STELLENBOSCH MUNICIPALITY

FINAL

4TH GENERATION INTEGRATED WASTE MANAGEMENT PLAN

2024 - 2029

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TABLE OF CONTENTS

Table of Contents

TABLE OF CONTENTS i

List of abbreviations v

Executive summary 1

1 Introduction 6

1.1 Background 6
1.2 Scope of the IWMP 7
1.2.1 Alignment and relationship of the IWMP with municipal plans 8
1.3 Methodology 8
1.4 Description of the geographical area 9
1.4.1 Locality 9
1.4.2 Climate 10
1.4.3 Geology 11
1.4.4 Geohydrology 12
1.4.5 Hydrology 12

2 Status Quo/ Situational Analysis 16

2.1 *Legislation* 16
2.1.1 National legislation and strategies 16
2.1.2 Provincial and local Policy and by-laws 19
2.2 Socio-economic context 21
2.2.1 Social indicators 21
2.2.2 Economic indicators 22
2.2.3 Socio-economic growth projections 24
2.3 Waste management systems and infrastructure 24
2.3.1 Waste management organisational structure 24
2.3.2 Waste collection services 31
2.3.3 Waste diversion plans 34
2.3.4 Waste facilities and infrastructure 36
2.3.5 Compliance audits 41
2.3.6 Future planned developments and infrastructure 47
2.3.7 Projects to be undertaken in the 2023/2024 Financial Year 54
2.4 Waste classification and quantities 54
2.4.1 Waste types 54
2.4.2 Waste studies and surveys 55
2.4.3 General waste quantities 61
2.5 Education and awareness initiatives 71
2.5.1 Material Recovery Facility open day events 71
2.5.2 Waste Awareness Event: Swop Shop 71
2.5.3 Flyers and Brochures 71
2.5.4 School recycling initiative programme 71
2.5.5 Continuous education, awareness, and training by the Municipality 72
2.6 Status of economics and finances of solid waste management practices 72
2.6.2 Overview of Capital Expenditure (CAPEX) Plans 73
2.6.3 Overview of Operational Expenditure (OPEX) Plans 75
2.6.4 Expected Performance of Solid Waste Management Directorate over the Short Term 75
2.6.5 Expectations for Future Changes in Investment and Operational Cost 76

2.6.6 Tariffs 79
2.7 3rd Generation (2020 – 2023) Integrated Waste Management Plan implementation 88

3 Gaps and Needs 92

4 Goals, objectives, and targets 94

4.1 Goals for Stellenbosch Municipality 94
4.2 Alignment with National and Provincial Waste Management Goals 95
4.3 Implementation Plan 96

5 Monitoring and review 107

5.1 Monitoring 107
5.2 Review 107

6 PUBLIC PARTICIPATION PROCESS 109

6.1 Comments and Response Report 109

TABLES

Table 1-1: Scope of work for the 4th Generation IWMP 6
Table 1-2: Key interventions and actions of the three strategic pillars of the NWMS 7
Table 1-3: Waste types and waste sources addressed in the IWMP 8
Table 1-4: SM Plans and Frameworks adopted by the IWMP 8
Table 1-5: Methodology for the 4th Generation IWMP 8
Table 2-1: Relevant national legislation and strategies 16
Table 2-2: Summary of provincial and local policies, plans, and by-laws 19
Table 2-3: Skills levels for formal employment. Source: Stellenbosch Municipality Socio-Economic Profile, 2022 22
Table 2-4: Waste collection schedule and areas covered. 32
Table 2-5: Areas that are currently included in the two-bag collection programme 33
Table 2-6: Municipal vehicles that are operational and dedicated to waste management operations. 34
Table 2-7: Implementation progress of the OWDP 35
Table 2-8: Summary of environmental approval and waste activities for SLF, IWMF and KTS 46
Table 2-9: Municipal areas sampled. 55
Table 2-10: Waste categories for waste characterisation study 56
Table 2-11: Waste characterisation results 57
Table 2-12: Comparison of the 2017 and 2023 waste characterisation results 60
Table 2-13: Waste Tonnages – SLF (July 2020 till June 2021) 62
Table 2-14: General Waste Disposed at Vissershok Landfill (Tonnages) from August 2019 to June 2023 62
Table 2-15: Estimated waste tonnages for the period 2023 to 2027 with estimated diversion tonnage targets 66
Table 2-16: Financial position of the Stellenbosch Municipality 72
Table 2-17: Stellenbosch Budget Provision (as % split) for Solid Waste Management for next 10 FY 74
Table 2-18: Stellenbosch CAPEX Budget for Solid Waste Management for next 10 FY 74
Table 2-19: Stellenbosch OPEX Budget for Solid Waste Management for next 3 FY 75
Table 2-20: Stellenbosch OPEX Budget Split for Solid Waste Management showing trend in growth over 7 FY 75

Table 2-21: Financial Performance of the Municipality 2018/2019 – 2024/25 (from NT mSCOA accounts) 76
Table 2-22: Change in (domestic) waste management tariffs 2016/17 – 2022/23 (mSCOA data) 76
Table 2-23: Stellenbosch Municipality Waste Management Capital Budget 77
Table 2-24: Refuse tariffs for the period 1 July 2023 - 30 June 2024 79
Table 2-27: Disposal Tariffs for the Period 01 July 2023 – 30 June 2024 82
Table 2-26: Implementation progress of the 3rd Generation IWMP 88
Table 3-1: Gaps and Needs identified. 92
Table 4-1: IWMP Implementation Plan 97
Table 6-1: Comments submitted by the DEA&DP, and responses provided by the project team 110

FIGURES

Figure 1-1: Locality of Cape Winelands in relation to Provincial Boundaries (SM 5th Generation, IDP 2022 -2027, May 2022) 9
Figure 1-2: Locality map of Stellenbosch Municipality (highlighted in yellow) in relation to Cape Winelands District Boundaries (5th Generation, IDP 2022 -2027, May 2022) 10
Figure 1-3: Average rainfall (mm) graph for Stellenbosch (worldweatheronline.com, July 2023) 11
Figure 1-4: Average temperature graph for Stellenbosch (worldweatherpnline.com, July 2023) 11
Figure 1-5: General Geology (Cape Farm Mapper, July 2023). 13
Figure 1-6: Hydrogeological Map (Cape Farm Mapper, July 2023). 14
Figure 1-7: Watercourses Map (Cape Farm Mapper, July 2023). 15
Figure 2-1: SM current population and estimated population. Source: Stellenbosch Socio-Economic Profile, 2022 21
Figure 2-2: Informal employment statistics. Source: Stellenbosch Municipality Socio-Economic Profile, 2022 23
Figure 2-3: Unemployment rate 2011 - 2021. Source: Stellenbosch Municipality Socio-Economic Profile, 2022 23
Figure 2-4: Structure of Stellenbosch Waste Management Division 26
Figure 2-5: Structure of Area Cleansing & Collections Section 27
Figure 2-6: Area Cleansing Section Staff Structure 28
Figure 2-7: Collections Section Staff Structure 29
Figure 2-8: Waste Minimisation and Disposal Section Staff Structure 30
Figure 2-9: *Access to services for Wards 19 and 20 receive below average refuse collection (Bureau of Economic Research)* 31
Figure 2-10: Stellenbosch Landfill Facility – Locality Map (SRK Consulting, External Audit Report, March 2023). 36
Figure 2-11: Klapmuts Transfer Station – Locality Map (SRK Consulting, External Audit Report, March 2023). 37
Figure 2-12: Integrated Waste Management Facility – Locality Map (SRK Consulting, External Audit Report, March 2023). 38
Figure 2-13: Stellenbosch Waste Disposal Facilities – Coupon Prices from 01 July 2023 – 30 June 2024 (inclusive of VAT). 40
Figure 2-14: Cells 1, 2, 3 & 4 – Construction areas and Final capping and piggy-back areas (Ingerop, March 2023). 50
Figure 2-15: CH_4 production by cell 2020 to 2040 (Ingerop, March 2023). 50
Figure 2-16: CH_4 production vs. extraction, 2020 to 2040 (Ingerop, March 2023). 51
Figure 2-17: Estimated CH extraction by cell, 2020 to 2040 (Ingerop, March 2023). 51

Figure 2-18: Estimated LFG extraction by cell, 2020 to 2040 (Ingerop, March 2023). 51
Figure 2-19: CH_4 production vs. extraction, 2020 to 2040 (Ingerop, March 2023). 51
Figure 2-20: Estimated CH_4 extraction by cell, 2020 to 2040 (Ingerop, March 2023).....52
Figure 2-21: Estimated LFG extraction by cell, 2020 to 2040 (Ingerop, March 2023). 52
Figure 2-22: Emissions of unburnt CH_4, project vs. baseline 2020 to 2040 (Ingerop, March 2023). 52
Figure 2-23: Estimates of potential electrical power production, 2024 to 2043 (Ingerop, March 2023). 53
Figure 2-24: Estimates of potential electrical power production, 2024 to 2043 (Ingerop, March 2023). 53
Figure 2-25: SM waste characterisation results of all areas combined (by weight) 58
Figure 2-26: SM waste characterisation results in broad categories (recyclables, non-recyclables, and organics).....58
Figure 2-27: Comparison of waste characterisation for high income, low income, and business samples 59
Figure 2-28: Comparison of the 2017 and 2023 waste characterisation results 60
Figure 2-29: Waste received at SLF from July 2020 - June 2021 61
Figure 2-30: General Waste Disposed at Vissershok Landfill (Tonnages) – (August 2019 – June 2023).....63
Figure 2-31: Split of waste received at the IWMF from April 2021 - May 2023 64
Figure 2-32: Incoming Green Waste Tonnages from July 2016 to March 2023.....65
Figure 2-33: Waste tonnages handled by Stellenbosch Municipality from January 2018 to April 2023 68
Figure 2-34: Summary of waste management tonnages with the SM.....69
Figure 2-35: Summary of current waste flows within the SM 70
Figure 2-36: CAPEX Budget Split – By Division for FY 2023-2026.....77
Figure 2-37: CAPEX Budget by Investor Source.....78
Figure 2-38: CAPEX Budget by Investment Area.....78
Figure 4-1: Potential/future waste management system within SM.....105
Figure 4-2: Potential future Waste flows within the SM upon implementation of the actions contained in the IWMP 106

ANNEXURES

Annexure A: Stellenbosch Municipality By-Law.

Annexure B: Organograms received from the Stellenbosch Local Municipality.

Annexure C: Waste Characterisation Report and Data Sheets.

Annexure D: HHW Survey.

Annexure E: Education and Awareness Flyers and Brochures.

List of abbreviations

AD	Anaerobic Digestion
CAPEX	Capital Expenditure
CBD	Central Business District
CDM	Clean Development Mechanism
CCT	City of Cape Town
CPA	Component Project Activity
CWD	Cape Winelands District
DEA&DP	Department of Environmental Affairs and Development Planning
DFFE	Department of Forestry, Fisheries and the Environment
DSI	Department of Science and Innovation
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
ECA	Environment Conservation Act
ECSA	Engineering Council of South Africa
EPR	Extended Producer Responsibility
EPWP	Expanded Public Works Programme
GDP	Gross Domestic Product
GN	Government Notice
HHW	Hazardous Household Waste
H&HCRW	Hazardous and Health Care Risk Waste
I&AP	Interested and Affected Parties
IDP	Integrated Development Plan
IPWIS	Integrated Pollutants and Waste Information System
IWMF	Integrated Waste Management Facility
IWMP	Integrated Waste Management Plan
KTS	Klapmuts Transfer Station
kW	Kilowatts
kWe	Kilowatt-electric
LC	Leachable Concentration
LFG	Landfill Gas
M&E	Mechanical and Electrical Contract
MFMA	Municipal Finance Management Act
MRF	Materials Recovery Facility
MSA	Municipal Systems Act
MSW	Municipal Solid Waste
MTREF	Medium Term and Expenditure Framework
NDP	National Development Plan
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEM:WA	The National Environmental Management: Waste Act (Act No. 59 of 2008)
NGO	Non-Governmental Organisation
NWMS	National Waste Management Strategy (2020)
OPEX	Operational Expenditure
OWDP	Organic Waste Diversion Plan
PoA	Programme of Activities
PRO	Producer Responsibility Organisation
RIA	Resource Innovations Africa (Pty) Ltd
RO-RO	Roll-on Roll-off
SDF	Spatial Development Framework
SDGs	Sustainable Development Goals
SM	Stellenbosch Municipality

SLF	Stellenbosch Landfill Facility
TC	Total Concentration
TMG	Table Mountain Group
VHK	Vissershok
WML	Waste Management Licence
WP	Waste Picker
WPIP	Waste Picker Integration Plan
WWTW	Wastewater Treatment Works

Executive summary

JG Afrika was appointed by the Stellenbosch Municipality (SM) to develop its 4th Generation Integrated Waste Management Plan (IWMP) to replace the 3rd Generation IWMP (2020 – 2023).

The development of an IWMP is a statutory requirement of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM:WA) that was promulgated and came into effect on the 1st of July 2009. Its goal is transforming the waste management methodology from being focused only on collection and disposal, to a sustainable practice that focusses on waste avoidance and environmental sustainability.

An IWMP is an integral tool to identify a municipality's current needs and acts as a guide towards sustainable waste management. The IWMP must be incorporated as part of each municipality's Integrated Development Plan (IDP), although it is submitted as a separate document. The IWMP also indicates the alignment of its goals with the Western Cape IWMP, the District Municipality IWMP and the National Waste Management Strategy, 2020 (NWMS).

The NWMS is a statutory requirement of the NEM:WA and is entrenched in Section 24 of the Constitution of the Republic of South Africa. The purpose of the NWMS is to provide strategic policy intervention and a framework for the implementation of the NEM:WA. The NWMS therefore *"outlines government's policy and strategic approach to waste management within the South African government's context and agenda of socio-economic development that is 'equitable, inclusive, sustainable and environmentally sound".* It is therefore aligned to South Africa's National Development Plan (NDP): Vision 2030, which aims to integrate the Sustainability Development Goals (SDG) of Agenda 2030 into the socio-economic development plans of the country.

The premise of the NWMS is to systematically improve waste management in South Africa by adopting the principles of the "circular economy" and the "waste hierarchy". As such, in implementing the NWMS, 2020 "*local government needs to shift the focus of waste collection services to enable and promote diversion of waste from landfills through reuse, recycling and recovery".*

The IWMP is therefore the fundamental strategic and planning document for implementing waste policy and ensuring waste services are supplied in accordance with the SM's constitutional mandate. The goals of the IWMP, as well as the monitoring thereof, should also feed into the SM's IDP which ensures that identified projects and activities are funded. The IWMP is a critical element of the SM's performance management system, the framework for which is provided in the Municipal Systems Act, 2000 (Act 32 of 2000).

SM's 4th Generation IWMP examines the current (2023) state (Status Quo Analysis) of the solid waste management system of the SM and provides the overview thereof. This includes the various aspects of, and the factors impacting the solid waste management system. These range from relevant legislation; the socio-economic context of the SM; waste types and quantities generated; waste management systems and infrastructure; education and awareness initiatives; and financing.

The analysis of the status quo assessment is utilised to identify the gaps and needs of SM's waste management system. The scope also includes the formulation of goals and objectives required to address the gaps and needs. The goals and objectives are limited to implementation at the local authority level. The implementation plan to improve the waste management system and to achieve the identified goals is coupled with a monitoring and review programme to ensure successful implementation of the IWMP. The IWMP will be implemented over the period 2024 - 2029 and will be reviewed yearly.

Legislation

The IWMP provides an overview of the national and local legislation, policies, and guidelines applicable to waste management systems within the SM. This includes the National Environmental Management: Waste Management Act, 59 of 2008 and its associated Regulations, and Norms and Standards; the SM Integrated Waste Management By-Law; and the Western Cape Integrated Waste Management Plan (2022 – 2027). A comprehensive list can be found in section *2.1 Legislation*.

Waste management systems and infrastructure

The SM municipal waste management responsibilities lie with the Directorate: Infrastructure Services (together with Electricity, Water, Sewerage, Stormwater, Transport, Roads, and Infrastructure Planning, Development, and Implementation). The waste management division of the directorate provides the following services: collections; recycling; disposal to landfill site; wheelie Bins (240L); hiring of wheelie bins (for special events); emptying of skips and drop-offs.

The designated Waste Management Officer for SM is the Senior Manager: Waste Management Infrastructure Services.

There are several vacancies within the Waste Management Department that need to be filled. The Municipality is working on appointing competent staff to fill the vacant positions. In the waste disposal section 2 Technician posts have been advertised in 2023. The Municipality plans to fill them before the end of 2023.

Stellenbosch Municipality serves approximately 38,500 households with solid waste management services. The 28,751 collection points are spread across the 22 wards of the Municipality. The refuse collection breakdown is approximately 20,000 wheelie bins and 4,000 standard refuse bags as of 2019. The refuse bins are used to collect from formal areas, while the refuse bags are used to collect from informal and farm/rural areas. The Municipality utilises 11 refuse collection trucks, that are operated by more than 60 crew members in a 30-hour working week.

The Municipality renders an area cleaning service 5 days a week from Monday to Friday. The area cleaning staffing structure consists of 2 teams. The first team covers area cleaning for Stellenbosch and the second team covers area cleaning for Franschhoek, Dwarsrivier, and Klapmuts. Area cleaning staff are appointed on temporary 6-month EPWP contracts and there are more than 400 EPWP workers appointed in this way every 6 months. Area cleaning staff make use of blue bags for the disposal of waste.

The Municipality provides a two-bag collection system in middle to high income areas where black bags and clear bags are collected once a week. Households are required to separate and sort waste at source into 2 streams, namely general landfill waste (black bags) and recyclable waste (clear bags). Clear bags are provided by the Contractor who is responsible for collecting the clear bags and taking them to the SM Materials Recovery Facility (MRF) for sorting.

The Municipality currently diverts organic waste from landfill by means of chipping and composting garden waste that is received at the Stellenbosch Landfill Facility (SLF). Garden waste is dropped off by residents and businesses at the landfill. Franschhoek residents have the option to drop their garden waste off at the Franschhoek drop-off facility.

Stellenbosch Municipality has an Organic Waste Diversion Plan (OWDP), dated 2022, which set annual targets and includes intervention to be implemented by SM to meet the DEA&DP's organic waste diversion targets.[1] The OWDP is yet to be implemented by the SM. **Table 2-7** provides comment on the implementation of the OWDP.

SM operates the following waste facilities:

- **Stellenbosch Landfill Facility:** The landfill comprises 3 waste disposal cells (Cells 1-3). The construction of Cells 1 and 2 commenced in 1966 and disposal ceased in April 2013, when they were shaped and temporarily capped with a soil substrate.

  Cell 3 currently receives waste from municipal area clean ups, but not general household waste. General household waste from the Municipality is transported to the Klapmuts Transfer Station (KTS), prior to disposal at the privately owned Vissershok Landfill Site in Cape Town, until Cell 4 has been constructed and can start receiving waste which is planned for 2024.

- **Klapmuts Transfer Station:** The KTS is a general waste transfer station that was constructed in 2000. All the general waste that is collected within SM is off-loaded from the compactor vehicles, onto an apron and transferred to 30m^3 containers and temporarily stored at the KTS. Once the containers are full, they are transported to the privately owned Vissershok Landfill Site in Cape Town for disposal.

- **SM Integrated Waste Management Facility (IWMF):** The IWMF has the following facilities:
  a. A Materials Recovery Facility (MRF) where recyclable materials (cardboard, paper, glass, plastic, cartons, and scrap metal) are sorted for recycling.
  b. A Recyclables drop-off for use by the public.
  c. A Hazardous Household Waste (HHW) drop-off for use by the public. The HHW is then disposed of at Vissershok Landfill.

- **Drop-off facilities:** The SM makes provision for the public to purchase coupons at their municipal cashiers, for the public to dispose of waste at the SLF, KTS, IWMF Drop-off, and Franschhoek Drop-off.

In terms of the Extended Producer Responsibility Regulations, Producer Responsibility Organisations (PRO) are obligated to collaborate and cooperate with municipalities to increase the recovery of identified products from municipal waste streams. As stated under Objective 1.2 of the Implementation Plan, Stellenbosch Municipality plans to partner with industry bodies and PROs to promote and ensure awareness and education of integrated waste management. This will be done by means of training programmes, workshops, and other related initiatives.

An independent external auditor and reviewer is appointed by the SM to undertake interim external audits of the SM's waste facilities. The independent external auditor audits compliance with the Waste Management Licences (WMLs) / permits issued in terms of Section 20 of the Environment Conservation Act 73 of 1989 (ECA), the NEM:WA, and relevant Norms and Standards published under the NEM:WA.

[1] The DEA&DP took a policy decision to implement a 50% restriction on organic waste being disposed to landfill by 2022 and a full prohibition of organic waste disposed to landfill by 2027. Municipalities are therefore obliged to divert organic waste streams away from landfills.

SM has several plans for future infrastructure development including the development of a new landfill cell at the SLF, installation of landfill gas extraction infrastructure, as well as a potential installation of landfill gas flaring and power generation plant.

Waste classification and quantities

JG Afrika conducted a waste characterisation study in May 2023 (15 to 19 May). The waste characterisation study was undertaken at KTS, as all general waste collected is transported to the KTS prior to being transferred to the Vissershok Private Landfill Site for disposal. The waste sampled included household and business/commercial waste. Waste from the two-bag system was not characterised.

The results show that the major waste fraction is organic waste (garden and food waste), which when combined makes up 38% of the waste sampled (by weight) for all areas. It should be noted that the characterisation was undertaken in autumn when higher than normal garden waste is expected.

The potentially recyclable fraction i.e., plastics (13%), metals (1%), glass (7%), paper & board (11%), and e-waste make up 33% of the sampled waste. The remaining waste consists of the residual waste fraction (19%), wood (1%), construction waste (1%), textiles (3%) and nappies (6%) which when combined are approximately 30%.

The organic and recyclable fractions make up more than half of the total waste stream (62%). These results indicate that the biggest diversion potential lies with the organic waste (i.e., mainly garden waste) fraction and recyclable materials from the general waste stream. The garden waste fraction may however vary due to seasonal changes. This must be considered when developing diversion plans.

Recyclables/packaging type waste and garden waste make up 80% of the waste stream in high income and business areas, and if targeted for diversion would result in high organic waste and recyclables diversion rates.

A different approach may be required for low-income areas, where focus is mainly placed on diverting the recyclable fraction. The organic waste fraction for low-income areas, when compared to high-income and business areas, was low at 20%. Despite this, the food waste fraction was noted to be unusually high. The largest waste fraction from the low-income area samples was residual waste at 30%. This was made up of wet sediment and broken fractions of glass, wood and small pieces of paper and plastic.

Overall, the waste characterisation results indicate that diverting recyclables along with garden waste, can increase overall diversion rates to approximately 55% and potentially up to 80% in certain income areas. However, this would depend on the level of contamination and quality of recyclables and therefore a three-bag system (recyclable, non-recyclable, and organic waste) for separation at household level would be recommended. Certain areas could also be provided with a targeted garden waste collection system.

Gaps and needs

The main gaps and needs identified for integrated waste management are as follows:

- **Legislation:** review of SM Integrated Waste Management By-Law and Policies as and when required.
- **Waste collection fleet:** investigate the potential for on-site repairs and maintenance of waste collection plant and vehicles. Outsourced services result in time and cost implications.
- **Transfer Stations:** up-grade facilities to keep-up with planned growth, and support decentralisation initiatives.
- **Waste diversion:** expand the two-bag collection system. Implement the OWDP.
- **Human resources:** fill vacant waste management posts.
- **Education and awareness:** continuously implement education and awareness initiatives.

