Quo for the town of Greyville

Waste generation and flow for the town of Greyville. A household characterisation was conducted which indicated a 20% organic fraction.

Source	Type of organic waste	Quantities collected	Frequency of collection extrapolated	Kg to Waste disposal	Kg to beneficiation	Destination distance by road
e.g. Greys hospital	Mixed food waste from wards	400 kg	monthly		400 kg	Pig farm in Greyville 15km

e.g. Greys hospital	Garden waste	100 kg	monthly	100 kg		Greenhaven landfill 60km
Municipal alien clearing: Greyville area	Green waste	12 tons (12000 kg)	monthly	12000 kg		Greenhaven landfill 70km
1000households in Greyville- 20% organic fraction	Mixed organic waste	20000 kg	monthly	20000 kg		
Greyville Abattoirs	Abattoir waste	52 tons (100 000 kg)	monthly	40 000 kg	12 000 kg	Greyville 10km Greenhaven 70 km
Totals				**72 100 kg**	**12 400 kg**	

Table 3: Organic waste flow table with sources, quantities and destinations

Total waste disposed: 72 100 kg = 72.1 tonnes

Total beneficiated: 12 400 kg = 12.4 tonnes

Total Organic Waste generated: 84 500 kg = 84.5tonnes

Current Organic Waste Diversion rate for Greyville: 12400/84500 x100 =14.7%

2.1.2.1 Treatment capacity and infrastructure

Town	Pig farmers can receive 500kg per week	Chipping; Can process 5 tons daily	Green waste drop-off	Composters	Rendering plants: process 10 tons abattoir weekly	Pyrolysis 10 tons of green waste per day	Anaerobic digesters 100 tons of mixed organics per day
Greyville	X				X		
Greenhaven			X				X
Bluewater	X	X				X	

2.1.2.2 Gap analyses

Item no	Current state	Desired state	Gaps	Actions to address gaps
1	No separation at source of organic waste from households	All households have composting bins and are only placing non-organics in their refuse bins	A campaign to get households to compost all their organic waste at home	Initiate phase 1 pilot roll out of composting bins and then incrementally roll it out to all areas
2	Businesses are not all separating their organics waste from dry waste and are disposing of it at the landfill	All businesses are separating their organics and ensuring that it is beneficiated	The need for a system of incentives/disincentives to encourage businesses to separate their organic waste at source and take responsibility to beneficiate it.	Develop incentive and disincentives for businesses to separate their organics and beneficiate it Communication plan to make businesses aware of scheme
3	No gate control or system at landfill to divert organics	Strict gate control and all landfill staff are trained to ensure that it is separated from general waste at landfill and then beneficiated	Need for an improved landfill management system to divert organic waste	Appoint and train landfill operators to manage organics as per waste diversion plan.
4	Outdated bylaw that has no provision that supports the diversion of organic waste	A solid waste bylaw that is aligned to current national and provincial legislation and priorities	Need to review and amend bylaw or adopt the provincial model bylaw	Review current waste bylaw in terms priorities and initiate legislative process
5	Poor infrastructure in place to divert and recover organics	All municipal transfer stations are well equipped to recover and separate waste	Need to review all waste sites and to use infrastructural study to determine costs of upgrading transfer stations /MRF's to maximise recovery	Develop an action plan with budgets to upgrade existing infrastructure that will support a waste diversion from landfill

6	No waste awareness activities	Intermittent waste awareness campaigns aimed at various stakeholders to reduce littering illegal dumping and to minimise waste	No waste awareness strategy and action plan in place	Develop and implement a waste awareness strategy and action plan for the municipality

Detailed Gap analyses				GAPs	Options	
Town	**Organic waste type**	**Total generated**	**Total treated**	**Total landfilled**	**Treatment option1**	**Treatment option 2**
Greyville	Food waste	20 tons weekly	10 tons weekly to pig farmers	10	Anaerobic digester in Greenhaven	Pig farmer in Bluewater's
	Abattoir waste	25 tons per week	10 tons treated at rendering plant	15 tons landfilled weekly	Send to anaerobic digester in Greenhaven	Increase rendering capacity in Greyville

Diversion rate currently working, what are you currently doing? What systems do you currently have in place? Budgetary implications to put systems in place, licensing implications, legal implications etc.