Goals and objectives

A total of five goals were identified for the SM. The development of these goals has been informed by the previous IWMP, situational analysis, and gap and needs assessment, as follows:

Goal 1: Strengthened education, capacity, and advocacy towards Integrated Waste Management.
Goal 2: Improved integrated waste management planning and implementation for efficient and financially viable waste management services and infrastructure.
Goal 3: Effective and efficient utilisation of resources.
Goal 4: Improved compliance monitoring and enforcement.
Goal 5: Increased waste diversion and recycling.

Monitoring and review

Monitoring of the IWMP is essential for strategic planning, technical and financial performance assessment, compliance monitoring, and public accountability. To ensure corrective action is taken where necessary, and that long-term strategic goals are met, it is imperative that monitoring focuses on the short-term objectives of the IWMP. Monitoring also makes provision for the adjustment of the IWMP.

The IWMP will be implemented once the IWMP has been approved by the DEA&DP. The following time schedule applies for the monitoring and review of the 4th Generation IWMP:

An annual performance report in terms of Section 13 (1) of the NEM:WA and section 46 of the Municipal Systems Act (MSA) which contains information on the implementation of municipal integrated waste management plans must be compiled and submitted to the DEA&DP.

The annual performance report must be compiled in accordance with the requirements as listed in Section 13 (2) of the NEM:WA which stipulates the following:

(a) the extent to which the plan has been implemented during the period;
(b) the waste management initiatives that have been undertaken during the reporting period;
(c) the delivery of waste management services and measures taken to secure the efficient delivery of waste management services, if applicable;
(d) the level of compliance with the plan and any applicable waste management standards;
(e) the measures taken to secure compliance with waste management standards;
(f) the waste management monitoring activities;
(g) the actual budget expended on implementing the plan;
(h) the measures that have been taken to make any necessary amendments to the plan;
(i) in the case of a province, the extent to which municipalities comply with the plan and, in the event of any non-compliance with the plan, the reasons for such non-compliance.

The effectiveness of the SM 4th Generation IWMP will be reviewed 5 years post its implementation date. Within 3-months of the end of the 5-year IWMP implementation period, a review report of the IWMP must be documented for formal submission to SM's Council and to the DEA&DP. The report should be made available to interested and affected parties (I&APs) (including the public). The review should include issues such as performance levels related to the implementation of the IWMP, improvements from baseline conditions / indicators, and the public's perceptions and opinions regarding waste management in general and its associated services.

1 Introduction

JG Afrika was appointed by the Stellenbosch Municipality (SM) to develop its 4th Generation Integrated Waste Management Plan (IWMP) to replace the 3rd Generation IWMP (2020 – 2023).

The terms of reference for the 4th Generation IWMP includes the components in **Table 1-1**.

Table 1-1: Scope of work for the 4th Generation IWMP

Studies	Conduct a waste characterisation study
Review and update of existing documents / information	• Review the 3rd Generation IWMP in the context of the National Waste Management Strategy, 2020 (NWMS), Provincial IWMP, relevant policies and legislation; • Review and update the hazardous and health care risk waste survey; • Review and update the existing Organic Waste Diversion Plan (OWDP); • Update information based on waste management activities and the waste situation that prevails currently in greater SM (WC024) area.
IWMP development	• Compile a draft IWMP and incorporate comments from internal review; • Determine the status quo; • Identify gaps and needs; • Prioritise the Municipality's needs; • Compile an implementation plan; • Compile a monitoring and review plan; • Identify any requirements that the Department of Environmental Affairs and Development Planning (DEA&DP) may need to be included in the IWMP.
Stakeholder engagement	• Prepare a presentation and present the draft IWMP to SM Management; • Conduct public participation, incorporate comments; • Submit to DEA&DP and incorporate comments.
Final IWMP	Prepare Final IWMP incorporating all comments and submit Final IWMP to Council.

1.1 Background

The development of an IWMP is a statutory requirement of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM:WA) that was promulgated and came into effect on the 1st of July 2009. Its goal is to transform the waste management methodology from being focused only on collection and disposal, to a sustainable practice that focusses on waste avoidance and environmental sustainability.

An IWMP is an integral tool to identify a municipality's current needs and acts as a guide towards sustainable waste management. The IWMP must be incorporated as part of each municipality's Integrated Development Plan (IDP), although it is submitted as a separate document. The IWMP also indicates the alignment of its goals with the Western Cape IWMP, the District Municipality IWMP and the National Waste Management Strategy, 2020 (NWMS).

The NWMS is a statutory requirement of the NEM:WA and is entrenched in Section 24 of the Constitution of the Republic of South Africa. The purpose of the NWMS is to provide strategic policy intervention and a framework for the implementation of the NEM:WA. The NWMS therefore *"outlines government's policy and strategic approach to waste management within the South African government's context and agenda of socio-economic development that is 'equitable, inclusive, sustainable and environmentally sound '"*. It is therefore aligned to South Africa's National Development Plan (NDP): Vision 2030, which aims to integrate the

Sustainability Development Goals (SDG) of Agenda 2030 into the socio-economic development plans of the country.

The premise of the NWMS is to systematically improve waste management in South Africa by adopting the principles of the "circular economy" and the "waste hierarchy". As such, in implementing the NWMS, 2020 "*local government needs to shift the focus of waste collection services to enable and promote diversion of waste from landfills through reuse, recycling and recovery".*

The IWMP is therefore the fundamental strategic and planning document for implementing waste policy and ensuring waste services are supplied in accordance with the SM's constitutional mandate. The goals of the IWMP, as well as the monitoring thereof, should also feed into the SM's IDP which ensures that identified projects and activities are funded. The IWMP is also a critical element of the SM's performance management system, the framework for which is provided in the Municipal Systems Act, 2000 (Act 32 of 2000).

Table 1-2: Key interventions and actions of the three strategic pillars of the NWMS

Key Intervention/s	Actions/Outcomes
PILLAR 1: WASTE MINIMISATION	
Divert organic waste from landfill through composting and energy recovery	The long term expected outcome is "Zero Waste going to Landfill". • 40% of waste diverted from landfill within 5 years; 55% within 10 years; and at least 70% within 15 years leading to Zero Waste going to landfill. • Include and implement organic waste technologies in local government IWMPs.
PILLAR 2: EFFECTIVE AND SUSTAINABLE WASTE SERVICES	
Separate waste at source	Integration of waste pickers into the waste management system.
	Public online and annually updated guidelines, case studies and planning tools on separation at source for municipal managers.
	National awareness campaign on recycling and waste management.
Effective integrated waste management planning	Development and implementation of 5-year provincial and municipal IWMPs.
	Improve collection, reporting, and dissemination of information on SAWIS.
	Building capacity in integrated waste management planning and provide revised IWMP guidelines.
	Municipalities include provisions for recycling drop-off/by back/storage centres in their IWMPs, supported by fiscal mechanisms/ Extended Producer Responsibility (EPR)[2] schemes.
PILLAR 3: COMPLIANCE ENFORCEMENT AND AWARENESS	
Ensure municipal landfill sites and waste management facilities comply with licensing requirements	Develop financial mechanisms to enforce compliance to license conditions.

1.2 Scope of the IWMP

SM's 4th Generation IWMP examines the current (2023) state (status quo or situational analysis) of the solid waste management system of the SM and provides the overview thereof. This includes the various aspects of, and the factors impacting the solid waste management system. These range from relevant legislation; the socio-economic context of the SM; waste types and quantities generated; waste management systems and infrastructure; education and awareness initiatives; and financing.

The analysis of the status quo as a baseline assessment is utilised to identify the gaps and needs of SM's waste management system. The scope also includes the formulation of goals and objectives required to address the gaps and needs. The goals and objectives are limited to implementation at the local authority level. The

[2] The EPR Regulations define EPR as follows: "*extended producer responsibility"* means that a producer's responsibility for an identified product is extended to the post-consumer stage of an identified product's life cycle.

implementation plan to improve the waste management system and to achieve the identified goals is coupled with a monitoring and review programme to ensure the successful implementation of the IWMP.

The IWMP will be implemented over a 5-year period from 2024 - 2029 and will be reviewed yearly.

The IWMP addresses the waste types and sources presented in **Table 1-3**.

Table 1-3: Waste types and waste sources addressed in the IWMP

Waste types addressed in the IWMP	Waste sources addressed in the IWMP
• Domestic waste • Garden waste • Construction and demolition waste • Household hazardous waste • Hazardous waste (including health care risk waste)	• Residential • Business • Industry • Farms/Rural areas • Illegal dumping • Street cleansing

1.2.1 Alignment and relationship of the IWMP with municipal plans

The IWMP aligns with SM's plans and frameworks included in **Table 1-4**.

Table 1-4: SM Plans and Frameworks adopted by the IWMP

Stellenbosch Municipality Environmental Management Framework (2014)	The framework addresses the legal and moral obligations of SM as it relates to the environment, and provides a dynamic vision, goals and objectives, and spatial and strategic directives towards giving effect to such obligations.
Stellenbosch Municipality Air Quality Management Plan (2013)	A strategic plan with a vision and mission, supported by short and long-term goals and objectives for the implementation of defined air quality management measures.
Stellenbosch Municipality Organic Waste Diversion Plan (OWDP) (2022)	The OWDP meets the DEA&DP's requirement for Municipalities to develop OWDPs. The OWDP sets annual targets and includes interventions to be implemented by SM to meet the DEA&DP's organic waste diversion targets.

1.3 Methodology

The following approach was undertaken to develop the 4th Generation IWMP.

Table 1-5: Methodology for the 4th Generation IWMP

1. Project inception meeting	The project was initiated through a project inception meeting with the SM and JG Afrika held on the 10 March 2023.
2. Waste characterisation study	The collection and analysis of accurate and reliable waste data was a key requirement to inform the development of the IWMP. To obtain up-to-date information on the character of waste generated, and to estimate possible waste diversion opportunities a waste characterisation study was undertaken in May 2023.
3. Site visits	Site visits were undertaken on the 14th of June 2023, by the JG Afrika team, to existing waste management infrastructure to gain full comprehension of the capacity and operations of the facilities.

4. Status quo analysis	Relevant data such as the 3rd Generation IWMP, OWDP, IDP, climate change documentation, waste quantities, budget plans, waste strategies, etc., was reviewed to determine the level at which waste management has been implemented within the Municipality to date. The status quo was used to determine the gaps and needs for the 4th Generation IWMP.
5. Engagement with SM	The JG Afrika team engaged with the SM Waste Management Officials who provided input, guidance, and information required to compile the IWMP.
6. Stakeholder engagement	Upon acceptance of the draft IWMP by the SM Council, JG Afrika will facilitate the public review period, during which various stakeholders will be provided an opportunity to comment on the draft document. Once this public review period has ended, JG Afrika will update the IWMP into a final document for SM Council final approval and implementation.

1.4 Description of the geographical area

This section describes SM's locality and associated climate, geology, geohydrology, and hydrology.

1.4.1 Locality

The Stellenbosch municipal area covers approximately 900 km² and falls within the Western Cape Province, in the Cape Winelands District Municipality (CWD). The SM's area of jurisdiction includes the main towns of Stellenbosch and Franschhoek, as well as several rural hamlets such as Wemmershoek, La Motte, De Novo, Kylemore, Pniël, Johannesdal, Languedoc, Groot Drakenstein, Muldersvlei, Klapmuts, Elsenburg, Raithby, Jamestown, Koelenhof and Vlottenburg (most with a population of less than 5 000). New nodes are emerging around agricultural service centres, for example, Koelenhof and Vlottenburg. Stellenbosch is a sought-after space, offering opportunity and quality of living, yet in close proximity to city life. This has placed the municipal area under constant development pressure. Apart from formal settlement areas, the municipal area also includes several informal settlements.

The Western Cape Province makes up 10.6% of the country's land surface and encompasses an area of 129 462 km². The province spatial area includes 1 metropolitan area (City of Cape Town), 5 district municipal areas (Central Karoo, Eden renamed Garden Route, Overberg, Cape Winelands, and West Coast) and 24 local municipalities. **Figure 1-1** is a map of the CWD in relation to the provincial district boundaries.

Figure 1-1: Locality of Cape Winelands in relation to Provincial Boundaries (SM 5th Generation, IDP 2022 -2027, May 2022)

The CWD is located within close proximity of the City of Cape Town (CCT), which offers access to trade opportunities, routes, and infrastructure such as expanding broadband networks, an international airport, the second largest container port in the country and a comprehensive road and rail network. This makes the CWD ideally located as an investment destination. The CWD municipal area incorporates the local municipalities of Drakenstein, Stellenbosch, Breede Valley, Langeberg and Witzenberg. Stellenbosch Municipality adjoins the CCT to the west and south and the Breede Valley, Drakenstein and Theewaterskloof Municipalities to the east and north. Functionally, SM forms part of the Greater Cape Town metropolitan area. **Figure 1-2**, shows the locality of SM in relation to CWD boundaries, and its locality in relation to the CCT.

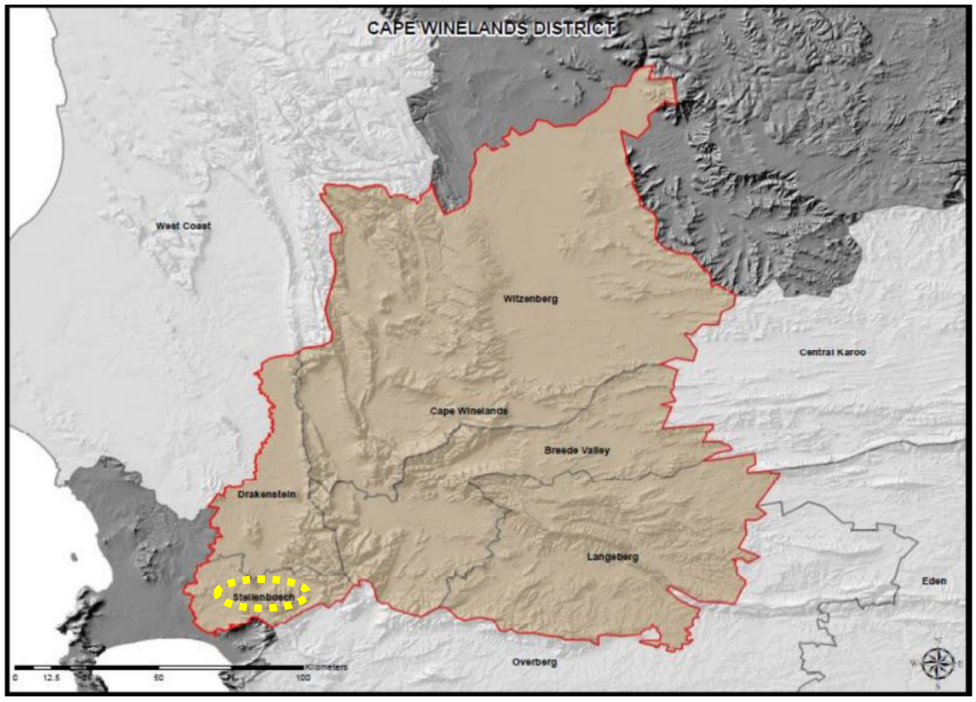


Figure 1-2: Locality map of Stellenbosch Municipality (highlighted in yellow) in relation to Cape Winelands District Boundaries (5th Generation, IDP 2022 -2027, May 2022)

1.4.2 Climate

Stellenbosch has a Mediterranean climate and typically receives about 673 mm of rain per year, mostly during winter. The lowest rainfall (10 mm) falls in February and the highest (37 mm) in June as indicated in the average rainfall graph **Figure 1-3.** The average midday temperatures for Stellenbosch range from 20°C in July to 34°C in February. The region is the coldest during July when the mercury drops to below 6°C on average during the night as indicated in the graph in **Figure 1-4**.

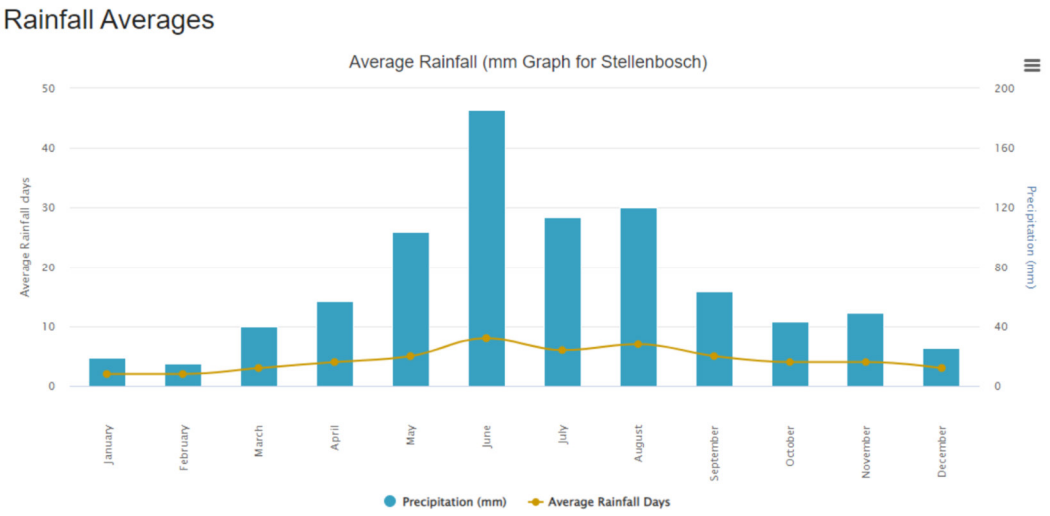


Figure 1-3: Average rainfall (mm) graph for Stellenbosch (worldweatheronline.com, July 2023)

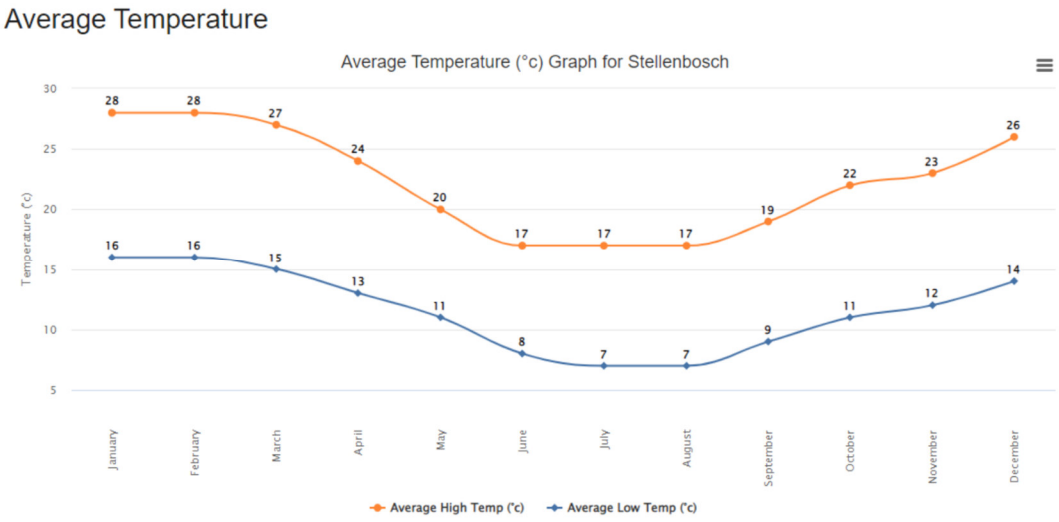


Figure 1-4: Average temperature graph for Stellenbosch (worldweatherpnline.com, July 2023)

1.4.3 Geology

The Stellenbosch Municipal area is underlain by 3 geological rock formations, these formations are the Malmesbury Group, Cape Granite Suite, and Table Mountain Group (TMG) (refer to **Figure 1-5**). Recent deposits of river alluvium and scree cover these bedrock units in places to varying thicknesses. The low-lying areas are underlain by rocks of the Malmesbury Group and dates back over 600 million years ago. The Malmesbury Group has been compacted over this period to form impermeable rocks such as phyllites and slates with clay soils. Present within the Malmesbury Group are granite intrusions which are dated approximately 600 million years.

The TMG comprises resistant quartzitic sandstones which form the mountain to the East of Stellenbosch and Franschhoek. These form the spine of the western limb of the Cape Fold Belt. The two main components of the TMG are the Peninsula Formation and the Nardouw Subgroup, which are separated by the Pakhuis and Cedarberg Formation that are mainly shaley in nature. Resistant sandstones form the rugged grey mountain

crags typical of the Western Cape scenery. Sandy and boulder are evident on the floodplain of the Berg River as well as the central parts of the area, which cover the underlying geology in places at varying thickness.

1.4.4 Geohydrology

The study area is classified into 3 types of aquifers, intergranular, fractured, and intergranular and fractured (refer to **Figure 1-6**). Intergranular aquifers comprise quaternary unconsolidated sediments which are intergranular in nature, whereas fractured aquifers develop from Malmesbury or TMG formations. The aquifers formed by granites are classified as intergranular and fractured.

In terms of groundwater, the main aquifer formation in the areas is the TMG Aquifer. The groundwater potential and quality of the Malmesbury group in general is highly variable. The fault zones and sandstones horizons that are in close contact to the TMG aquifer or granites, display relatively high yields with moderate to good water quality. However, moving further away from these zones, towards the west the water quality is poorer.

The granite formations obtain a moderate to poor yield but with good water quality, whereas the alluvium deposits display a shallow groundwater table that is limited in extent and thickness. Currently, there are no significant wellfields developed within the area as all existing groundwater used is mainly for domestic farming and stock watering.

1.4.5 Hydrology

The Berg and Eerste River are the only significant rivers that flows through the Stellenbosch area and are listed as ecologically sensitive rivers by the Department of Water and Sanitation (DWS) (refer to **Figure 1-7**).

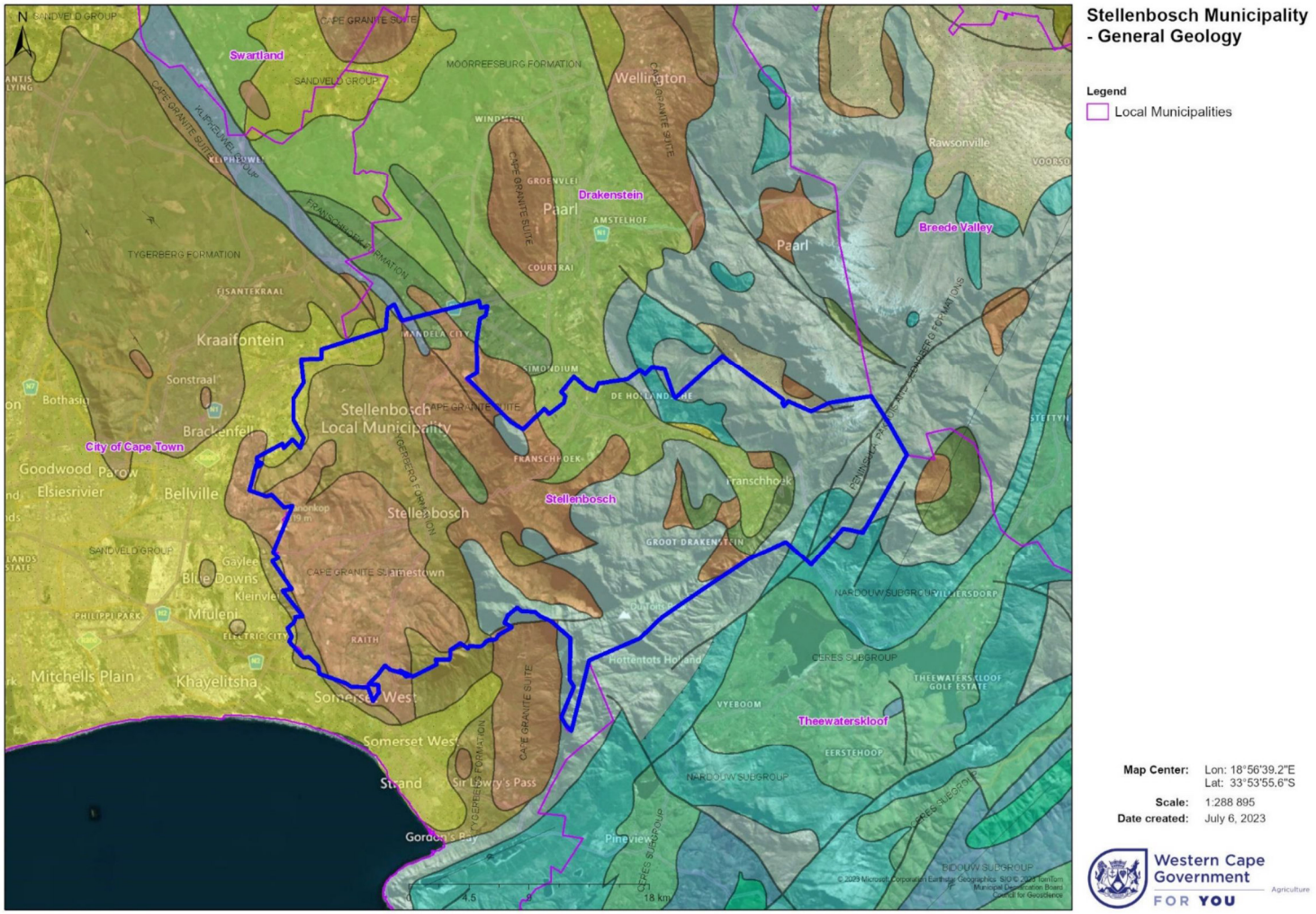


Figure 1-5: General Geology (Cape Farm Mapper, July 2023).

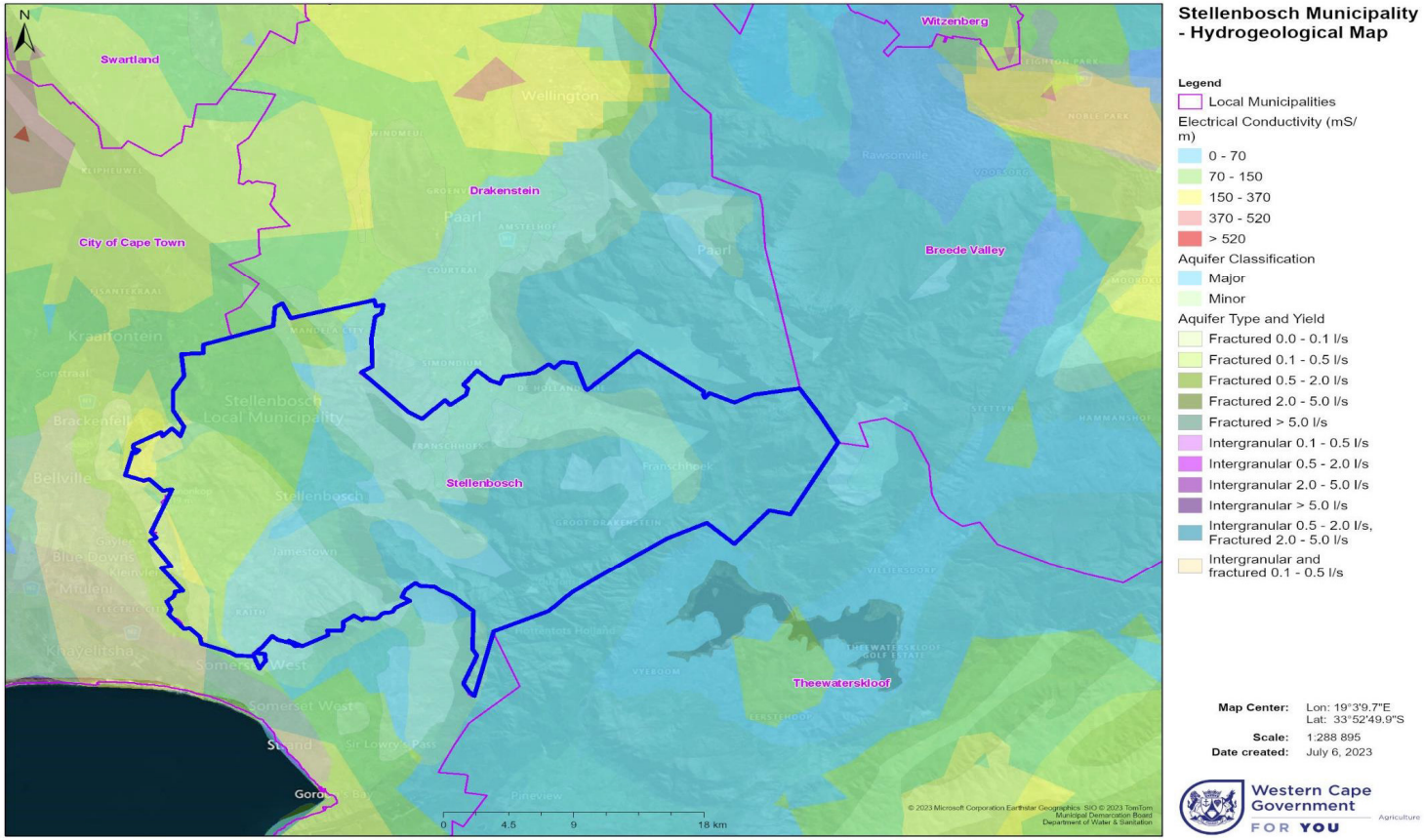


Figure 1-6: Hydrogeological Map (Cape Farm Mapper, July 2023).

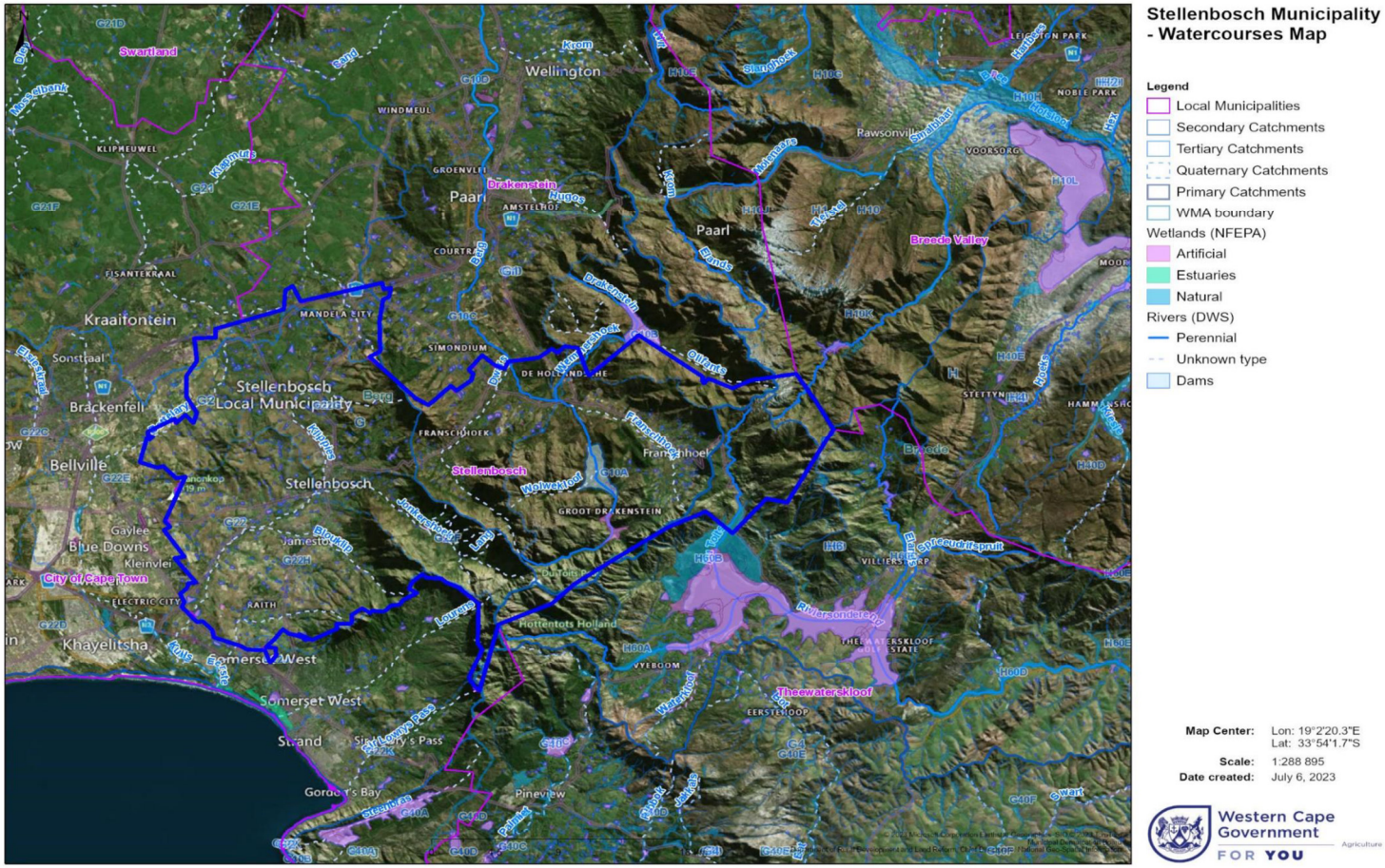


Figure 1-7: Watercourses Map (Cape Farm Mapper, July 2023).

2 Status Quo/ Situational Analysis

This section of the IWMP provides an assessment of the current (2023) state of the solid waste management system of the SM and provides an overview thereof. This includes the various aspects of, and the factors impacting the solid waste management system. These range from relevant legislation; the socio-economic context of the SM; waste types and quantities generated; waste management systems and infrastructure; education and awareness initiatives; and financing.

2.1 Legislation.

Table 2-1, and **Table 2-2** respectively present the national and local legislation, policies, and guidelines applicable to waste management within the SM.

2.1.1 National legislation and strategies

A summary of relevant national waste legislation, strategy, and guidelines is provided in **Table 2-1.**

Table 2-1: Relevant national legislation and strategies

Document	Description / Intent	Relevance to waste management
The South African Constitution (No 108 of 1996)	The Constitution is the supreme law of the Republic. The Bill of Rights, encompassed in Chapter 2 of the Constitution enshrines the rights of all people in South Africa, and affirms the democratic values of human dignity, equality, and freedom.	Section 24 of the Bill of Rights provides all citizens the right to an environment that is not harmful to their health and well-being and to have the environment protected through reasonable legislative and other measures. It is within this provision that IWMPs must strive or come up with measures to uphold the rights of all citizens within the jurisdiction of the municipality and should enhance and promote environmental protection from any form of degradation as enshrined by the South African Constitution.
National Environmental Management Act (No 107 of 1998)	To uphold the provisions of Section 24 of the Bill of Rights. To provide for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state (Republic of South Africa, 2023).	NEMA, as amended, is used as a regulatory tool to ensure the management and conservation of natural resources and the environment. NEMA sets out the Environmental Management Principles that must be applied to guide the interpretation, administration, and implementation of the NEMA and any other law concerned with the protection and management of the environment. NEMA also promotes the application of appropriate environmental management tools to ensure the integrated environmental management of activities that have an impact on the environment.
National Environmental Management Waste Act (No 59 of 2008) (NEM:WA)	NEM:WA promotes integrated waste management based on the waste management hierarchy as a means to reduce the amount of waste going to landfill, through waste avoidance, reduction, re-use, recycling, recovery, treatment, and safe disposal as a last resort (IWMSA, 2023).	Overarching framework legislation under the National Environmental Management Act (No 107 of 1998) dealing specifically with the management of waste in South Africa. Includes list of waste management activities that have, or are likely to have, a detrimental effect on the environment.
National Environmental Management: Waste Act, 59 of 2008: Waste Tyre	The aim of this regulation is to provide guidelines for the safe management of tyre waste.	The Act outlines the prohibitions, registration of waste generators, duties of tyre dealers, the

Document	Description / Intent	Relevance to waste management
Regulations (29 September 2019)		waste tyre stockpile abatement plan and the storage of waste tyres.
National Environmental Management: Waste Act, 59 of 2008: National Norms and Standards for Organic Waste Composting (25 June 2021)	• Provide a national uniform approach relating to controlling of composting or organic waste at a facility that falls within the threshold to prevent or minimise potential negative impacts on the bio-physical and socio-economic environment; and • Ensures the implementation of the best practical environmental option in composting of organic waste.	These Norms and Standards apply to organic waste composting facilities that have the capacity to process compostable organic waste, in excess of 10 tonnes per day. The norms and standards prescribe requirements for the management of waste composting facilities.
Government Gazette 10008. GNR 634 – 636 Waste Classification and Management Regulations (2013)	• Waste Classification and Management Regulations and Supporting Norms & Standards. • Facilitates the implementation of the waste hierarchy to move away from landfill to reuse, recovery and treatment. • Separate waste classification from the management of waste. • Divert waste from landfill and into utilisation where possible. • Provide measures to monitor the progress.	**Waste Classification and Management Regulations (GNR 634):** Regulate classification and management of waste to give effect to provisions of the Act. Prescribes general duties of waste generators, transporter and manager. Establish a mechanism for the listing of waste management activities that do not require a waste management licence. Prescribes requirements for disposal of waste to landfill. Prescribe requirements and timeframes for the management of certain wastes. **National Norms and Standards for the Assessment of Waste for Landfill Disposal (GNR 635):** Prescribe the requirements for the assessment of waste prior to disposal to landfill. *Approach*: Identify the chemical substances/elements present in the waste. Sample and analyse to determine the total concentration (TC) and leachable concentration (LC). Compare the TC and LC to the risk levels identified in the relevant tables. Determine the type of waste for disposal to landfill. **National Norms and Standards for the Disposal of Waste to Landfill (GNR 636):** Determine the class of landfill. Provide standard containment barrier requirements (engineering design requirements). List waste acceptance criteria for disposal of waste to landfill. List waste disposal restrictions.
Government Gazette 37088. GNR 926 – National norms and standards for the storage of waste (2013)	The purpose of the norms and standards is to: • Provide a uniform national approach relating to the management of storage waste facilities. • Ensure best practice in the management of waste storage facilities; and	Prescribes requirements for the management of waste storage facilities.

Document	Description / Intent	Relevance to waste management
	• Provide minimum standards for the design and operation of new and existing waste storage facilities.	
Government Gazette 41175. GNR 1093 – National norms and standards for the sorting, shredding, grinding, crushing screening or baling of general waste (2017)	Provides a uniform national approach relating to the management of waste facilities that sort, shred, grind, crush, screen, chip, or bale general waste.	Prescribes the requirements for the management of facilities, with an operational area in excess of 1 000m^2, that sort, shred, grind, crush, screen, chip, or bale general waste.
Government Gazette 35583. GNR 625 National Waste Information Regulations (2012)	Regulate the collection of data and information to fulfil the objectives of the national waste information system (Republic of South Africa, 2012).	Establishes a mechanism for collection, verification, reporting and record keeping of waste information. Prescribes list of waste activities that must be registered on the South African Waste Information System (SAWIS). Prescribes requirements for reporting waste information to the SAWIS. Prescribes the general and hazardous waste types for reporting to the SAWIS.
National Pricing Strategy for Waste Management (GN 904 of 2016)	The key aims of the strategy is to increase the diversion of waste from landfill, reduce the generation of waste and encourage reduction, reuse and recycling of waste. The strategy provides a methodology for setting waste management charges.	The strategy identifies three economic instruments for waste management: Downstream instruments Upstream instruments Subsidy-based instruments
The Waste Management Series, Department of Water Affairs and Forestry, **Second Edition 1998** Document 1: Minimum Requirements for the Handling, Classification and Disposal of hazardous Waste. Document 2: Minimum Requirements for Waste Disposal by Landfill ("Minimum Requirements") Document 3: Minimum Requirements for the Monitoring at Waste Management Facilities	This series establishes a reference framework of standards for waste management in South Africa. Document 1 sets out the waste classification system. In this, wastes are placed in two classes, General or Hazardous, according to their inherent toxicological properties. Document 2 addresses landfill classification, and the siting, investigation, design, operation and monitoring of landfill sites. Document 3 addresses the monitoring of water quality at and around waste disposal facilities	Document 1 **no longer has relevance** as it has been superseded by the Waste Classification and Management Regulations (2013). Document 2 was the primary guide (though not legislated) for landfills in South Africa. It **has largely been superseded** by the Waste Classification and Management Regulations (2013) and best practice guidelines, particularly the aspects entailing site design and development, quality assurance and landfill closure. **Site selection and post-closure monitoring are still guided by the Minimum Requirements**. Document 3 aims to: Standardize monitoring procedures. Provide specifications for monitoring design. Provide mechanisms for communication between waste management companies and authorities. **This document is still in use as a guideline**, though there are aspects legally enforced through conditions contained in waste management licences.
Government Gazette 43879. Extended Producer Responsibility (GN 1184 of 2020); and Government Gazette 44078. Amendment of the regulations and notices regarding	Provide the framework for the development, implementation, monitoring and evaluation of extended producer responsibility schemes by producers in terms of section 18 of the Waste Act and facilitates the effective and efficient management of identified end of life products and to encourage and enable the	Details and the roles and responsibilities of producers and Producer Responsibility Organisations (PROs) as well as the minimum requirements and criteria for Extended Producer Responsibility (EPR) schemes. The Regulations require producers and PROs administering EPR schemes to co-operate with

Document	Description / Intent	Relevance to waste management
extended producer responsibility (GN 20 of 2021)*	implementation of circular economy initiatives. *Provides updates to the Extended Producer Responsibility (GN 1184 of 2020) regulations.	municipalities to increase the recovery of recyclables from municipal waste streams.
National Waste Management Strategy (2020)	The NWMS is structured around a framework of three pillars each with their respective goals. The goals along with their respective targets are to be achieved by dates (year) indicated in the NWMS. The 2020 NWMS has three strategic pillars to improve waste management in South Africa: Pillar 1: Waste Minimisation Pillar 2: Effective and Sustainable Waste Services Pillar 3: Compliance Enforcement and Awareness	The NWMS 2020 sets out a monitoring and evaluation framework, which includes measures such as annual reporting systems to review progress; annual progress reports to be submitted by the Provinces and regarding implementation of provincial Integrated Waste Management Plans; and databases that record compliance and enforcement activities. In the field of governance, the Strategy defines the roles and responsibilities of the institutions and the civil society. It recognizes that waste is generated by all social and economic sectors and therefore the implementation of the NWMS requires a high degree of cooperation and understanding between government departments, spheres of government, the private sector, academia, research institutions and civil society.
Waste Picker Integration Guideline for South Africa: Building the recycling Economy and Improving Livelihoods through Integration of the Informal Sector (August 2023)	To improve the working conditions and livelihoods of the informal waste sector and to better integrate pickers into the country's waste economy, the Department of Forestry, Fisheries, and the Environment (DFFE), and the Department of Science and Innovation (DSI) developed this guideline document, with the support of the University of Witwatersrand.	It fulfils the commitment made by the Department of Forestry, Fisheries, and the Environment (DFFE) in the 2011 National Waste Management Strategy (NWMS) to "provide guidance to municipalities and industry on measures to improve the working conditions of waste-pickers."
The SA Plastics Pact	The South African Plastics Pact (SA Plastics Pact) is a collaborative pre-competitive initiative that brings together key stakeholders from the local plastics value chain, including businesses, the South African government, Producer Responsibility Organisations (PROs), NGOs and other key players to tackle plastics waste and pollution at its source.	The SA Plastics Pact, aims to stimulate industry-led innovation, dialogue and collaboration to create new business models, generate job opportunities, and unlock barriers to move towards a circular economy for plastic, with improved economic, environmental and societal outcomes overall.

2.1.2 Provincial and local Policy and by-laws

A summary of the applicable provincial and local policies, plans, and by-laws are presented in **Table 2-2**.

Table 2-2: Summary of provincial and local policies, plans, and by-laws

Document	Description / Intent
Western Cape Provincial Spatial Development Framework (March 2014)	The SDF states that 'the increasing waste generation in the Western Cape, if not recycled, will give rise to the need for more waste disposal sites–especially in proximity to urban concentrations. The location of regional waste site has the potential to either unlock opportunities or unnecessarily burden municipalities operations. New waste disposal sites are not needed if recovery/recycling facilities and related awareness programmes are rolled out. Further challenges arise from illegal dumping, shortfalls in hazardous waste facilities, growing informal settlements, and a lack of recyclable collection from homes. A mindset of 'reduce, rethink, recycle' still needs to be mainstreamed.
The OneCape 2040	The OneCape 2040 aims to transition from an unsustainable carbon-intensive resource-use society to sustainable, low carbon resource use to ensure that the Western Cape Province is recognised as the leader and innovator in the Green Economy. The province supports local government and the private sector to improve the recovery of waste material and beneficial use thereof.

Document	Description / Intent
	The purpose is to encourage and provide a vision for a more inclusive and resilient economic future for the Western Cape. It does not replace any existing statutory plans required of province or municipalities but is intended as a guideline for stakeholders.
Western Cape Green Economy Strategy Framework, 2013	The 2013 Western Cape Green Economy Strategy Framework aims to achieve the double dividend of optimising green economic opportunities and enhancing environmental performance. The strategy identifies three high-level priorities for green growth: • Natural gas and renewables. • Financial infrastructure. • Green jobs–including the waste sector
Western Cape Integrated Waste Management Plan, 2022 - 2027 **(May 2023)** **Incl. Organic Waste Diversion Directive**	The plan provides: • A strategic direction regarding integrated waste management in the Western Cape provincial government, local government, industry, commerce and civil society. • An overview of Waste Management in the Western Cape i.e., provides broader context in which the CCT Solid Waste Management is operating. • Strategic direction, goals, objectives to be achieved in the short, medium, and long term. Municipalities with an implementation plan that includes relevant output indicators, activities, and responsible parties required to achieve the waste management goals within the stipulated timeframes. The plan includes Western Cape Government Department of Environmental Affairs and Development Planning's (DEA&DP) policy decision to institute a 50% restriction on organic waste being disposed to landfill by 2022 and a full (100%) prohibition of organic waste disposed to landfill by 2027. Waste Management Licences (WML) for municipal facilities are being updated to include this condition
Western Cape Government DEA&DP Strategic Plan 2020 – 2025	The Strategic Plan highlights the Western Cape Province's strategic agenda for environmental and development planning mandates for the 2020 – 2025 period. This is to ensure that the natural and built environment is governed, both at provincial and municipal level, to achieve the intentions set out in the national environmental, spatial planning, and land use management legislation, and the NDP. The Strategic Plan focuses on six priority areas with specific outcomes to be achieved within the 5-year period. The outcomes to be achieved for the Waste Management priority are: • 50% diversion of waste from landfill based on a 2018 baseline of 29% • Increase the number of district municipalities receiving SMME support to create jobs and to promote the waste economy. • 95% of households to have access to basic refuse removal services based on a 2018 baseline of 92%. • To have 85% of waste facility owners submitting compliance audits. • To have 80% of municipalities with by-laws aligned to NEM:WA. • 90% of municipalities to have 3rd generation IWMPs.
Western Cape Government DEA&DP Guideline for the management of Green Waste in the Western Cape, 2018	The document provides guidance on: • The legislative requirements and implications for the management of green waste. • Specific legislative requirements for different treatment options. • Advantages and disadvantages of various green waste treatment options. • Key aspects for municipalities to consider is to ensure that effective green waste management is achieved.
Western Cape Government DEA&DP Guideline to Separation of Waste at Source, 2019	The Separation of Waste at Source provides: • Assistance for municipalities to meet national and provincial waste diversion priorities and targets. • Practical solutions to assist municipalities to implement separation-at-source. • Details of how existing separation-at-source programmes and systems work. • Guidance on implementing separation-at-source including costing needs, challenges, learnings, and successes from other municipalities.
Stellenbosch Municipality Integrated Waste Management By-Law	The Integrated Waste Management By-Law is a very comprehensive document which deals with all the components of waste management within the Municipality. The document deals with the principles of waste and the categories of waste within the Municipality and explains the obligations that waste generators have towards sustainable waste management. The document explains the by-laws that pertain to each waste type under its own category and includes priority waste and hazardous wastes. The by-law also provides information on who is required to develop an integrated waste management plan and guidelines on the storage, separation and recycling of waste. It also explains what measures will be taken against those who do not adhere to the by-laws and which officials are designated with powers to uphold the by-laws.