2.1.3 Review Local and Provincial Legislation and strategic documents

It is important to keep abreast with current national and provincial waste related legislation to ensure that the municipality, its citizens and industries comply with them. It is also critical to ensure that your municipality has a solid waste bylaw and that this bylaw is aligned to provincial and national legislation.

A well thought out bylaw should empower the municipality to implement effective waste minimisation strategies like the diversion of organic waste. It is also important to know the legislation that impacts on all who are treating and beneficiating organic waste. One of the key elements of developing an organic waste diversion plan is to ensure that you review your bylaw status and initiate the amendment process. The provincial Model Integrated Waste Management By-law has incorporated the clauses to assist municipalities to divert organics.

The legislative framework for the management of organic waste in South Africa is presented in the table below.

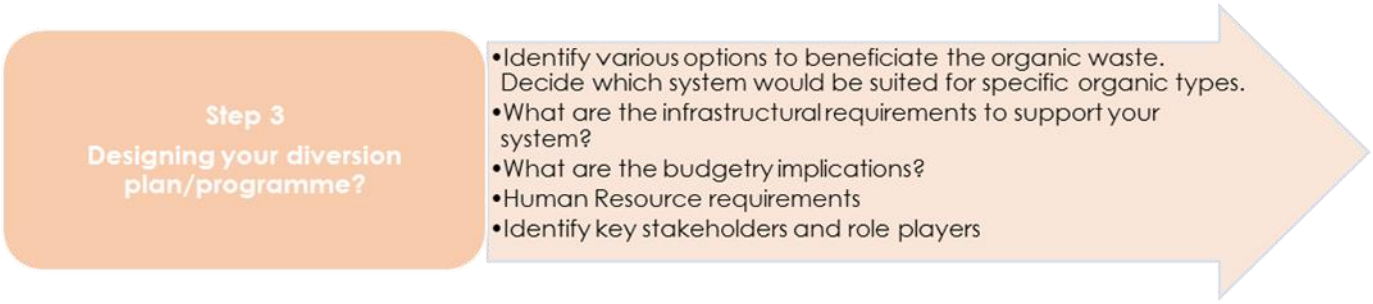
Environmental Legislation	Sections Relating to Organic Waste	Implication
Model Integrated Waste Management By-law	Chapter 6: Handling different types of waste Organic waste (1) The occupant of land or premises on which— (a) organic waste is generated, may compost the waste on the premises, provided that the composting does not cause a nuisance or harm to human health or damage to the environment; (b) organic waste is generated and not composted, must ensure that the waste is collected and treated or disposed of within a reasonable time after the generation thereof. (2) The municipal manager may issue a directive to— (a) a transporter of garden waste or a person providing garden maintenance services, to transport any garden waste to a designated facility provided by the Municipality for disposal; (b) an organic waste generator to develop an integrated refuse management plan indicating measures to minimise and recover such waste; and (c)an organic waste generator to transport the waste to designated facilities for treatment or disposal. (3) The Municipality or a service provider may, on the written request of the occupant of premises on which organic waste is generated, deliver an appropriate receptacle for storing organic waste, in addition to any receptacle provided in terms of section 5(1) for general waste, on payment of a tariff.	The incorporation of clauses within the Model Integrated Waste Management By-law empowers a municipality to implement effective waste minimisation strategies like the diversion of organic waste.
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"	This provision speaks to illegal dumping of any waste or any damage to the environment resulting from the mismanagement of waste.
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	Duty on holders of waste to minimise the waste. 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.

	stopped, to minimise and rectify such pollution or degradation of the environment.	
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) Draft National Waste Management Strategy (DEA, 2019)	The National Waste Management Strategy (NWMS Table 3, 2011) 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	The National regulations require the registration and reporting of organic waste and garden waste to SAWIS.