2.2 Socio-economic context

This section provides a description of SM's socio-economic context. The social indicators considered include population density, current and estimated population, and household size. The economic indicators considered include a sectoral overview; employment statistics; and service delivery. The information presented in this section was sourced from the *Stellenbosch Municipality Socio-Economic Profile, 2022*[3].

2.2.1 Social indicators

2.2.1.1 Population density

Amidst rapid urbanisation, population density figures aid public sector decision-makers mitigate environmental, health and service delivery risks. In 2022, the population density of the CWD was at 45 persons/km², and that of SM was at 240 persons/km².

2.2.1.2 Current and estimated population

SM's population totalled 199 325 persons in 2022, the second most populated municipal area in the CWD. This total is expected to grow to 215 456 by 2026, equating to an average annual growth rate of 2% for the period.

Figure 2-1 depicts the population composition of the municipal area per age cohort. These groupings are expressed as a dependency ratio which indicates those who are part of the workforce (Age 15 – 64) and those who are dependent on them (children or senior citizens). A higher dependency ratio implies greater pressure on social systems and the delivery of basic services. Between 2022 and 2026, the largest population growth was recorded in the 65+ age category of 2.7%. This reflects possible improvements in life expectancy (an ageing population) or that more people are choosing the Stellenbosch Municipal area as a retirement destination. Notable growth is also expected in the working age cohort, which results in an overall decrease in the dependency ratio towards 2026.

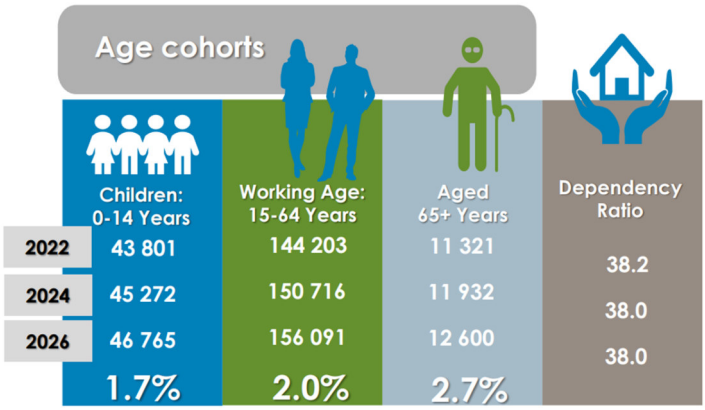


Figure 2-1: SM current population and estimated population. Source: Stellenbosch Socio-Economic Profile, 2022

2.2.1.3 Household size

Household size refers to the number of people per household. The household size is projected to remain constant at 3.6 people per household between 2022 and 2026. Contributing factors to the trend of a constant average household size include, but are not limited to, lower fertility rates, ageing population, divorce,

[3] The data sourced for compiling this document is primarily sourced from Statistics South Africa, administrative data from sector departments, the Municipal Review and Outlook (MERO), Global Insight Regional Explorer and Quantec. The data sourced from sector departments are the most recent that is available. The Statistics South Africa 2011 Census and 2016 Community Survey contains the latest survey data available at municipal level.

cultural patterns surrounding intergenerational co-residence, as well as socio-economic factors that shape trends in employment, education, and housing markets.

2.2.2 Economic indicators

2.2.2.1 Sectoral overview

The three largest sectors in the SM, in terms of contribution to Gross Domestic Product (GDP) in 2020, are:

- Finance, insurance, real estate, and business services at 26.5%
- Wholesale & retail trade, catering, and accommodation at 17.5%
- Manufacturing at 16.3%

In 2020, the economy of Stellenbosch was valued at R18 625.6 billion and employed 71 911 people. Historical trends between 2016 and 2020 indicate that the municipal area realised an average annual growth rate of -0.7%. The 2020 recession made a substantial dent in the average growth rate over the period, but load shedding and the drought within the province also played a major role in prior years.

Estimates for 2021 however indicated a marked recovery in growth (4.6%) from the effects of the COVID-19 related restrictions to economic activity in 2020. It was largely driven by growth in the wholesale & retail trade, catering & accommodation (7.8%) as tourism activity resumed; as well as the finance, insurance, real estate & business services (3.5%); and manufacturing (5.0%) sectors. The mining and quarrying (-14.2%), construction (-1.0%) and general government (-0.9%) sectors were the only sectors that experienced further economic decline after the easing of restrictions.

Despite the economic recovery experienced in 2021, the economy continued to shed jobs, with an estimated 2 435 net jobs lost. This was largely driven by job losses in the wholesale & retail trade, catering & accommodation (-945 jobs); manufacturing (-338 jobs); and agriculture, forestry & fishing (-328 jobs) sectors, reflecting that employment creation is lagging the improved GDP. Only the general government sector was able to create jobs during the year.

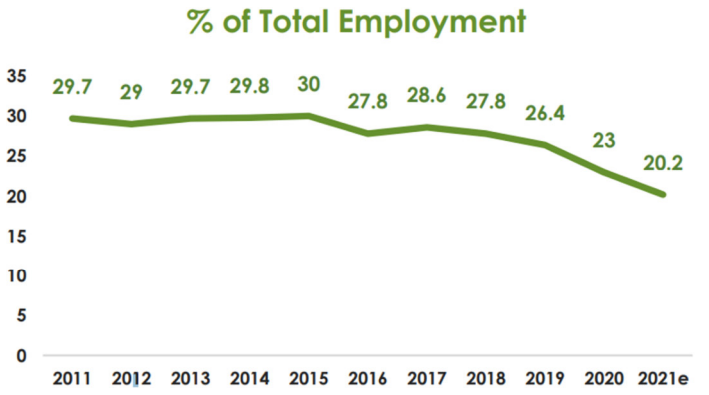
2.2.2.2 Employment

It was estimated that Stellenbosch's total employed will, in 2021 amount to 69 476 workers, of which 55 435 are employed in the formal sector and 14 041 are informally employed. Employment in the formal sector had an annual average increase of only 0.2% from 2016 to 2020 while the informal sector suffered an annual average decline of 5.9% over this period. The informal economy was responsible for most of the job losses in 2021. This is a concern as the informal economy should be able to act as a buffer during times of economic recession.

Most of the formally employed consisted of semi-skilled and low-skilled workers. The skilled category only contributed 25.8% to total formal employment. The skilled and semi-skilled categories grew at a pace of 0.7% per annum from 2016 to 2020 and notably outpaced low-skilled employment which shed 0.9% of jobs per annum. The growth in the skilled categories reflects the increasing market demand for skilled labour and the need for skills development initiatives, especially with the growing tertiary sector in the SM area.

Table 2-3: Skills levels for formal employment. Source: Stellenbosch Municipality Socio-Economic Profile, 2022

Skill levels formal employment	Skill level contribution 2020 (%)	Average growth (%) 2016 - 2020	Number of jobs (2020)	Number of jobs (2021)
Skilled	25.8	0.7	14 305	14 433
Semi-skilled	42.2	0.7	23 353	23 327
Low-skilled	32.0	-0.9	17 688	17 675
Total	**100**	**0.2**	**57.340**	**54.314**



	2019	2020	2021e
Number of jobs	20 693	16 565	14 041

Figure 2-2: Informal employment statistics. Source: Stellenbosch Municipality Socio-Economic Profile, 2022

SM (estimated at 16.1% in 2021) had the second highest unemployment rate in CWD and is above the district (15.4%) rate, but significantly below the Western Cape (25.1%) unemployment rate. Unemployment has been on an upward trend from 2015 to 2021 largely driven by the job losses because of the drought, loadshedding and economic recession over this period. The non-economically active population has also increased from 2020 to 2021 as job losses and an insufficient supply of jobs have led to an increasing number of discouraged work-seekers. Unfortunately, most job losses affected low skilled and informal workers who are more vulnerable to living in poverty during times of economic decline.

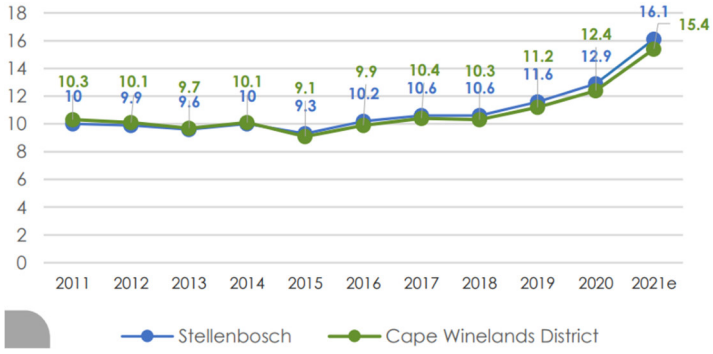


Figure 2-3: Unemployment rate 2011 - 2021. Source: Stellenbosch Municipality Socio-Economic Profile, 2022

2.2.2.3 Service delivery

The Constitution stipulates that every citizen has the right to access to adequate housing and that the State must take reasonable legislative and other measures within its available resources to achieve the progressive realisation of this right. Access to housing also includes access to services such as potable water, basic sanitation, safe energy sources and refuse removal services, to ensure that households enjoy a decent standard of living.

With a total of 50 792 households in the SM area, 74.5% have access to formal housing. The lowest when compared with other municipalities in the CWD area; the CWD average is 82.4%. The SM area also has the highest percentage of people living in informal settlements at 24.7%. In comparison, 16.9% of people across the CWD reside in informal settlements. Access levels to basic services in the municipal area (expressed as percentage of households) were as follows in 2019:

- Piped water inside / within 200 m of the dwelling: 99.3%.
- Flush or chemical toilet: 96.4%.
- Electricity (for lighting): 96.8%; and
- Refuse at least weekly by local authority: 82.1%.

2.2.3 Socio-economic growth projections

According to the population and economic growth projections in SM's 5th Generation IDP (2022 – 2027):

- The population in the municipality will continue to grow above the average provincial rate, and urbanisation rates will increase with settlements absorbing the bulk of growth.
- The ability of the economy to absorb growth, particularly regarding job creation, is concerning.
- The informal sector will continue to provide livelihoods to a significant proportion of residents.
- The growing youthful population, large student population, and the seasonal influx of labour are likely to increase the municipality's dependency ratio, in addition to a smaller base from which the municipality can collect revenue to provide services and opportunities that will improve the lives of the poor.
- Inequality in the municipal area, and particularly in the historic towns such as Stellenbosch and Franschhoek, remains significant and current development patterns are not addressing the issue.
- Crime rates remain high and the market response i.e., private security provision for those who can afford it, is likely to exacerbate inequality.
- Upgrading and provision of basic services and housing will remain the focus of the municipality, including other government agencies for the foreseeable future. The focus on these priority areas can lead to foregoing investment in other areas that would likely have more socio-economic spin-offs and result in improved place-making.
- The municipality's inability to provide basic services to 100% of households (e.g., refuse removal) leads to dumping, environmental degradation and resulting health-related problems.

2.3 Waste management systems and infrastructure

This section discusses the current solid waste management system in the SM. This includes the organisational structure of the Municipality; solid waste collection methods and vehicles; collection schedules; and waste diversion, treatment, and disposal.

2.3.1 Waste management organisational structure

The municipal waste management responsibilities lie with the Directorate: Infrastructure Services (together with Electricity, Water, Wastewater, Stormwater, Transport, Roads, and Infrastructure Planning, Development, and Implementation). The waste management division of the directorate provides the following services according to the municipal website: collections; recycling; disposal to landfill site; wheelie Bins (240L); hiring of wheelie bins (for special events); emptying of skips and drop-offs.

2.3.1.1 Designated Waste Management Officer

Chapter 3 of the NEM:WA states the following:

- **Section 10. (3):** Each municipality authorised to carry out waste management services by the Municipal Structures Act, 1998 (Act No. 117 of 1998), must designate in writing a waste management officer from its administration to be responsible for co-ordinating matters pertaining to waste management in that municipality.
- **Section 10. (4):** A power delegated, or a duty assigned to a waste management officer by virtue of subsection (3) may be sub-delegated or further assigned by that officer to another official in the

service of the same administration, subject to such limitations or conditions as may be determined by the municipality.

- **Section 10. (5):** Waste management officers must co-ordinate their activities with other waste management activities in the manner set out in the National Waste Management Strategy established in terms of section 6 or determined by the Minister by notice in the Gazette.

The designated Waste Management Officer for SM is Mr Clayton Hendricks who is the Senior Manager: Waste Management Infrastructure Services.

2.3.1.2 Organogram: SM Waste Management Infrastructure Services

The Senior Manager: Waste Management (Municipal Waste Manager) is supported by 2 Section Managers. One for the Area Cleansing and Collections Section, and one for Waste Minimization and Disposal Section.

There are several vacancies that need to be filled. The Municipality is working on appointing competent staff to fill the vacant positions. In the waste disposal section, the two Senior Technician posts have been filled. The Stellenbosch Municipality Waste Department microstructure will be revised in the 2024/25 financial year.

Area Cleansing employs 12 permanent staff and also appoint approximately 400 EPWP Workers on temporary 6-month EPWP contracts every 6 months. There are 2 Operator/Supervisor positions and the position of Superintendent that are in the process of being filled.

Refer to **Figure 2-4** to **Figure 2-8** for the SM Waste Management Division Organograms[4].

[4] ***Note:*** due to the organograms provided to JG Afrika, by the SM, not being legible, JG Afrika has redone the organograms. The redone organograms were submitted to the Municipality to utilise as a working document to be updated as and when required.

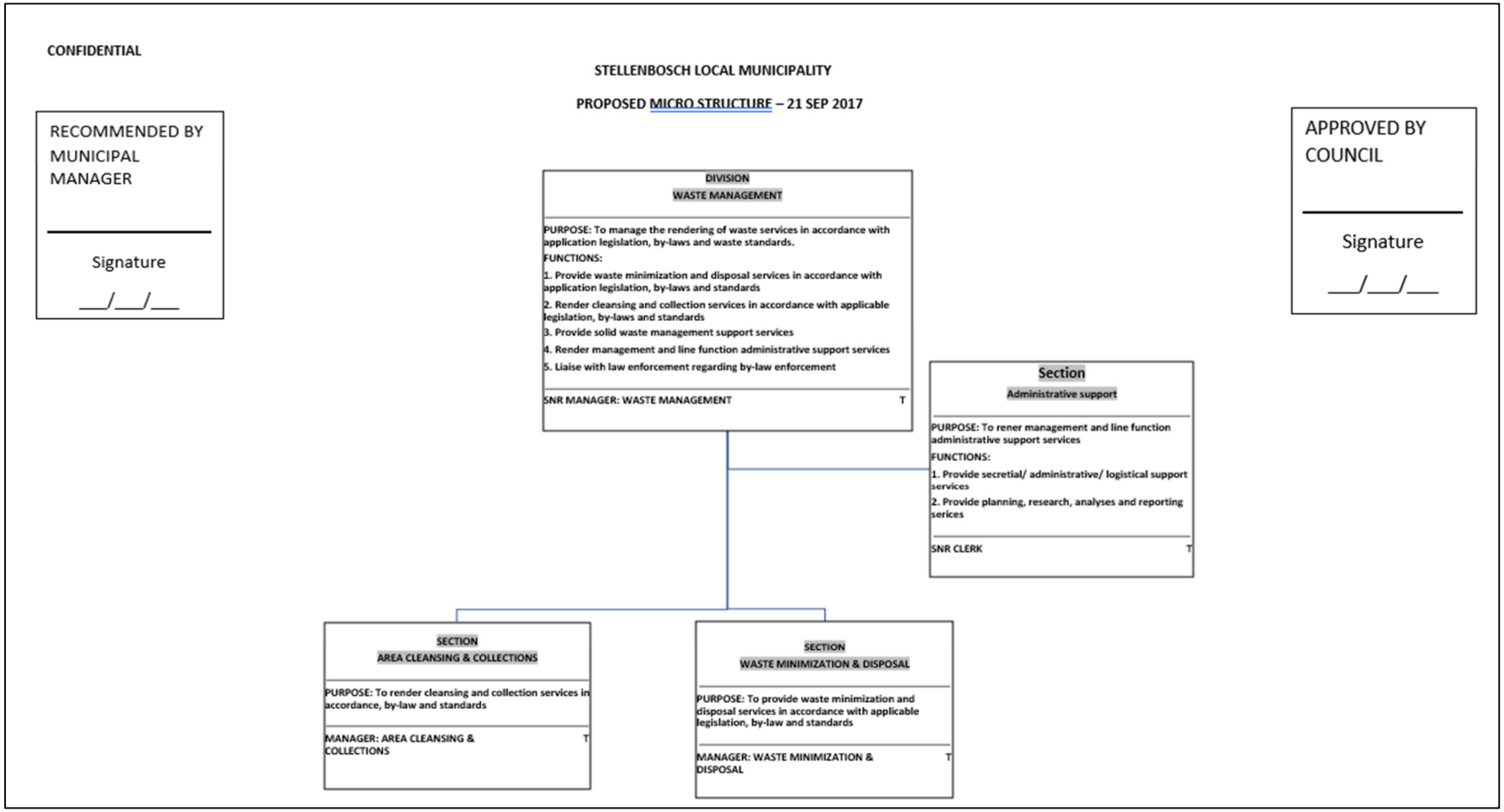


Figure 2-4: Structure of Stellenbosch Waste Management Division

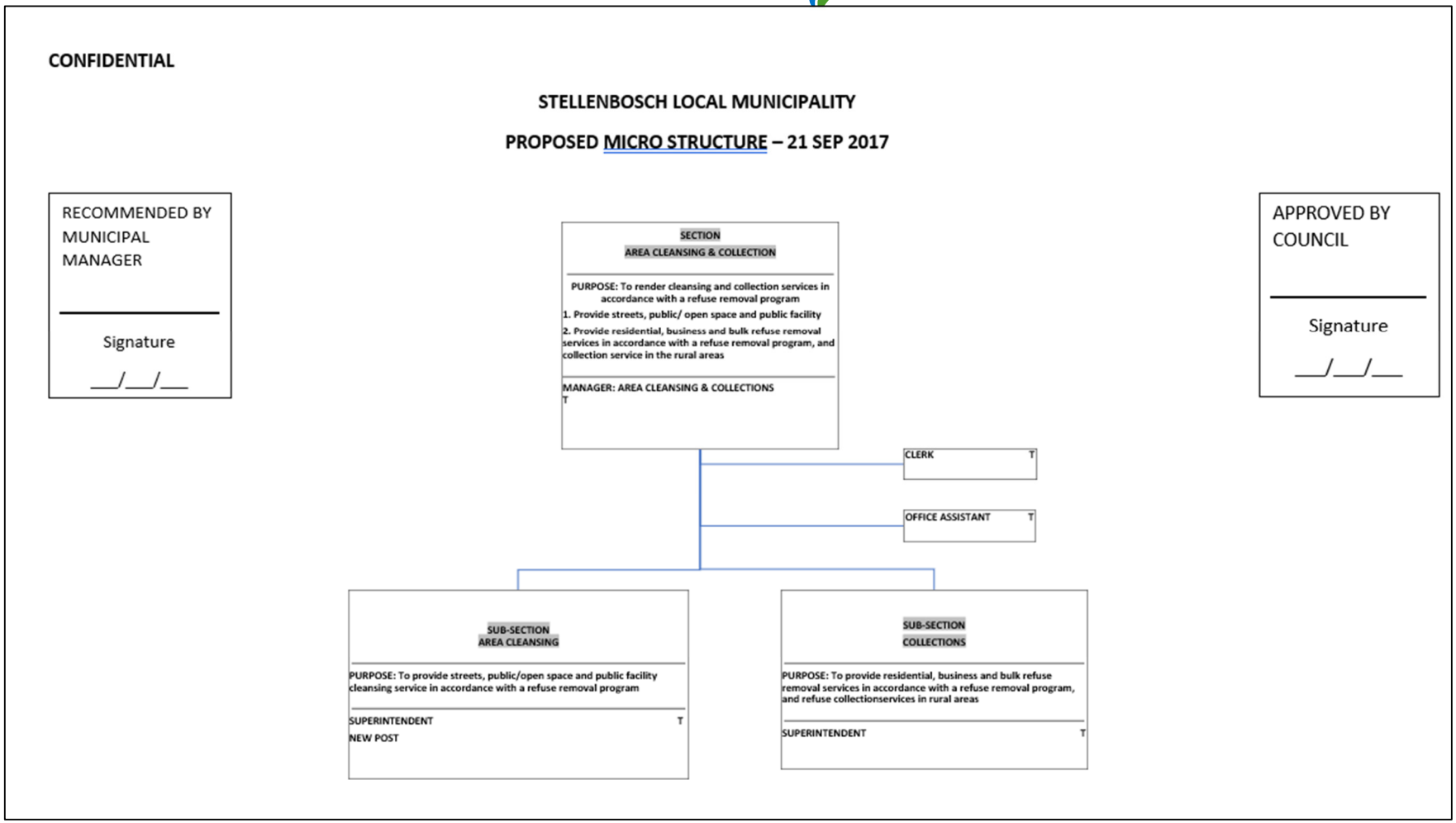


Figure 2-5: Structure of Area Cleansing & Collections Section

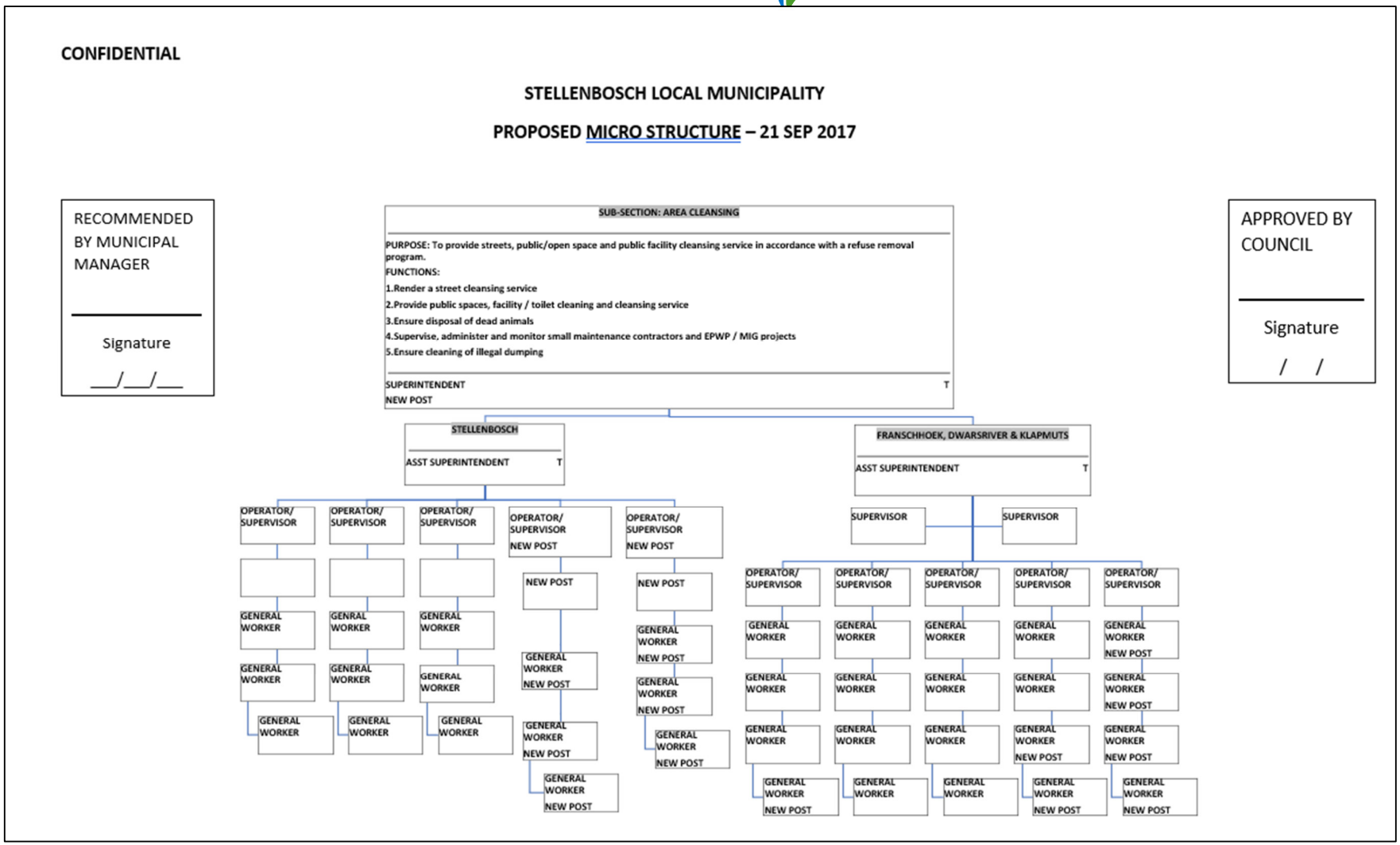


Figure 2-6: Area Cleansing Section Staff Structure

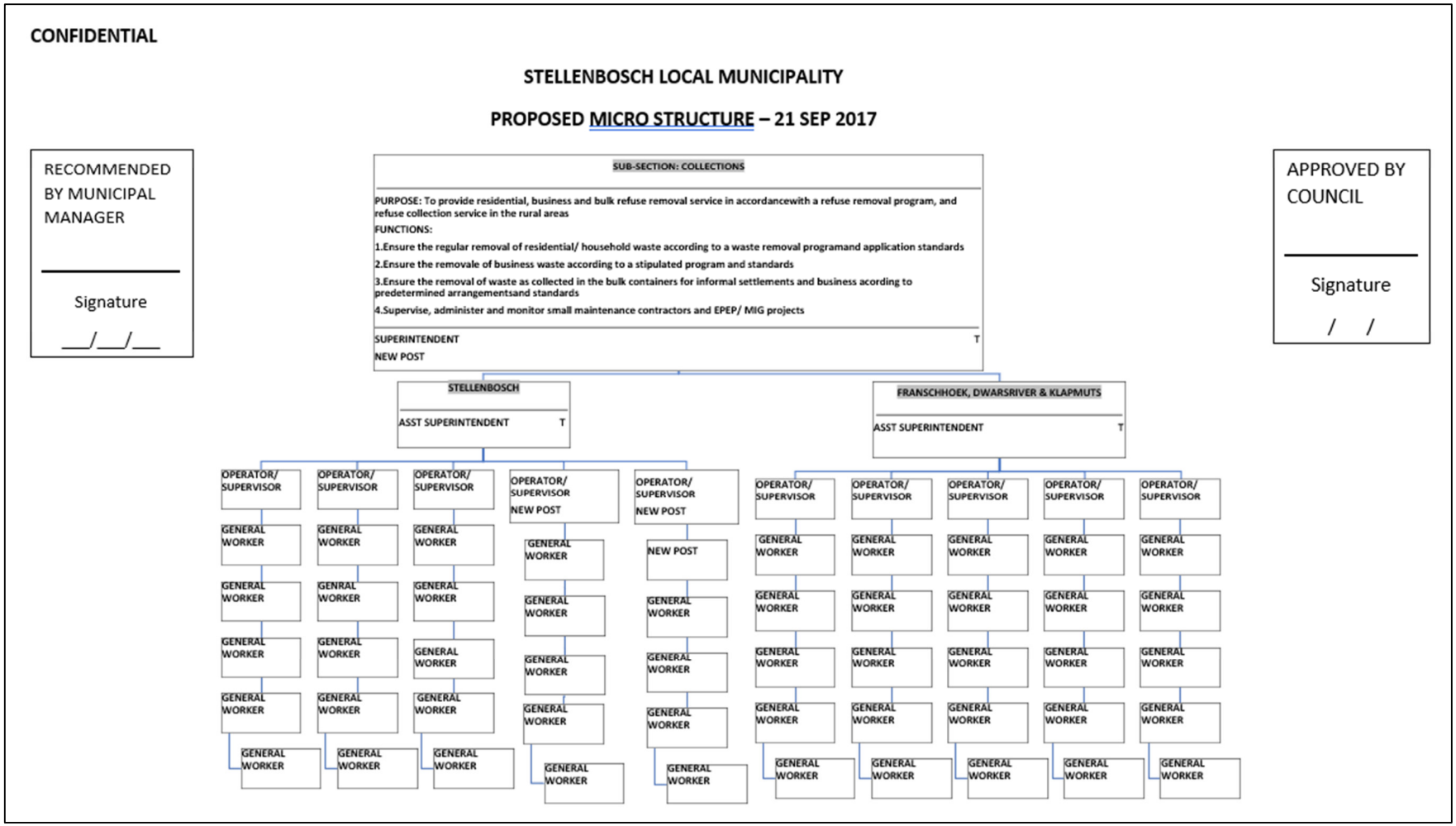


Figure 2-7: Collections Section Staff Structure

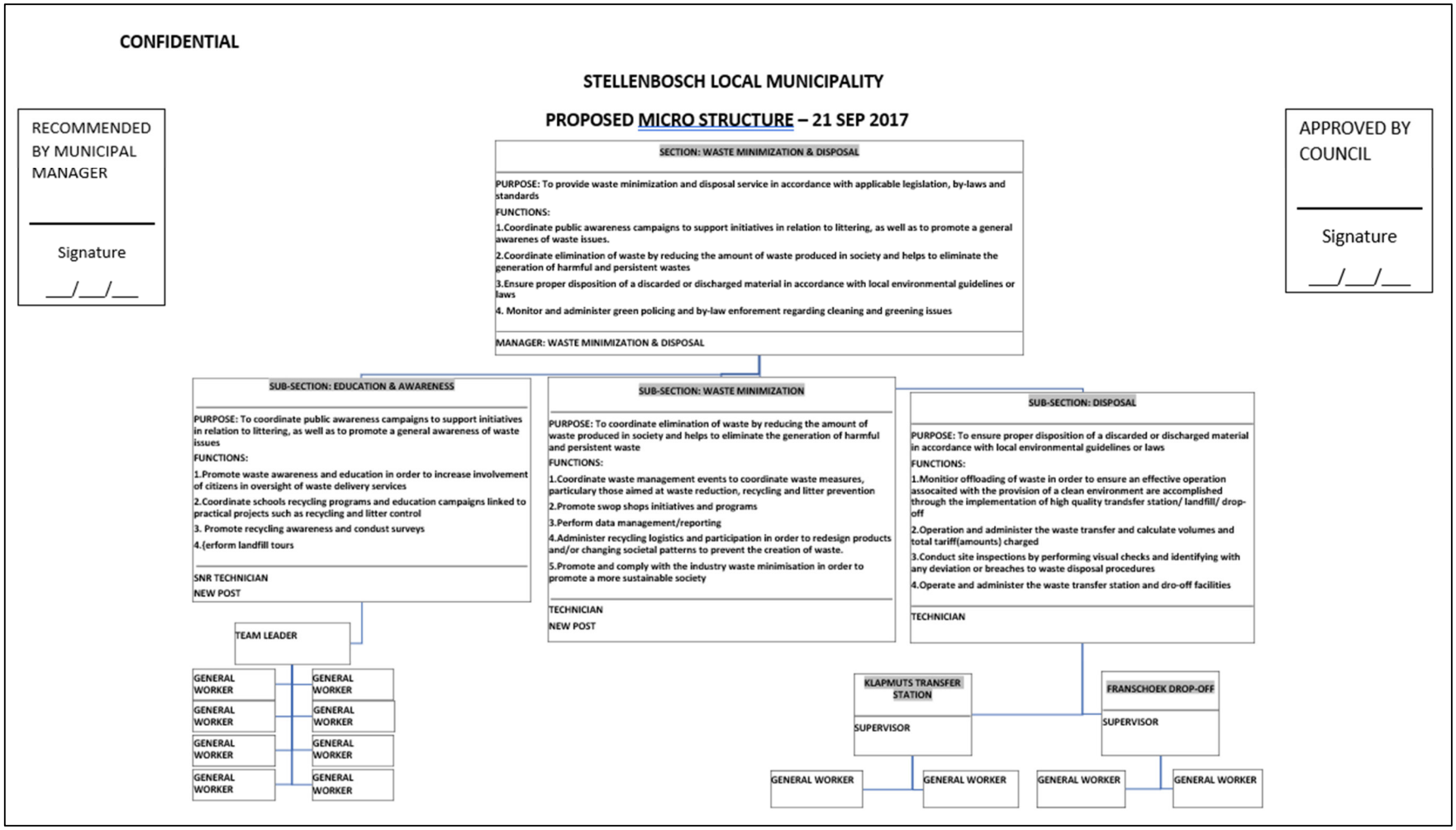


Figure 2-8: Waste Minimisation and Disposal Section Staff Structure

2.3.2 Waste collection services

Stellenbosch Municipality provides approximately 82.1% *(Stellenbosch Municipality Socio-Economic Profile, 2022)* of households with solid waste management collection services. The 17.9% not receiving solid waste collection services are located in farm/rural areas within Wards 19 and 20.

According to the Bureau of Economic Research, majority of farm dwellings in Ward 19 and 20 (see **Figure 2-9**) receive below average refuse collection. It must be noted that the refuse collection service is offered to the farm owner and not to the farm dwellers. If the farm owners refuse the service unfortunately no service will be rendered to farm dwellers.

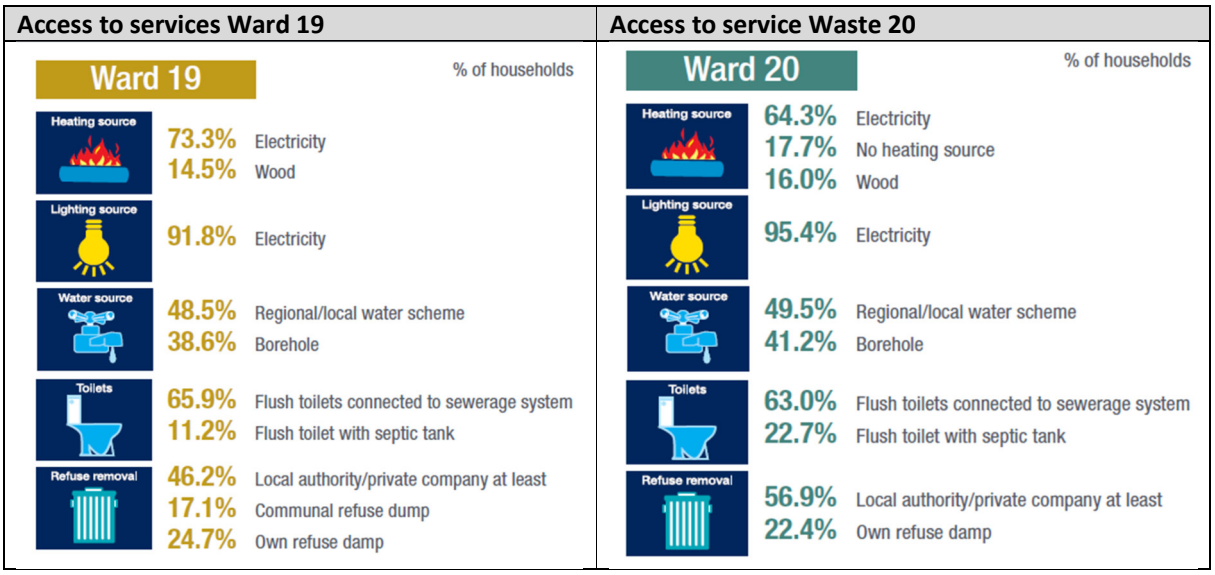


Figure 2-9: Access to services for Wards 19 and 20 receive below average refuse collection (Bureau of Economic Research)

The farms/rural areas have access to the three (3) drop off facilities in the SM:

- Stellenbosch Landfill,
- Klapmuts Transfer Station, and
- Franschhoek Waste drop off.

The collection services are as follows:

- 28 751 collections points are spread across the 22 wards of the Municipality.
- The refuse collection breakdown is approximately 20 000 wheelie bins and 4 000 standard refuse bags.
    - The refuse bins are used to collect from formal areas, while the refuse bags are used to collect from informal and farm/rural areas.
- All formal households in urban areas receive kerbside collection once per week.
- All informal households receive a weekly collection service.
- Some refuse removal services exist in rural areas and farming communities. These communities also have access to drop-off facilities.

The Municipality utilises 11 refuse collection trucks, that are operated by more than 60 crew members in a 30-hour working week. The current waste collection schedule is shown in **Table 2-4**.

Table 2-4: Waste collection schedule and areas covered.

Truck No	Truck Reg	Monday	Tuesday	Wednesday	Thursday	Friday
SW 8	CL 27923	Lanquedoc Meerlust SAPD Drakenstein	Onderpapegaai Vliegveld Vlottenburg Farms	Lyndoch Vlaeburg R44		
SW 9	CL 54065	Uniepark,Rozendal Simonswyk Universiteits oord	La Colline till Dorp Str Krigeville	Bottom Idas Valley	Bottom Cloetesville White City	Jamestown
SW 10	CL 27347	Stellenbosch University and Devon Valley Industrial Area	Die Boord	Stellenbosch University and Devon Valley Industrial Area	Cloetesville (Smarties/ Weltevrede)	Stellenbosch University and Devon Valley Industrial Area
SW 11	CL 31479	Mostertdrift	Noordwal oos Zimbabwe Flats Digteby Vlottenberg	Bo Idas Valley The Ridge	Bo Cloetesville Long str. South	Welgevonden
SW 12	CL 23506	Klap Residential and Business & Koelenhof Business	Klapmuts New Houses	Klapmuts RDP Houses	Koelenhof farms Nuutgevonden/Nooigedacht Klein Welgevonden	Klapmuts & Koelenhof Business
SW 13	CL 64272	Stellenbosch CBD	Brandwacht Dalsig	Stellenbosch CBD	Pniel and Farms along Helshoogte Rd	Stellenbosch CBD
SW 14	CL 64779	All business located outside of the CBD	Paradyskloof	All business located outside of the CBD	Tenantville (Kwarentyn & Welgelegen)	All business located outside of the CBD
SW 15	CL 71677	Kayamandi & Plankenbrug	Kayamandi Snake Valley	Thubelitsha & Plankenbrug	Kayamandi New Houses	Tenantville Plankenbrug Business
Franschhoek	Hired Truck	Bergrivier Dam, Amanzi spring water plant, Trades including B&B, 2 main farm roads and main roads	Wemmershoek, station road, voortrekkers park Maasdorp, Dennegeur, La Motte, Bellingham farm (Rupert) and happy valley road	Groendal, trades, 2 main farm roads and main roads	Mooiwater	Town, trades, B&B, all farm roads and main road

2.3.2.1 Area Cleansing services

The Municipality renders an area cleansing service 5 days a week from Monday to Friday. The area cleansing staffing structure consists of 2 teams. The first team covers area cleaning for Stellenbosch and the second team covers area cleaning for Franschhoek, Dwarsrivier, and Klapmuts. Area Cleansing employs EPWP Workers on temporary 6-month contracts. Area Cleansing staff make use of blue bags for the collection and disposal of waste.

2.3.2.2 Two-bag collection system

The Municipality provides a two-bag collection system in middle to high income areas where black bags and clear bags are collected once a week. Approximately 12 500 of 26 000 formal households are serviced per week. Households are required to separate and sort waste at source into 2 streams, namely general landfill waste (black bags) and recyclable waste (clear bags). Clear bags are provided by the Contractor who is responsible for collecting the clear bags and taking them to the SM Materials Recovery Facility (MRF) for sorting.

Table 2-5 provides a list of the areas that are currently included in the two-bag collection programme.

Table 2-5: Areas that are currently included in the two-bag collection programme.

Areas included in the two-bag collection programme	
Uniepark, Karindal, Aanhou Wen, Rozendal	Dorp/Stasie street
Mostertsdrift	Franschhoek
Simonswyk	Idas Valley, Lindida, Arbeidslus
Universiteits Oord	Raithby
Technopark	Agape Retirement Village
Die Boord, Fairways, Die Wingerd, Harringtons Place	Blaauwklippen Road
Paradyskloof, Schuilplaats, Lieberheim, Anesta, Eden, La Pastorale	Jamestown
Brandwacht	Cloetesville
Dalsig, Bo-Dalsig	Brandwacht-aan-rivier
Krigeville	Parmalat
Onder Papegaaiberg, Devon Vallei, Devon Park, Kleinvallei	Jonkershoek
La Colline/Die Rand	Welgevonden
Die Laan	

The recyclables were previously transported to a mini MRF situated adjacent to the Stellenbosch Landfill Facility (SLF), however from August 2019 to 31 March 2021, these were taken directly to the Kraaifontein MRF in the CCT for sorting.

The SM Integrated Waste Management Facility (IWMF) adjacent to the landfill started operations on 1 April 2021 and includes a MRF, which has the capacity to process 450 tons of incoming recyclable material per month and can employ up to 40 people. The MRF is currently not being used to its full capacity (currently operating at approximately 30%) as the Two Bag System is not fully in place across the municipality.

There are currently 19 staff employed at the MRF for sorting and 8 staff collecting the clear bags of recyclables. Recyclable material that is accepted includes paper, newspapers, magazines, cardboard, glass, plastic bottles and containers, metal packaging, and liquid board packaging. The contract includes areas into which the programme will be expanded each year as follows:

- Year 1: Groendal, Mooiwater, and La Motte.
- Year 2: Kayamandi North and Kayamandi South.
- Year 3: Klapmuts and Lanquedoc.

The Municipality also opened a public drop-off, located at the IWMF in April 2021. Residents may bring clean recyclable materials to the facility during operating hours and are also allowed to bring garage waste for free disposal into the skips provided in vehicles with a maximum carry capacity of 1.5 tons. This is to allow residents which are not included in the two bag areas to participate in recycling.

2.3.2.3 Organic waste collection

The Municipality currently diverts organic waste from landfill by means of chipping and composting garden waste that is received at the Stellenbosch Landfill. Garden waste is dropped off by residents and businesses at the landfill. Franschhoek residents may drop their garden waste off at the Franschhoek drop off facility. This is transported to Stellenbosch Landfill Site for chipping and shredding.

2.3.2.4 Fleet for waste management

A list of municipal vehicles dedicated to waste management operations is presented in **Table 2-6**.

Table 2-6: Municipal vehicles that are operational and dedicated to waste management operations.

REG No.	Year Model	Model	Date Purchased	Section in use	Years in Operation to date (2024)
CL 46779	2009	ISUZU NPR 400 AMT CRE	2009	Area Cleaning	15 years
CL 64272 (SW13)	2011	Nissan Diesel UD 330 Compactor	Jan-11	Collections	13 years
CL 63523	2011	DULEVO Sweeper 5000	2011	Area Cleaning	13 years
CL 64779 (SW14)	2011	Nissan Diesel UD 330 Compactor	Feb-11	Collections	13 years
CL 27923 (SW8)	2012	Nissan Diesel Compactor	Apr-12	Collections	12 years
CL 71576	2013	Toyota Hilux 2.0	May-13	Collections	11 years
CL 71677 (SW15)	2013	Nissan Diesel G300 Compactor	Jun-13	Collections	11 years
CL 76140	2015	Chev 1.4 bakkie	May-15	Area Cleaning	9 years
CL 31479 (SW11)	2015	UD 370 Diesel Compactor	May-15	Collections	9 years
CL 59281	2016	VW Polo Vivo	Jun-16	Disposal	8 years
CL81470	2017	MST Digger Loader	Jun-17	Disposal	7 years
CL 27347 (SW10)	2017	Isuzu FXZ 28-360 Compactor	Mar-17	Collections	7 years
CL 23506 (SW12)	2017	Isuzu FXZ 28-360 Compactor	Mar-17	Collections	7 years
CL 81138	2017	Isuzu FXZ 28-360 Compactor	May-17	Collections	7 years
CL 26704	2017	Mahindra DC Turbo Bakkie	Jun-17	Disposal	7 years
CL 51075	2017	Hino 300 815 Crew Cab 6A 11	Nov-17	Area Cleaning	7 years
CL 39782	2017	Priclo Caravan	Jun-17	Disposal	7 years
CL 26704	2017	BELERO NEF 4X4 P/U S/C	2017	Collections	7 years
CL 83193	2018	Hino 300 815 Crew Cab 6A 11	May-18	Area Cleaning	6 years
CL 83195	2018	Hino 300 815 Crew Cab 6A 11	May-18	Area Cleaning	6 years
CL 83198	2018	Nissan NP200 1.6i	May-18	Area Cleaning	6 years
CL 83197	2018	Nissan NP200 1.6i	May-18	Collections	6 years
CL 52034	2018	Hino 300 815 Crew Cab 6A 11	Apr-18	Area Cleaning	6 years
CL 83465	2018	MST Digger Loader	Jun-18	Area Cleaning	6 years
CL 83483	2018	UD 10-ton Tipper Truck	Jun-18	Area Cleaning	6 years
CL 84071	2018	UD 10-ton Tipper Truck	Sep-18	Area Cleaning	6 years
CL 54065 (SW9)	2018	UD 10-ton Refuse Compactor	Dec-18	Collections	6 years
CL 45166	2019	UD 10-ton Refuse Compactor	Jun-19	Collections	5 years
CL 22049	2019	MST Digger Loader	Jul-19	Area Cleaning	5 years
CL 10783	2019	UD 16 Ton Hooklift	Aug-19	Disposal	5 years
CL 34145	2020	HANOMAG Compactor	2020	Collections	4 years

Currently all mechanical repairs on equipment and vehicles are outsourced by the Municipality which has implications on turn-around times for servicing / repairing vehicles.