	Level 3 Specific Waste type: Garden Waste (01) Garden Waste must be reported under GW2001	
National Norms and Standards for the Disposal of Waste to Landfill (23 August 2013, GG No. 36784 GN No. 636)	Waste is evaluated in terms of the Norms and standards for the Assessment of Waste for Landfill Disposal set in terms of Section 7(1) of the NEM: WA. Waste Disposal Restriction provides prohibitions and restrictions on the disposal of waste to landfill and accompanying compliance timeframe. Section 5 (1) (q) the regulations states waste which has an angle of repose of less than 5 degrees or waste with a moisture content of less than 40% has been enforced by August 2019 which forces food waste diversion from landfill due to leachate production, (t) 25% diversion of separated garden waste must take effect within 5 years, and 50% diversion within 10 years i.e. from 2018 to 2023. and (u)indicates that infectious animal carcasses and animal waste are prohibited and/or restricted from landfills with immediate effect, implying that treatment is needed before disposal at Class B sites.	The National regulations provides restrictions and prohibitions on the disposal of waste to landfill for liquid waste, garden waste and animal waste and infectious animal carcasses.
Regulations regarding Fertilizer (GN No. 250, 23 March 2007)	Annexure A gives the requirements for the registration of fertilizers in South Africa and the general requirements for fertilizers (including compost, municipal compost, sewage sludge, etc.)	Provides requirements for fertilisers for compost, municipal compost, sewage sludge etc.
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.
NEM: WA National Norms and Standards for Organic Waste Composting	Provides a uniform approach relating to controlling the composting of organic waste at a facility that falls within the required threshold. Ensures the BPEO in the composting of organic waste.	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.
National Norms and Standards for the Sorting, Shredding, grinding, Crushing, Screening, or Baling of General Waste. (No. 243 of 2017)	The purpose of the norms and standards is to provide a uniform national approach relating to the management of facilities that sort, shred, grind, crush, screen, or bale general waste.	The Norms and Standards apply to a waste facility that has an operational area that is 1000m^2, and a facility that has an operational area that is less than 1000m^2 must comply with section 4(4) of the Norms and Standards.

The National Environmental Management: Air Quality Act (Act no. 39 of 2004), Standards and Regulations	The requirements for the use of biomass in boilers must be adhered to, as required by the 'Declaration of a Small Boiler as a controlled Emitter and Establishment of Emission Standards' (GG No. 831, 1 November 2013). Applicable for technologies that treat waste especially where any combustion or emission takes place.	*The Department of Environment, Fisheries and Forestry (DEFF) has confirmed that Category 10 of the NEM:AQ is no longer applicable to biogas facilities.*

3. Design your system and resource requirements



Now that you have completed the status quo on organics in your municipality and have identified the gaps, you can proceed with a detailed diversion plan with the required timeframes, resources and budgets. It is important to prioritise your actions in terms your resource and budgetary constraints while ensuring that your municipality is compliant with the legislation. It is imperative that you alert your senior managers and your political principles on compliance with the legislation so that they can prioritise budgets and resources for waste in order to avoid legal action.

The steps you have taken thus far are:

1. Conduct study on the status of managing organic waste in your municipality
2. Identifies the gaps and required actions.

You are now ready to draft your diversion plan where you will now include the actions from your gap analyses and add resources (both human and physical resources), institutional arrangements needed; budgets and timeframes.

The table below provides the framework for your organic waste diversion plan. A Gantt chart specifying actions on a calendar can be drafted from this framework.

3.1 Table below provides the framework for your organic waste diversion plan

Town	Waste source	Waste type	Quantities to be diverted	Preferred Diversion option	Human resource requirements	Infrastructural requirements	Institutional Arrangements	budgets	Action owner	Start date	Implementation date
Greyville	Greyville abattoir	Abattoir waste	15 tons weekly	Divert to anaerobic digester with negotiation with abattoir &rendering plant to increase capacity in long term	No additional staff	None for municipality	- abattoir owner to deliver abattoir waste directly to anaerobic digester. -Waste manager to engage with management of anaerobic digester facility.	none	Waste manager		
Greyville	Greyville hospital Greyville hotel Betty's bistro Guest houses Spar residential	Mixed food waste	10 tons	Anaerobic digester in Green haven	Communications officer; environmental officers; EPWP coordinator - EPWP workers, YES programme youth for awareness and delivery of notices to businesses and households	Food waste drums for business green genie composting bins pilot for households	-Awareness material and notices to be developed for households. - advertisements in local newspaper. - payment structure for business to hire of food bins. - incremental roll out plan for composting	R200000 R350000	Waste manager		

3.2 Gant chart

No	Deliverable	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Year 2	Year 3
1	Finalise and obtain approval for the organic waste diversion plan														
2	Prioritise actions on your diversion plan														
3															
4															
5															
6															
7															
8															

4. Get traction

- Get the public opinion on the different systems
- Get public buy-in to these systems
- Decide on a system together
- Get buy-in from the Councilor as well as budget

In this step it is important that you get buy-in from the local community and councillors. The community needs to agree to the proposed system as they are needed to make the system work. Councillor buy-in is also very important as they vote for the budget allocation and they can support the project through their interaction with their ward.