Objective 2.3 of the implementation plan includes an action to develop a fleet management, maintenance, and replacement strategy to allow budgeting to take place.

2.3.3 Waste diversion plans

2.3.3.1 Organic Waste Diversion Plan

The DEA&DP took a policy decision to implement a 50% restriction on organic waste being disposed to landfill by 2022 and a full prohibition of organic waste disposed to landfill by 2027. The Western Cape IWMP (2017-2022) puts an obligation on municipalities to divert 50% of organic waste streams away from landfill sites by 2022 and a complete ban on organic waste disposed at landfill sites by 2027.

JG Afrika were appointed to compile an Organic Waste Diversion Plan (OWDP) for the SM in 2021 and it has been updated and included as part of the implementation plan of this IWMP. It was recommended that the SM pursue a multi-pronged approach to organic waste diversion which favours and encourages separation at source, identifies a treatment option and creates an enabling environment. Certain activities will need to run in parallel as more information and other studies are completed to inform phasing and planning as the Organic Waste Diversion System is rolled out.

To date, the OWDP has not been fully implemented. Comments on the status of the implementation of the OWDP are indicated in **Table 2-7**.

Table 2-7: Implementation progress of the OWDP

Summary of Outcomes of Organic Waste Diversion Plan (November 2021).	Comment on Implementation of Proposed Outcomes (to date).
Organic Waste Drop-off sites.	• Currently the garden waste is accepted at SLF and Franschhoek Drop-off. • An organic waste transfer station is still in the planning process (EIA and plans were completed, however the site has not been rezoned) but was placed on hold due to the landfills site extension taking priority. The option of using Klapmuts may be considered in future, should the WWTW be upgraded to produce primary sludge.
Three bag separation at source in all residential areas within the SM area.	• The municipality provides a two-bag system, wheelie bin and clear bag in certain residential areas for recyclables only and not organic waste. • Garden waste can be dropped off by residents at the drop-offs but is not collected separately. • Klapmuts does not have a garden waste drop-off. • A Consultant has been appointed for Franschhoek to find a suitable site to construct a mini-MRF. The mini-MRF will include a garden waste and builder's rubble area. The location of the garden waste site will allow for garden waste to be chipped before transportation.
Organic Waste separation and collection for all business and commercial areas.	This has not yet been implemented. The implementation plan sets a target for 100% of the objectives and targets of the OWDP to be implemented by 2027. This includes the organic waste separation and collection for all businesses and commercial areas.
Partnership with Stellenbosch University to ensure the waste management systems are aligned.	This has not yet been implemented.
Transport system to collect organic waste and transport to the Organics Refuse Transfer Station.	The Municipality are considering organic waste drop-off sites rather a than a collection system.
A long term off-take solution for organic waste.	This is still in the planning stage and will be undertaken by the Municipality and likely to be combined with the upgrade of Klapmuts WWTW and the production of primary sludge to be treated with the organic waste.
Improved waste data capturing and reporting.	• No changes in the integrity of the Municipality's data or an overarching view of waste tonnages for the Municipality as a whole. • Municipality is engaging and having meetings with DEA&DP. Data is captured onto the Integrated Pollutants and Waste Information System (IPWIS).
Communication and awareness strategy focussed on Separation at Source and organic waste.	• Implementing the roll-out of composting bins in Franschhoek using the EPWP Education and Awareness Team. • Franschhoek residents were offered an opportunity to collect a compost bin, free of charge, at the Public Waste Drop Off in Fabriek Street, Franschhoek. • The public was informed by making use of the various platforms available in the Communications Department.

	• A team of designated EPWP workers from the Municipality, (informally known as Green Minds), were available to issue bins to residents. • A total of 43 bins were issued on the day.

The OWDP has been updated and integrated into the IWMP Implementation Plan, which includes the actions required, see **Table 4-1.**

2.3.4 Waste facilities and infrastructure

2.3.4.1 Stellenbosch Landfill Facility

The SLF is located on Portion 2 of Farm Morgenster 203, Remainder of Farm 183, Remainder of Farm Veldwagtersriver Outspan 280, Stellenbosch. The landfill is accessed from Devon Valley Road (Refer to **Figure 2-10**). The landfill comprises 3 waste disposal cells (Cells 1-3). The construction of Cells 1 and 2 commenced in 1966 and disposal ceased in April 2013, when they were shaped and temporarily capped. Cells 1 and 2 have not yet been closed in terms of the closure requirements specified in the Minimum Requirements for Waste Disposal by Landfill, Department of Water Affairs and Forestry (DWAF) (1998). Cell 3 currently receives waste from municipal area clean ups, but not general household waste as it has reached its' maximum height. General household waste from the Municipality is therefore transported to the Klapmuts Transfer Station (KTS), prior to disposal at the privately owned Vissershok Landfill Site in Cape Town. The construction of a new cell, Cell 4, is planned and it is expected it will start receiving waste in 2024. Cell 4 will be developed between Cells 2 and 3, and will be filled ("piggy-backed") above the slopes of Cells 2 and 3.

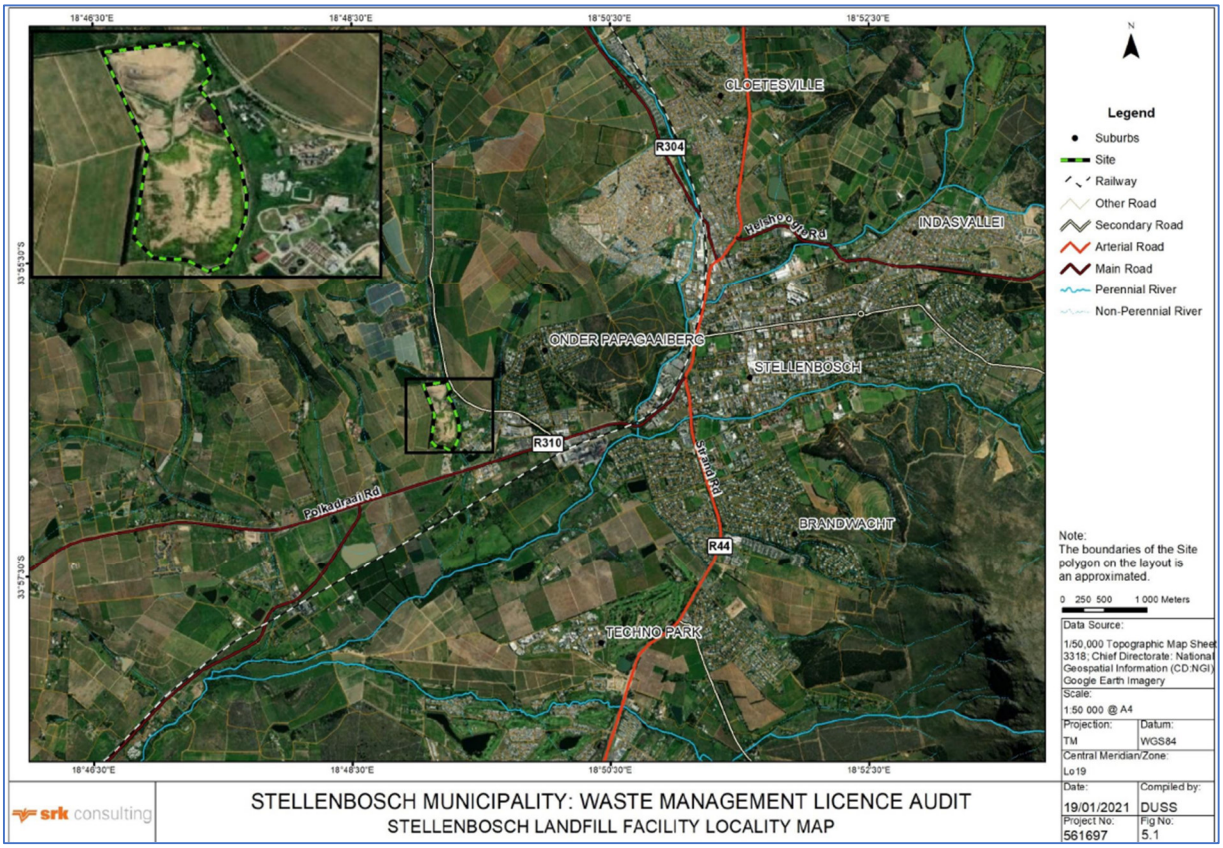


Figure 2-10: Stellenbosch Landfill Facility – Locality Map (SRK Consulting, External Audit Report, March 2023).

A Site Supervisor who is responsible for the daily operation of the site manages the landfill, on behalf of the SM.

The Municipality has appointed a service provider to undertake the chipping of organic/green waste on site. Builder's rubble is crushed, stockpiled, and transported off site once sold (collected by contractors).

Three general waste storage containers on site are used by the local community for temporary waste drop off. When the containers are full, they are taken to Vissershok Landfill by a private waste contractor. Two lockable 30m³ hazardous waste containers are available for the storage of household hazardous waste dropped-off by the public. These are located near the entrance to the facility.

2.3.4.2 Klapmuts Transfer Station (KTS)

The KTS is located on Farm 739, Paarl, along the R101 (Old Paarl Road), approximately 1.3 km from the Klapmuts Central Business District (Refer to **Figure 2-11**) and 15.49 km from the SLF. The KTS is a general waste transfer station that was constructed in 2000. All the general waste that is collected in the SM is off-loaded from the compactor vehicles, onto the apron and transferred to 30m³ containers and temporarily stored at the KTS. Once the containers are full, they are transported to the privately owned Vissershok Landfill Site in Cape Town for disposal.

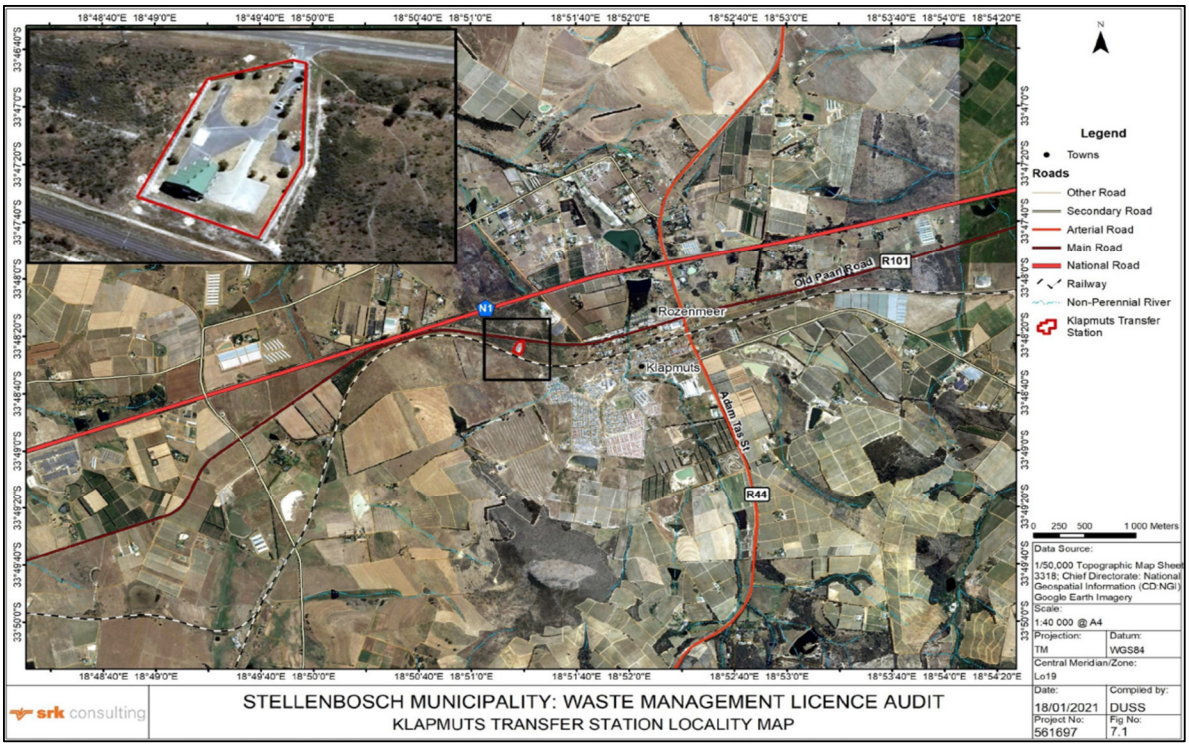


Figure 2-11: Klapmuts Transfer Station – Locality Map (SRK Consulting, External Audit Report, March 2023).

The KTS was operating in accordance with an ECA permit, dated 27 March 2000. The ECA permit is no longer valid due to changes in legislation, and the KTS is now operated in accordance with the Norms and Standards in terms of the NEM:WA (The facility was registered in terms of the Norms and Standards for the Storage of Waste on 7 November 2021).

The KTS is managed by SM and is fenced with a controlled access point. A weighbridge at the entrance to the facility weighs vehicles upon entry and exit and waste tonnages are recorded. The facility comprises an open sided roofed structure in which waste is dropped off, transferred, and temporarily stored prior to disposal. Skips are located on site for the public to drop waste off.

Waste delivered to the facility by the SM and private disposal vehicles by the surrounding farms in the Municipality is loaded into 30m³ Roll-on Roll-off (RO-RO) containers prior to transporting to the private Vissershok Landfill Site by a private waste management service provider.

As indicated by the SM the transport of waste disposal services to Vissershok is still being undertaken by the previous service provider and on a month-to-month basis while the new tender is adjudicated and awarded. The KTS is currently operating at maximum capacity, with approximately 120 x 30m^3 containers transported to Vissershok per week. This is approximately 3 130 tons per month.

2.3.4.3 Integrated Waste Management Facility

The Stellenbosch IWMF is located on Remainder of Farm 280, Veldwagtersriver and the Remainder of Farm 279, Stellenbosch District, adjacent to the SLF. The IWMF boundaries are depicted in **Figure 2-12**. The facility is accessible from Polkadraai Road (R310) and thus easily accessible by the public.

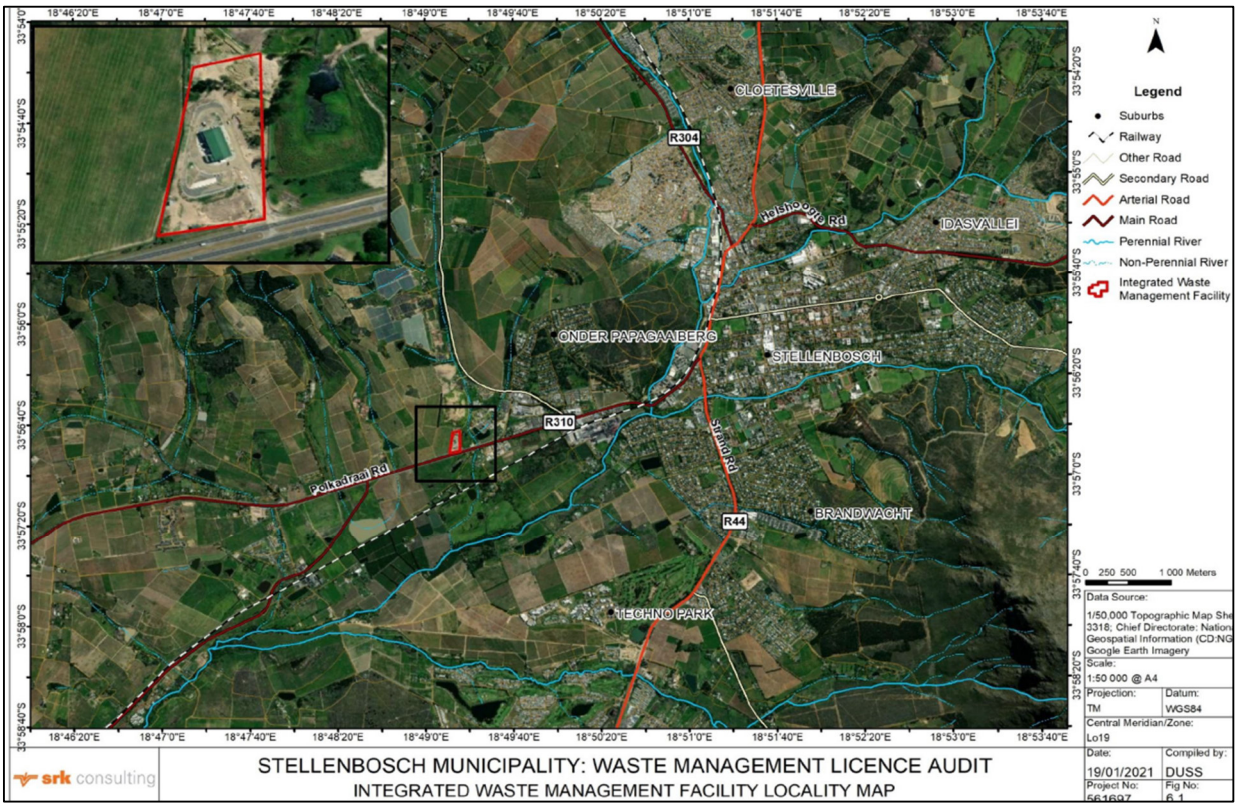


Figure 2-12: Integrated Waste Management Facility – Locality Map (SRK Consulting, External Audit Report, March 2023).

The facility is operated by a service provider appointed on behalf of the SM. The IWMF has a MRF where recyclable materials (cardboard, paper, glass, plastic, cartons, scrap metal, and liquid board packaging) are sorted for recycling. Recyclables can be dropped off by the public. The service provider that is appointed by the SM to collect recyclables from specific areas participating in the household recycling programme also manages the IWMF.

Hazardous Household Waste (HHW) (fluorescent bulbs and lamps only) can also be dropped off at the IWMF by the public and when there is sufficient volume, it is taken to the Vissershok Landfill for disposal.

Construction of the IWMF commenced in August 2019 and was completed in November 2020. The IWMF commenced operation on 1 April 2021. The IWMF is operated in accordance with the Norms and Standards for the Storage of Waste (referred to as GN 926), dated 29 November 2013, and GN 1093 National Norms

and Standards for the Sorting, Shredding, Grinding, Crushing, or Bailing of General Waste (referred to as GN 1093) published under the NEM:WA, Act 59 of 2008.

The Norms and Standards prescribe conditions applicable to the facility in terms of registration, location and design requirements, as well as operational management requirements pertaining to access control, emergency preparedness, monitoring, auditing and reporting.

The IWMF is fenced with controlled access. A weighbridge at the entrance weighs vehicles upon entry and exit and waste tonnages are recorded. The facility has impermeable concrete floors and a tarred ring road for safe one-way traffic movement. A drop-off and storage area for recyclable general waste and bulky non-recyclable general waste is provided at the facility.

A HHW area is located outside the waste reclamation building, on an impermeable surface, for the public to drop off fluorescent bulbs and lamps, paints, chemicals, and batteries. The facility receives e-waste, which is stored in a container on site and once full is removed by the service provider. An independent contractor is appointed by the SM to collect the non-recyclable general waste and hazardous waste for disposal at Vissershok. Scrap metal is removed from site by the appointed service provider. The Municipality does not accept asbestos at any of its' facilities.

Inside the MRF, mixed recyclable waste is received from residential collections, recycling drop-off, commercial/industrial collections and is fed onto a conveyor from which workers sort waste into different waste streams (plastic, tins, paper etc.). The tailings and non-recyclable general waste (tailings) that have not be picked by workers will drop off the end of the conveyor into a skip and are disposed to landfill by the appointed service provider. Sorted recyclable waste is compacted / baled at the MRF and collected by recyclers.

2.3.4.4 Drop-off facilities

The SM allows for the public to purchase coupons at their municipal cashiers for the public to access, in order to dispose of waste at the SLF, KTS, IWMF Drop-off, and Franschhoek Drop-off. The Stellenbosch waste disposal facilities coupon prices for 01 July 2023 till the 30 June 2024 are indicated in **Figure 2-13**.

STELLENBOSCH WASTE DISPOSAL FACILITIES

STELLENBOSCH
STELLENBOSCH • PNIEL • FRANSCHHOEK
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Name:	Stellenbosch Landfill Site	Stellenbosch Drop Off & MRF	Klapmuts Transfer Station	Franschhoek Drop Off	Coupon prices from 01 July 2023 - 30 June 2024 VAT included
Location:	Devon Valley Rd	Adam Tas Rd	R101 Old Paarl Rd	Fabriek Street	
Operating Hours:					
Mondays to Fridays	08:00 - 16:30	08:00 - 16:30	08:00 - 16:30	08:00 - 16:30	
Saturdays	08:00 - 13:00	08:00 - 13:00	08:00 - 13:00	08:00 - 13:00	
Public Holidays	08:00 - 13:00	08:00 - 13:00	08:00 - 13:00	08:00 - 13:00	
Good Friday	Closed	08:00 - 13:00	Closed	Closed	
Closed	Sundays, Christmas, New Year's Day				
Waste types accepted:	Kindly refer to definitions of waste types below.				
Garden waste	✓	×	✓	✓	Vehicle capacity of more than 1,5T: R29,00/Ton ONLY AT LANDFILL SITE
Builders' rubble	✓	×	✓	✓	Vehicle capacity of more than 1,5T: R29,00/Ton ONLY AT LANDFILL SITE
General / Mixed waste	✓	×	✓	×	¼T: R206,25 | ½ T: R412,50 | 1T: R825,00
Recyclables	×	✓	×	×	FREE
E-waste	×	✓	×	×	FREE
Garage/ Bulky waste	×	✓	×	✓	FREE
Household hazardous waste	✓	✓	×	✓	FREE
Soil	✓	×	×	×	Vehicle capacity of more than 1,5T: R29,00 /Ton
Definitions:					
Garden waste	Grass cuttings, branches and leaves ONLY. If it contains other waste = Mixed / General waste				
Builders' rubble	Clean builder's rubble ONLY. If it contains e.g. iron, wood, plastic = Mixed / General waste				
General / Mixed waste	General waste / Contaminated garden waste or builders' rubble / Household waste				
Recyclables	Waste that is recyclable and seperated at source, e.g. Plastic, tin, aluminium, cardboard, paper, glass- mixed in one bag is acceptable				
Garage/ Bulky waste	Waste items that cannot fit into the household's 240L wheelie bin				
Household hazardous waste	Any unwanted household product labelled as flammable, toxic, corrosive, or reactive. The most common products include aerosols, anti-freeze, fertilizer used oil, paint supplies, poisons and solvents, fluorescent tubes, chemical cleaning supplies, household batteries.				
E-waste	Discarded electronic appliances such as mobile phones, computers, and televisions and it may include monitors, printers, scanners, keyboards, mice, cable circuit boards, lamps, clocks, flashlight, calculators, answering machines, digital/video cameras, radios, VCRs, DVD players, MP3 and CD players, kitchen equipment (toasters, coffee makers, microwave ovens, etc.)				
Please Note:					
Tariffs are set for certain waste types, depending on the actual mass. Charged per Ton or part thereof. A coupon system is in place. Coupons are sold at the municipal cashiers. **Limitations is set for volumes accepted on a specific site, and may be subjected to site supervisor's approval.**					

Figure 2-13: Stellenbosch Waste Disposal Facilities – Coupon Prices from 01 July 2023 – 30 June 2024 (inclusive of VAT).

2.3.5 Compliance audits

An independent external auditor and reviewer is appointed by the SM to undertake interim external audits in a 3-year cycle.

The independent external auditor audits compliance with the Waste Management Licences (WMLs) / permits issued in terms of Section 20 of the Environment Conservation Act 73 of 1989 (ECA), the NEM:WA, and relevant Norms and Standards applicable published under the NEM:WA.

In addition to inspecting whether the licence / permit conditions are adhered to, the external auditor reviews relevant data and information related to the specific operations and plans of each site and associated environmental impacts i.e. litter, stormwater management, access control, air and water quality monitoring etc. The auditors then recommend corrective actions to be implemented by the Municipality where partial or non-compliances are identified.

The most recent external audits were undertaken by an Independent Auditor (the appointed Consultant) on the 16 April 2024 of the three waste management facilities, namely the Stellenbosch Landfill Facility (SLF), the Integrated Waste Management Facility (IWMF) and the Klapmuts Transfer Station (KTS).

2.3.5.1 Compliance Assessment Tables of Waste Facilities from 16 April 2024 External Audits

Stellenbosch Landfill Site- WML Ref: 19/2/5/1/B4/45/WL0182/22

Name:	Type:	Location:	Reference No.:
Stellenbosch Landfill Site	**WDF**	DEVON VALLEY ROAD, STELLENBOSCH	WML Ref: 19/2/5/1/B4/45/WL0182/22

Category	No. of Conditions Audited (N)	Score (S)	Average Compliance [$C_{ave.}$ = (S/2N)(100)]	Average Weight [$W_{ave.}$ = (N/$N_{tot.}$)(100)]	Adjusted Weight ($W_{adj.}$)	Average Score (%) [$S_{ave.}$ = ($C_{ave.}$)($W_{ave.}$)]	Adjusted Score (%) [$S_{adj.}$ = ($C_{ave.}$)($W_{adj.}$)]
Administration (A)	42	74	88.10%	36.84%	**10%**	32.46%	8.81%
General Operations (O)	18	27	75.00%	15.79%	**20%**	11.84%	15.00%
Special Operations (SO)	32	50	78.13%	28.07%	**30%**	21.93%	23.44%
Monitoring (M)	22	34	77.27%	19.30%	**40%**	14.91%	30.91%
Average Previous Compliance Rating (Total $S_{ave.}$)						81.14%	***
Environmentally Weighted Previous Compliance Rating (Total $S_{adj.}$)						***	**78.16%**

Category	No. of Conditions Audited (N)	Score (S)	Average Compliance [$C_{ave.}$ = (S/2N)(100)]	Average Weight [$W_{ave.}$ = (N/$N_{tot.}$)(100)]	Adjusted Weight ($W_{adj.}$)	Average Score (%) [$S_{ave.}$ = ($C_{ave.}$)($W_{ave.}$)]	Adjusted Score (%) [$S_{adj.}$ = ($C_{ave.}$)($W_{adj.}$)]
Administration (A)	44	83	94.32%	34.92%	**10%**	32.94%	9.43%
General Operations (O)	30	54	90.00%	23.81%	**20%**	21.43%	18.00%
Special Operations (SO)	31	58	93.55%	24.60%	**30%**	23.02%	28.06%
Monitoring (M)	21	34	80.95%	16.67%	**40%**	13.49%	32.38%
Average Current Compliance Rating (Total $S_{ave.}$)						90.87%	***
Environmentally Weighted Current Compliance Rating (Total $S_{adj.}$)						***	**87.88%**

Current Compliance Rating	Status Indicator (Total $S_{adj.}$)		Required Action
84.5% ≤ Total $S_{adj.}$ ≤ 100%	Compliant (Green)	**87.88%**	**Minor Improvements**
64.5% ≤ Total $S_{adj.}$ < 84.5%	Partially Compliant (Amber)		Improvements
Total $S_{adj.}$ < 64.5%	Non-Compliant (Red)		Major Improvements

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Stellenbosch Integrated Waste Management Facility- Registration No: 19/2/1/2/3/2 [0032/21]

Name:	Type:	Location:	Reference No.:
Stellenbosch Integrated Waste Management Facility	RTS or MRF	Adam Tas Road, Stellenbosch	Registration No: 19/2/1/2/3/2 [0032/21]

Category	No. of Conditions Audited (N)	Score (S)	Average Compliance [$C_{ave.} = (S/2N)(100)$]	Average Weight [$W_{ave.} = (N/N_{tot.})(100)$]	Adjusted Weight ($W_{adj.}$)	Average Score (%) [$S_{ave.} = (C_{ave.})(W_{ave.})$]	Adjusted Score (%) [$S_{adj.} = (C_{ave.})(W_{adj.})$]
Administration (A)	25	47	94.00%	37.31%	10%	35.07%	9.40%
General Operations (O)	21	40	95.24%	31.34%	40%	29.85%	38.10%
Special Operations (SO)	14	28	100.00%	20.90%	30%	20.90%	30.00%
Monitoring (M)	7	14	100.00%	10.45%	20%	10.45%	20.00%
Average Previous Compliance Rating (Total $S_{ave.}$)						96.27%	***
Environmentally Weighted Previous Compliance Rating (Total $S_{adj.}$)						***	**97.50%**

Category	No. of Conditions Audited (N)	Score (S)	Average Compliance [$C_{ave.} = (S/2N)(100)$]	Average Weight [$W_{ave.} = (N/N_{tot.})(100)$]	Adjusted Weight ($W_{adj.}$)	Average Score (%) [$S_{ave.} = (C_{ave.})(W_{ave.})$]	Adjusted Score (%) [$S_{adj.} = (C_{ave.})(W_{adj.})$]
Administration (A)	24	48	100.00%	34.78%	10%	34.78%	10.00%
General Operations (O)	21	40	95.24%	30.43%	40%	28.99%	38.10%
Special Operations (SO)	14	25	89.29%	20.29%	30%	18.12%	26.79%
Monitoring (M)	10	20	100.00%	14.49%	20%	14.49%	20.00%
Average Current Compliance Rating (Total $S_{ave.}$)						96.38%	***
Environmentally Weighted Current Compliance Rating (Total $S_{adj.}$)						***	**94.88%**

Current Compliance Rating	Status Indicator (Total $S_{adj.}$)		Required Action
84.5% ≤ Total $S_{adj.}$ ≤ 100%	Compliant (Green)	**94.88%**	**Minor Improvements**
64.5% ≤ Total $S_{adj.}$ < 84.5%	Partially Compliant (Amber)		Improvements
Total $S_{adj.}$ < 64.5%	Non-Compliant (Red)		Major Improvements

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Name:	Type:	Location:	Reference No.:
Klapmuts Transfer Station	**RTS or MRF**	Farm 739, Division of Paarl	DEA&DP Reference No: 19/2/1/2/3/2 (0033/21)

Category	No. of Conditions Audited (N)	Score (S)	Average Compliance [$C_{ave.} = (S/2N)(100)$]	Average Weight [$W_{ave.} = (N/N_{tot.})(100)$]	Adjusted Weight ($W_{adj.}$)	Average Score (%) [$S_{ave.} = (C_{ave.})(W_{ave.})$]	Adjusted Score (%) [$S_{adj.} = (C_{ave.})(W_{adj.})$]
Administration (A)	17	34	100.00%	54.84%	**10%**	54.84%	10.00%
General Operations (O)	5	10	100.00%	16.13%	**40%**	16.13%	40.00%
Special Operations (SO)	6	8	66.67%	19.35%	**30%**	12.90%	20.00%
Monitoring (M)	3	6	100.00%	9.68%	**20%**	9.68%	20.00%
Average Previous Compliance Rating (Total $S_{ave.}$)						93.55%	***
Environmentally Weighted Previous Compliance Rating (Total $S_{adj.}$)						***	**90.00%**

Category	No. of Conditions Audited (N)	Score (S)	Average Compliance [$C_{ave.} = (S/2N)(100)$]	Average Weight [$W_{ave.} = (N/N_{tot.})(100)$]	Adjusted Weight ($W_{adj.}$)	Average Score (%) [$S_{ave.} = (C_{ave.})(W_{ave.})$]	Adjusted Score (%) [$S_{adj.} = (C_{ave.})(W_{adj.})$]
Administration (A)	17	34	100.00%	54.84%	**10%**	54.84%	10.00%
General Operations (O)	5	9	90.00%	16.13%	**40%**	14.52%	36.00%
Special Operations (SO)	6	9	75.00%	19.35%	**30%**	14.52%	22.50%
Monitoring (M)	3	6	100.00%	9.68%	**20%**	9.68%	20.00%
Average Current Compliance Rating (Total $S_{ave.}$)						93.55%	***
Environmentally Weighted Current Compliance Rating (Total $S_{adj.}$)						***	**88.50%**

Current Compliance Rating	Status Indicator (Total $S_{adj.}$)		Required Action
84.5% ≤ Total $S_{adj.}$ ≤ 100%	Compliant (Green)	**88.50%**	**Minor Improvements**
64.5% ≤ Total $S_{adj.}$ < 84.5%	Partially Compliant (Amber)		Improvements
Total $S_{adj.}$ < 64.5%	Non-Compliant (Red)		Major Improvements

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2.3.5.2 Conclusions and Recommendations from External Audits (dated 16 April 2024)

Stellenbosch Landfill Site

The key areas where improvements have been noted and or some attention is required from a Compliance perspective are listed as follows:

- Engineering Design approvals and Authority response – DWS
- Stormwater Management – completion of new containment dam to ensure new disposal area can be commissioned
- Groundwater Monitoring – background monitoring of borehole required
- Surface Water Monitoring – new sampling point in Veldwachters River required
- Air Quality Monitoring – review of sampling frequency as necessary
- Waste Manifest Records are required
- Signage - the signage will only be erected once all the site engineering works, and related site upgrades have been completed.
- Vegetation (Alien) Management Plans must be compiled and implemented.
- Ongoing Training of Personnel (Municipal and Contractors)

Stellenbosch Integrated Waste Management Facility (IWMF)

During the external compliance audit discussion, the importance of ensuring that the E-Waste which is removed off site for recovery and recycling and is managed by an accredited waste contractor so as to prevent avoidable occupational and health safety related incidents was discussed and agreed to.
The IWMF Operator agreed that an inspection of the appointed E-Waste contractor's premises is necessary.

Klapmuts Transfer Station

The key areas where ongoing attention is required from a Compliance perspective not ignoring the fact that the Municipality have put in place measures to ensure operations are as neat as practically possible are listed as follows:

- Windblown Litter to be continually collected/controlled by the appointed EPWP personnel
- Capacity and Operational Status of Facility – RTS Upgrade
- Training – in particular the EPWP personnel
- Stormwater Management – to be addressed as part of the RTS refurbishment and upgrade project.
- Personnel Capacity – employment of an adequate number of EPWP personnel to be maintained.

Table 2-8 details the environmental approvals and waste activities authorised at each of these facilities. In summary:

- The SLF was constructed and is operated in accordance with an ECA Permit and WML.
- The IWMF was constructed and is operated in accordance with the National Norms and Standards for the Storage of Waste (referred to as GN 926), and the National Norms and Standards for the Sorting, Shredding, Grinding, Crushing, or Bailing of General Waste (referred to as GN 1093) published under the National Environmental Management: Waste Act 59 of 2008 (NEM:WA).
- KTS was issued with a Permit dated 27 March 2000 in terms of the Environmental Conservation Act 73 of 1989 (ECA), due to changes in legislation, the ECA Permit is no longer valid and the KTS is

required to operate according to the Norms and Standards for the Storage of Waste (GN 926 of November 2013).

Table 2-8: Summary of environmental approval and waste activities for SLF, IWMF and KTS

Approval and Status	Date of Issue of WML / Registration	Activities Authorised
Stellenbosch Landfill Facility		
Permit in terms of section 20(1) of the ECA (Ref: 16/2/7/G203/D16/Z1/P331) Status: *Replaced by WML issued on 31 January 2023.*	20 January 1999	Develop and operate a waste disposal site classified a G:M: B+ facility, on Portion 2 of Farm Morgenster 203, the Remainder of Farm Grootvlei 183 and on Farm Veldwagtersriver No. 280 in the Stellenbosch district.
Authorisation Letter (Ref E13/2/10/3-B4/37-WL0063/11) Status: *Replaced by WML issued on 31 January 2023.*	10 January 2013	Permission granted to use newly constructed Cell 3 for waste disposal in accordance with the ECA Permit conditions.
WML Variation in terms of NEM: WA (Ref E13/2/10/7-B4/37-WL0077/11) Status: *Replaced by WML issued on 31 January 2023.*	7 February 2013	Variation of ECA Permit condition 3.13, allowing for a height increase of Cell 1 and Cell 2 from 16 m to 23 m.
WML in terms of NEM: WA (Ref 19/2/5/1/B4/46/WL0118/14) Status: *Active*.	13 September 2018	**Category A and Category C of GN 718 of 03 July 2008, as amended:** **Category A:** 14. The decommissioning of a facility for a waste management activity listed in terms of Category A or B of this schedule. **Category C:** 1. The storage of general waste at a facility that has the capacity to store in excess of 100 m^3 of general waste at any one time, excluding the storage of waste in lagoons or the temporary storage of such waste. 2. The storage of hazardous waste at a facility that has the capacity to store in excess of 80 m^3 of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons or temporary storage of such waste. 3. The storage of waste tyres in a storage area exceeding 500 m^2.
WML in terms of NEM: WA (Ref: 19/2/5/1/B4/45/WL0182/22) Status: *Active*.	31 January 2023	Permission granted for the continued operation of Cell 3 and the construction and operation of Cell 4 at the SLF, Stellenbosch. This Licence replaces the existing Permits (Permit No's. 16/2/7/G203/D16/Z1/P331 and E13/2/10/7-B4-37-WL0077/11).
Integrated Waste Management Facility		
Registered in terms of GN 926 and GN 1093 [Reference No: 19/2/1/2/3/2 (0032/21)]	7 November 2021	**Category C of GN 242 of 17 March 2017:** 1. The storage of general waste at a facility that has the capacity to store in excess of 100m^3 of general waste at any one time,

		excluding the storage of waste in lagoons or temporary storage of such waste. 2. The storage of hazardous waste at a facility that has the capacity to store in excess of 80m³ of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons or temporary storage of such waste. 3. The storage of waste tyres in a storage area exceeding 500m²; and 4. The sorting, shredding, grinding, crushing, screening or bailing of general waste.
Klapmuts Transfer Station		
Registered in terms of GN 926. [Reference No: 19/2/1/2/3/2(0033/21)]	7 November 2021	**Category C of GN 242 of 17 March 2017:** 1. The storage of general waste at a facility that has the capacity to store in excess of 100m³ of general waste at any one time, excluding the storage of waste in lagoons or temporary storage of such waste. 2. The storage of hazardous waste at a facility that has the capacity to store in excess of 80m³ of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons or temporary storage of such waste; and 3. The storage of waste tyres in a storage area exceeding 500m².

The DEA&DP granted a WML (Ref: 19/2/5/1/B4/45/WL0182/22) for the continued operation of Cell 3 (height increase to 130masl) and the construction and operation of a new Cell 4 at the SLF, on 31 January 2023. This WML replaces the WMLs (ECA Permit No's. 16/2/7/G203/D16/Z1/P331 and E13/2/10/7-B4-37-WL0077/11).

2.3.6 Future planned developments and infrastructure

2.3.6.1 Development of a new landfill cell at the Stellenbosch Landfill

In August 2019, Cell 3 reached its capacity at a final height of 23 m above natural ground level, and municipal solid waste (MSW) has since been transported to the private Vissershok landfill in the CCT for disposal. Only relatively small quantities of builder's rubble and garden waste has been received at the site since that date and has also been diverted to Vissershok for disposal from July 2022.

Due to the significant cost of transporting MSW to the Vissershok landfill, the SM has entered into an agreement with ESKOM to relocate the powerlines around the landfill footprint, so that the areas between Cells 1,2 and Cell 3 currently "sterilised" by the powerline's servitude can be used for MSW landfilling. This area is to be developed as Cell 4 of the SLF and will be operational by June 2024.

The development of Cell 4 of the SLF includes the following infrastructure:

- Development of Cell 4 divided into three sub cells.
- A leachate management system.
- A contaminated water management system including a contaminated water dam.
- Upstream storm water management system.
- Associated access infrastructure to the south of the older Cells 1 and 2.
    - A new access route to the facility with storm water management infrastructure for the access roads.
    - The relocation of a weighbridge from the adjacent IWMF onto the landfill access road.

- Installation of a new weighbridge with associated weighbridge office.
- A container staging area; and
- Construction of a new office building.

The design of Cell 4 and the associated infrastructure was done based on legislative requirements and best practices to enable the incorporation of the required facilities required for the operation and maintenance of the SLF.

In formulating the design for Cell 4 and the associated infrastructure, every effort has been made to meet the objectives of landfill design, i.e., to provide a cost effective, environmentally, and socially acceptable facility whilst complying to the required standards and legislation.

2.3.6.2 Landfill gas extraction and air quality monitoring

In terms of the WML and Section 20 Permit, SM must develop an air quality monitoring program and undertake regular monitoring as set out in the WML and Section 20 permit conditions.

It is a requirement of the WML to ventilate gas within the waste body to prevent the build-up of dangerous concentrations of gas. No gas ventilation wells have been installed on any of the cells. Gas does, however, ventilate through the soil since no impermeable capping is in place.

A Contractor has been appointed for gas flaring and design of a gas extraction facility. The Municipality confirmed that infrastructure required for the gas flaring will be installed in July 2024 and flaring will commence in May 2025.

Establishment of a landfill gas extraction well field, flaring compound, and electricity generation at the Stellenbosch Landfill

A service provider was appointed in June 2022 for the Provision of professional services for *"project registration, design, and tender documentation for the establishment of a landfill gas extraction well field, flaring compound and electricity generation at the Stellenbosch Landfill"* based on the successful submission of an invited bid from the SM.

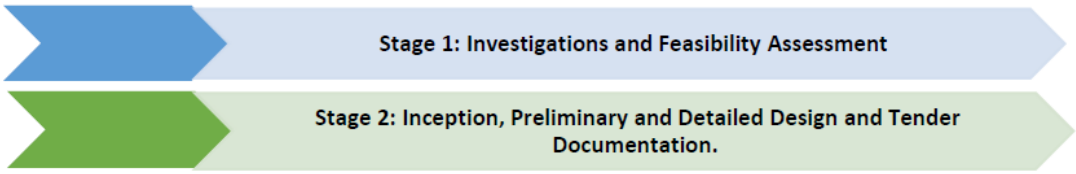
The main objective of this assignment is to design and establish a landfill gas extraction system over various stages as follows:

1. Design and install gas well fields and flaring unit; and
2. Electricity generation unit

Stellenbosch has embarked on an Electricity Generation Augmentation Project to generate sufficient energy to prevent the need to load shed and the electricity generated using landfill gas from the site will therefore be incorporated into the Stellenbosch grid in order to reduce the reliance on the ESKOM supply.

There is a current Programme of Activities (PoA) registered for South Africa for landfill gas extraction, flaring and electricity generation through the City of Cape Town. The PoA is a framework approval which has several individual component projects included under the framework. The Stellenbosch project will be able to link into the PoA as a Component Project Activity (CPA) as it fits into the requirements of this specific PoA.

There are there are currently two components to the project, namely:



Stage 1: The Feasibility Assessment will include the determination of existing and future quantities of waste in or going to landfill, the estimation of the quantity of landfill gas that can be generated and the viability of firstly, registering for Clean Development Mechanism (CDM) and secondly, for the production of electricity. The output will be a Feasibility Report advising the Municipality on the way forward (**currently underway**).

Stage 2: Based on the outcome of the Feasibility Assessment, the Consultant will undertake the design and preparation of Tender Documents for the construction of a landfill gas extraction system including flaring.

The inclusion of power generation in Stage 2 will be dependent on the recommendations of the Feasibility Report. The following should be noted:

- Cells 1, 2 and 3 are producing gas and a gas monitoring project was implemented.
- Cells 1 and 2 are old and unlined while Cell 3 is lined but not yet capped. Cell 4 is in design stage.
- SM has been allowed to utilise the existing PoA of the CCT with the provision that the Cities CDM Specialists are involved.
- The project procurement strategy was discussed, and it was agreed that a single Civils contract with a nominated Mechanical and Electrical Contract (M&E) contract would be the favoured strategy.

Landfill gas modelling

To estimate the current and future production and collection of landfill gas (LFG) at the SLF using a numerical model, based on estimations of historic and future waste deposition, as well and waste characteristics and consideration of landfill management, it was necessary to:

- Design the LFG extraction and flaring systems.
- Analyse viability of using the LFG in generators to produce electrical power.
- Estimate future LFG emissions with and without the project (baseline comparison).
- Estimate the potential for production of electrical power, if a generator were to be installed.

Landfill background and history

Before 2000, waste from SM was placed in Cell 1 of the landfill. Most waste was burnt, so waste from this period is not considered in gas calculations. Cell 2 was used for disposal of waste from 2000 to 2012.

Operation of Cell 3 commenced in 2013. Since 2019 disposal of domestic waste was drastically reduced. It is now only receiving small quantities, as well as construction and demolition waste. Domestic waste from the municipality is being sent to other landfills.

The landfill awaits the construction of Cell 4.

All of the “piggy-back” areas of Cells 1 and 2, and part of that of Cell 3 will be covered by an impermeable liner above a rubble gas collection layer attached to horizontal gas drains. **Figure 2-14** illustrates the overall layout of Cells 1, 2, 3 and 4 and the areas of initial construction, “piggy-back” filling and final capping.

Figure 2-14: Cells 1, 2, 3 & 4 – Construction areas and Final capping and piggy-back areas (Ingerop, March 2023).

Landfill gas production and collection

Landfill gas production was estimated using the IPCC model (2019 refinement). **Figure 2-15** shows the estimated CH_4 production by cell.

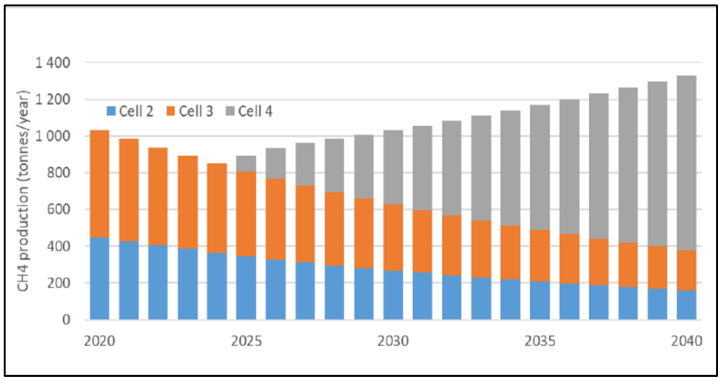


Figure 2-15: CH_4 production by cell 2020 to 2040 (Ingerop, March 2023).

Figure 2-16 - Figure 2-18 present the prediction CH_4 and LFG extraction, by cell, and compare these with gas production.

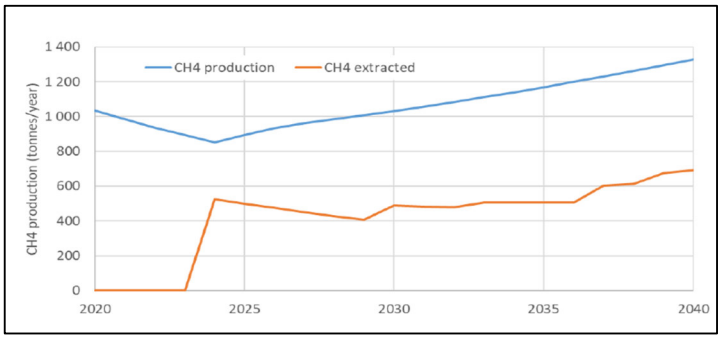


Figure 2-16: CH_4 production vs. extraction, 2020 to 2040 (Ingerop, March 2023).

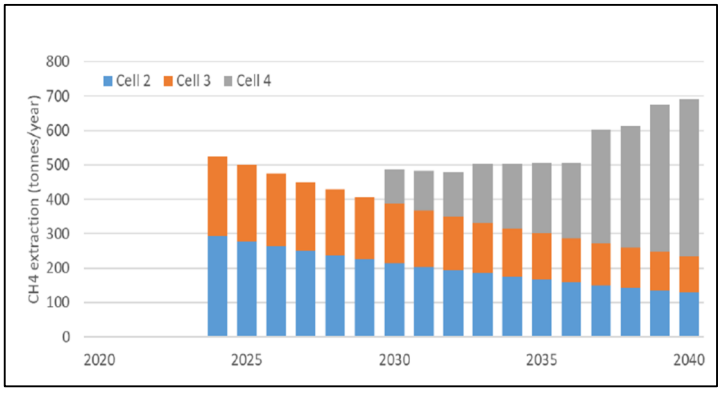


Figure 2-17: Estimated CH extraction by cell, 2020 to 2040 (Ingerop, March 2023).

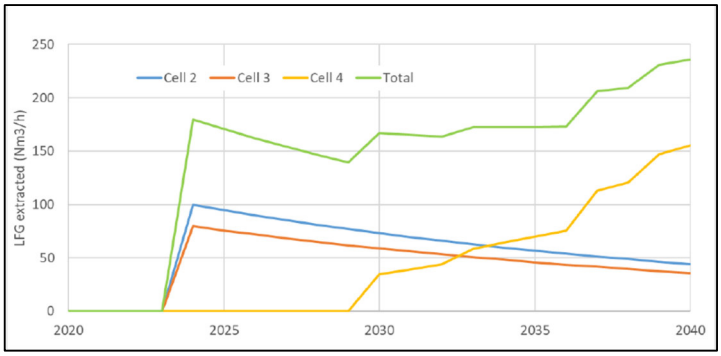


Figure 2-18: Estimated LFG extraction by cell, 2020 to 2040 (Ingerop, March 2023).

Landfill gas collection

Figure 2-19 - Figure 2-21 present the predicted CH_4 and LFG extraction, by cell, and compares these with gas production.

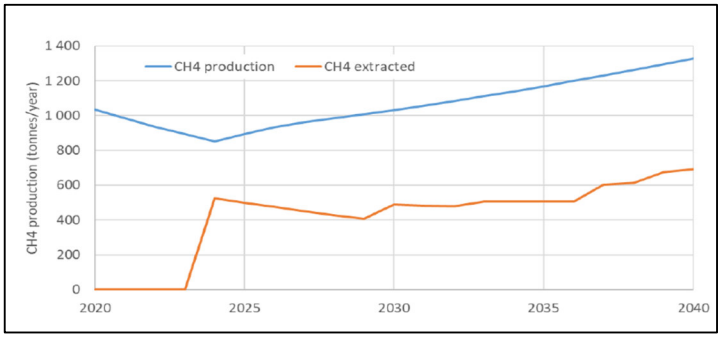


Figure 2-19: CH_4 production vs. extraction, 2020 to 2040 (Ingerop, March 2023).

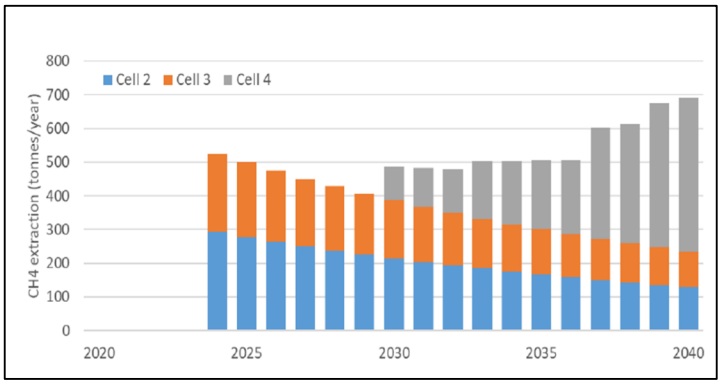


Figure 2-20: Estimated CH_4 extraction by cell, 2020 to 2040 (Ingerop, March 2023).

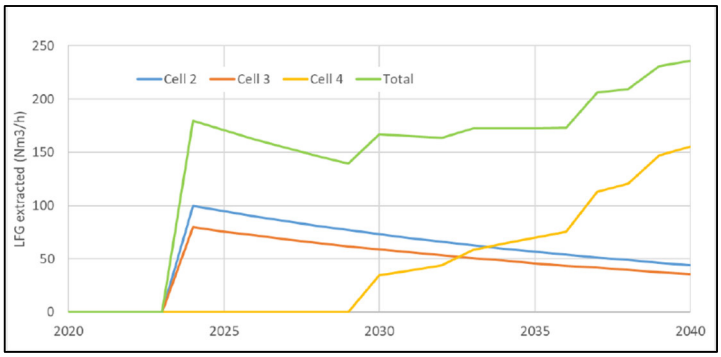


Figure 2-21: Estimated LFG extraction by cell, 2020 to 2040 (Ingerop, March 2023).

Baseline comparison

Figure 2-22 compares emissions of unburnt CH_4, with and without the project.

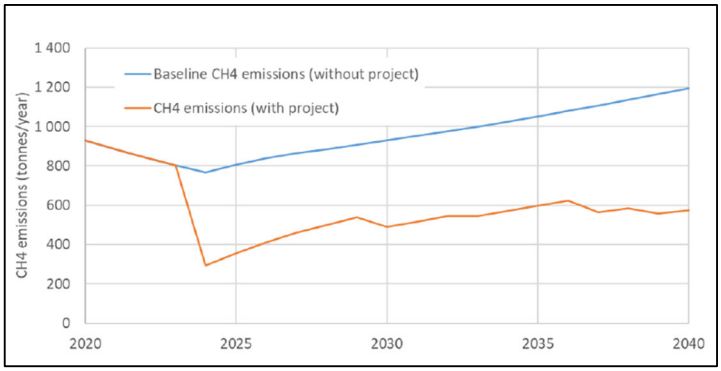


Figure 2-22: Emissions of unburnt CH_4, project vs. baseline 2020 to 2040 (Ingerop, March 2023).

Power generation

The potential for production of electrical power was estimated considering the CH_4 extraction estimates. The resulting electrical power estimates are shown in **Figure 2-23**. These suggest generator capacities of about 250 to 300 kWe, which is a low figure for LFG use in power generation. Some of the principal biogas generator manufacturers do not produce generators smaller than 400 kWe. This highlights the need to maximise LFG extraction through improved landfill management.

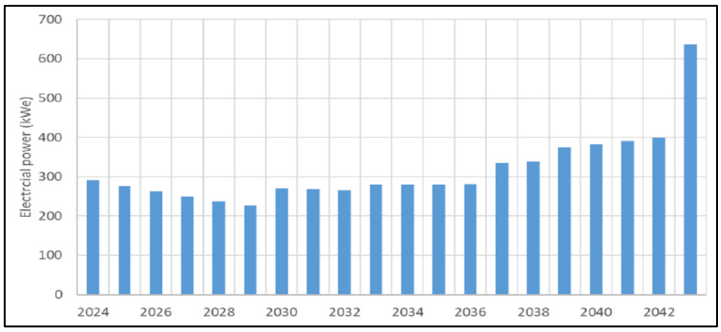


Figure 2-23: Estimates of potential electrical power production, 2024 to 2043 (Ingerop, March 2023).

Landfill gas flaring and power generation viability study

Following the estimation of future production and collection of LFG from the SLF, the economic viability of three projects was analysed:

- Option 0 - Baseline - LFG extraction and flaring only.
- Option 1 - LFG extraction and flaring + income from CDM credits.
- Option 2 - LFG extraction and flaring + income from CDM credits + power generation with export of energy produced to the grid.

Infrastructure required

The following equipment and infrastructure will be required to implement power generation:

- Electrical generators, in a prefabricated shipping container.
- Equipment for pumping, measuring and control of extracted LFG.
- Equipment for removal of condensates and contaminants from the LFG.
- Electrical installations, including transformer substation, instrumentation, control, and automation.
- Connection to the grid, including power line and all the electrical equipment and protection necessary to guarantee the connection in the conditions imposed by the grid operator.
- The extraction and flaring design already considers a flare compound which can accommodate the generation equipment.

As the estimates suggest generator capacities of only about 250 to 300 kWe Option 2 consider the installation of a generator with a capacity of 330 kW.

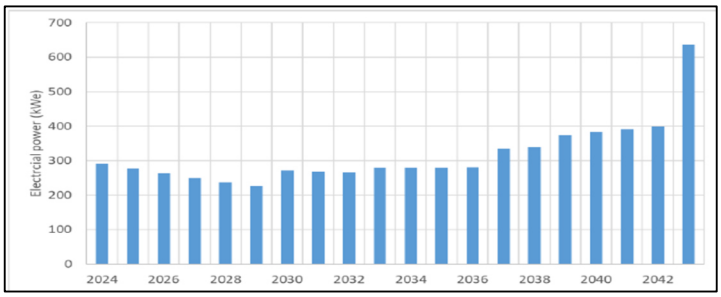


Figure 2-24: Estimates of potential electrical power production, 2024 to 2043 (Ingerop, March 2023).

The following conclusions can be drawn:

- All options have negative net present value.
- CDM for flaring provides significant benefit, reducing the net loss by 22 million Rand.
- For Option 1, running costs would be similar to income from CDM, without considering initial investments.

Power generation has a lower Net Present Value (i.e., a greater loss) than flaring only. There would be no additional CDM income, and income from energy sales would not offset the increased operating costs, even without considering the capital investment.

2.3.7 Projects to be undertaken in the 2023/2024 Financial Year

Major capital expenditure is planned in the following areas during the 2023/2024 financial year as stated in the Medium-Term Revenue and Expenditure Framework (MTREF) for the Financial Period 2023/ to 2025/2026:

- Expansion of the landfill site (New cells).
- Landfill Gas to Energy.

2.4 Waste classification and quantities

This section presents the waste types and quantities generated in the SM.

2.4.1 Waste types

With reference to the Waste Act (Act 59 of 2008), the Waste Amendment Act (Act 14 of 2013) and their associated regulations, the only types of waste allowed for disposal at the Stellenbosch disposal facilities are general waste types 2, 3, and 4, as per the Waste Classification and Management Regulations (GN R.634) August 2013. No municipal landfills that are located within the Municipality are allowed to accept hazardous, or types 0 and 1 waste, as per the classification regulations for disposal.

The above legislation divides waste in South Africa into two main categories: hazardous and general. The current (2023) legislated definitions being:

Type of waste	Description of waste
Hazardous Waste	Is any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical, or toxicological characteristics of that wase, have a detrimental impact on the health and the environment and includes hazardous substances, material or object within business waste, residue deposits and residue stockpiles. Residue deposits and residue stockpiles refer to mining waste that does not form part of the municipal waste function. **Business waste** means 'waste that emanates from premises that are used mainly for commercial, retail, wholesale, entertainment or government administration purposes.
General Waste	Waste that does not pose an immediate hazard or threat to health or to the environment and includes: a) Domestic Waste b) Building and demolition waste c) Business waste d) Inert Waste e) Any waste classified as non-hazardous waste in terms of the regulations made under section 96 and includes non-hazardous substances, materials or objects within business, domestic, inert building and demolition wastes'
Domestic Waste	Waste that excludes hazardous waste that emanates from premises that are mainly for residential, educational, health care, sport or recreation purposes and includes: a) Garden and park wastes b) Municipal waste c) Food Waste
Building and Demolition Waste	Waste that excludes hazardous waste that is produced during construction, alteration, repair, or demolition of any structure.

2.4.2 Waste studies and surveys

2.4.2.1 Updates Hazardous and Health Care Risk Waste Survey

A Hazardous and Health Care Risk Waste (H&HCRW) Survey was conducted by Aquila Environmental in August 2020 and was updated by JG Afrika in 2023 using 2022 data.

The updated survey found that H&HCRW generated in the study area could be categorised under six of the potential seventeen Industrial Groups listed in Schedule 3 of the National Environmental Management: Waste Amendment Act (NEM: WAA) Act No. 26 of 2014).

The study found that the total volume of HCRW for 2020 was 88 253 kg/annum and 108 905 kg/annum for 2022. This reflects an increase of 23% in the total volume of HCRW generated in the Stellenbosch Municipality, despite fewer respondents to the survey in all categories.

The study concluded the following:

- Generation of household hazardous waste is not included in the scope of the study but the disposal thereof via the municipal system can still cause harm. A system aimed at collecting household hazardous waste is advised.
- Many of the car manufacturing industries could not provide accurate volumes of tyre, battery, and oil waste as many of these businesses struggle to find a service provider willing to accept the hazardous waste. In addition, battery theft has been highlighted as a problem within the area. It has been noted that once batteries are stolen, they are dismantled in order to retrieve the valuable lead content for reselling purposes. This results in concentrated acid leaching out of the battery and potentially leading to pollution.
- Some tyre manufacturing companies indicated that their tyre waste is disposed of privately, hence there is no record of this. The risk of this activity is that the waste might not be taken to a registered landfill which accepts hazardous waste, which may lead to pollution.
- Waste tyres are managed by the Department of Forestry, Fisheries and the Environment's Waste Bureau. Tyre dealers must comply with the Waste Tyre Regulations.

2.4.2.2 Waste characterisation study (JG Afrika, May 2023)

As a key aspect of compiling this IWMP, JG Afrika conducted a waste characterisation study in May 2023 (15 to 19 May). This section presents the applied methodology, and the results of the study.

Methodology[5]

Location: The waste characterisation study was undertaken at KTS, as all general waste collected is transported to the KTS prior to being transferred to the Vissershok Private Landfill Site for disposal.

Areas sampled within SM:

Table 2-9 indicates the area, within the SM, that the waste selected from incoming waste collection vehicles was sampled from, as well as the waste type and income level of the areas, where applicable.

Table 2-9: Municipal areas sampled.

Date	Sample No.	Truck registration	Suburb, town / area	Waste type
15 May 2023	1	CL 27923	Stellenbosch CBD	**Business**
	2	CL 81138	Lynedoch	**Residential**
	3	CL 45166	Kayamandi	**Residential**

[5] The study was conducted in accordance with the Western Cape Department of Environmental Affairs and Development Planning Waste Characterisation Guideline for Municipalities (March 2017)

Date	Sample No.	Truck registration	Suburb, town / area	Waste type
16 May 2023				**(Informal settlement – skip sample)**
	4	CL 27347	Die Boord	**Residential**
17 May 2023	5	KT96WKGP	La Colline	**Residential**
	6	CY255492 (Waste Mart)	Stellenbosch CBD	**Business**
18 May 2023	7	CAA 467 949	Franschhoek (Groendal)	**Residential**
	8	CA 924 153 (Waste Mart)	Cloetesville	**Residential**
19 May 2023	9	CL 27347	Pniel	**Residential**
	10	CL 31479	Welgevonden	**Residential**

Waste categories:
The waste was sampled into the following waste categories:

Table 2-10: Waste categories for waste characterisation study

• Paper and cardboard	• Nappies
• Glass	• Mixed Food Waste (Organic waste)
• Plastics	• Green/Garden Waste (Organic waste)
• Metals (i.e. ferrous and non-ferrous, steel, tins, cans, aluminium)	• Construction Waste (i.e. bricks, cement bags)
• E-Waste	• Wood (i.e., pieces of furniture, firewood)
• Textiles (i.e. fabric, clothing, linen, shoes)	• Liquid Board Packaging (i.e., Tetrapak™)
• Residual Waste (comprising of sediment wet sediment and broken fractions of glass, wood and small pieces of paper and plastic)	• Other (i.e., miscellaneous types of waste, containers containing unidentifiable liquids)

Results

Table 2-11: Waste characterisation results

WASTE CHARACTERISATION	Klapmuts Transfer Facility							
Date	15.05.2023	15.05.2023	16.05.2023	17.05.2023	17.05.2023	18.05.2023	19.05.2023	
Type	Business	Residential	Residential	Residential	Business	Residential	Residential	TOTAL
No of Samples	1	1	2	1	1	2	2	UNIT (KG)
Waste Type								
Paper & Board	72.6	17.72	85.14	57.68	55.88	93.42	80.16	**462.6**
Glass	82.22	23.68	59.32	41.32	28.62	58.49	26.22	**319.87**
Plastics	31.88	25.26	135.72	44.08	44.02	138.48	140.46	**559.9**
Metals	5.94	3.12	7.18	3.54	3.6	10.68	10.72	**44.78**
E-Waste	0.64	0	1.68	1.16	1.6	0.5	1.98	**7.56**
Nappies	2.38	13.6	82	18.02	13.06	65.66	41.38	**236.1**
Residual Waste	57.32	56.6	271.92	44.4	0	300.52	109.5	**840.26**
Mixed Food Waste	44.86	22.76	88.08	99.46	41.06	105.4	185.7	**587.32**
Green Garden Waste	37.94	2.1	423.82	20.02	339.98	36.3	188.72	**1048.88**
Construction Waste	1.04	1.85	5.12	8.64	10.62	7.4	8.22	**42.89**
Wood	0	0	50	0	0	0.72	10.68	**61.4**
Textiles	2.68	4.62	35.72	4.72	3.2	49.28	19.1	**119.32**
Tetrapak	1.08	0.76	0	2.2	0	0.7	4.6	**9.34**
Other	0.84	3	5.4	3.8	0.68	2.84	1.56	**18.12**
TOTAL	**341.42**	**175.07**	**1251.1**	**349.04**	**542.32**	**870.39**	**829**	**4358.34**

Based on the combined results shown in **Figure 2-25** and **Figure 2-26**, it appears that the major waste fraction is organic waste (garden and food waste), which when combined makes up 37% of the waste sampled (by weight) for all areas. It should be noted that the characterisation was undertaken in autumn when higher than normal garden waste (leaves) is expected.

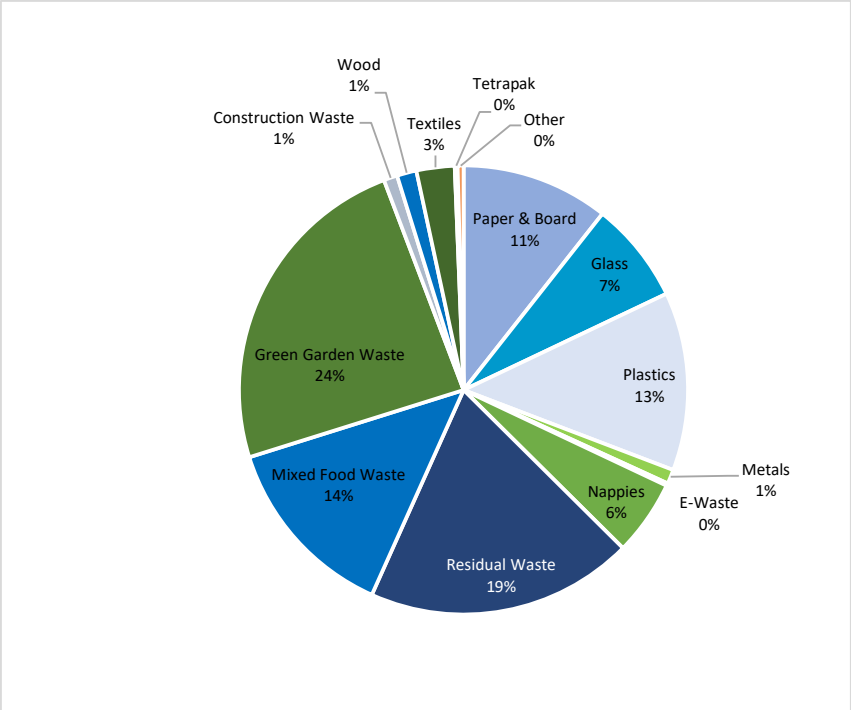


Figure 2-25: SM waste characterisation results of all areas combined (by weight)

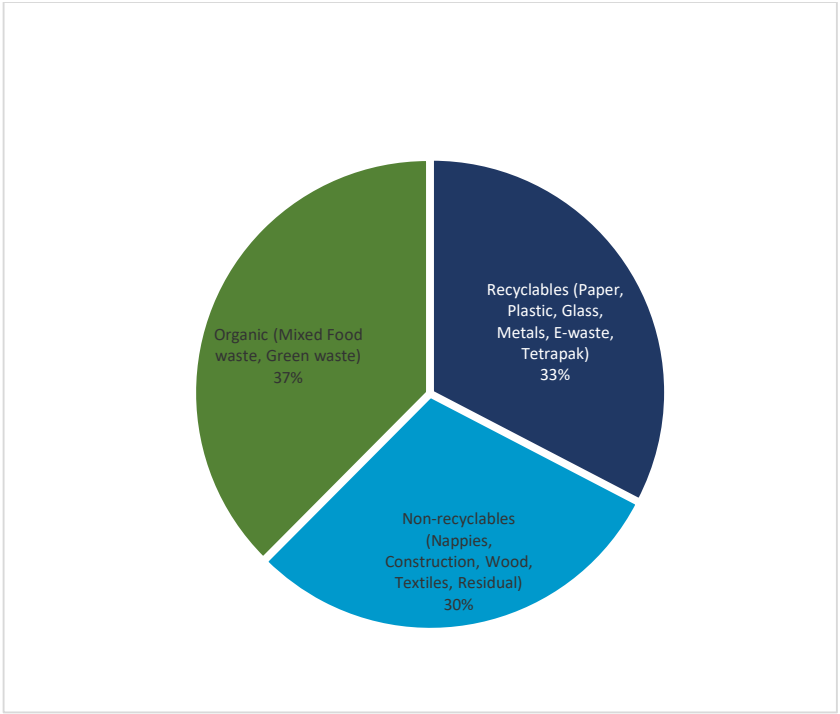


Figure 2-26: SM waste characterisation results in broad categories (recyclables, non-recyclables, and organics)

The potentially recyclable fraction i.e., plastics (13%), metals (1%), glass (7%), paper & board (11%), and e-waste make up 33% of the sampled waste. The remaining waste consists of the residual waste fraction (19%), wood (1%), construction waste (1%), textiles (3%) and nappies (6%) which when combined are approximately 30%.

The organic and recyclable fractions make up more than half of the total waste stream (62%). These results indicate that the biggest diversion potential lies with the organic waste (i.e., mainly garden waste) fraction and recyclable materials from the general waste stream. The garden waste fraction may however vary due to seasonal changes. This must be considered when developing diversion plans.

When considering the results presented in **Figure 2-27** recyclables/packaging type waste and garden waste make up 80% of the waste stream in high income and business areas, and if targeted for diversion would result in high organic waste and recyclables diversion rates. The high-income areas are included in the two-bag collection programme which is why the recyclables represent a relatively small fraction of the waste stream.