4.1 Public Buy-in on the System

As mentioned previously it is important that the people residing in your area are happy with the system that you would like to implement. It is important that they agree to the system and are willing to do their part to make it work. None of the systems will be effective if we don't get public buy-in. Consultation is thus key in this regards, public meetings or meetings with public bodies, including rotary associations, clubs, woman's groups etc. can be easy ways to get a wide amount of exposure with minimal effort. This is the beginning of your awareness. It is not just important that the public are made aware of the proposed systems that you would like to implement but that they also have input into the project.

4.2 Political will and budget

It is important that the costs of any system be estimated so that this can be compared to the current price of disposal. The following needs to be considered:

- How much airspace is left at the current site?
- How much will it cost to construct a new cell with a liner, if space is available?
- How much will it cost to licence a new site?
- How long will it take to licence a new site, taking into consideration that most Waste Management Licences are currently appealed and challenged within the High Court?
- Is there land available close to municipality to do this?

All these factors should be considered as the future costs are much higher than the current costs. Which points to the fact that the current airspace of the site is very valuable and should be saved as much as possible. Awareness to be effective. It is thus important to get the people involved as soon as possible and to keep them

informed throughout the process. Letting them know about the costs involved and the costs saved will help your cause. These facts can also be used to get political buy-in for the project. These projects usually stimulate job creation and certain systems can also be used as a tool for awareness raising within the Municipality. Councillors can help in various ways, from actively engaging with their area to helping pave the way for these different systems.

5. Implementation

It is now time for you to implement your chosen systems. It is however advised that these systems should first be piloted as the outcomes of these systems cannot always be predicted. Although one system worked within one geographic and demographic area, doesn't mean it will work in another one.

5.1 Provincial Strategy: Creating opportunities to maximise beneficiation and divert organic waste from landfill

The below section outlines a strategy for the Western Cape to divert organic waste from landfill and unlock organic waste as a resource. The strategy aims to use various scalable solutions to generate significant economic value through unlocking finance, strengthening policy, stimulating innovation and promoting education.

The Provincial Framework for increasing Organic Waste diversion from landfill is presented in the **Error! Reference source not found.**below and forms part of the strategy.

The provincial strategic framework strives towards the achievement of the following goals with accompanying objectives:

Goal 1: Waste Prevention - Reducing the Generation of Organic Waste

Goal 2: Recover Resource from Organic Waste stream

Goal 3: Support resource recovery infrastructure

Goal 4: Promote the beneficiation of organic waste

Goal 5: Improving waste information management

Goal 6: Awareness and education

5.2 Continued awareness and education with a Communication Plan

It is now important that you continue raising awareness within your Municipality. This can take many forms:

- Distribution of a waste management calendar to residents
- Newsletters issued with rates and taxes
- Promotion material sent to residents advising them of what can be diverted
- Presentations in schools, displays at malls, etc.
- Public awareness helps to divert waste in two ways: it educates the public about alternatives to disposal and it raises the awareness of residents on waste management issues. With the program an additional staff person would be added.
- Waste related puppet shows
- Home composting starter kits with bins/bags and fridge magnets
- Articles in the local newspaper about diversion amounts given in easily understood terms (e.g. x amount of rugby fields, x number of trees saved etc.)
- Liaising with homeowners' associations and rental agencies
- Events and outdoor recycling
- Banners with slogans on waste management and separation at source

5.3 Review the system

If a system is implemented, it is important that the system is assessed to make sure that it is working as required. If new technology or systems are developed they can be brought into the current system to make sure that the system stays efficient.

Gain more useful information at these sites:

https://www.refed.com/

https://dec.vermont.gov/waste-management/solid/universal-recycling

Notes: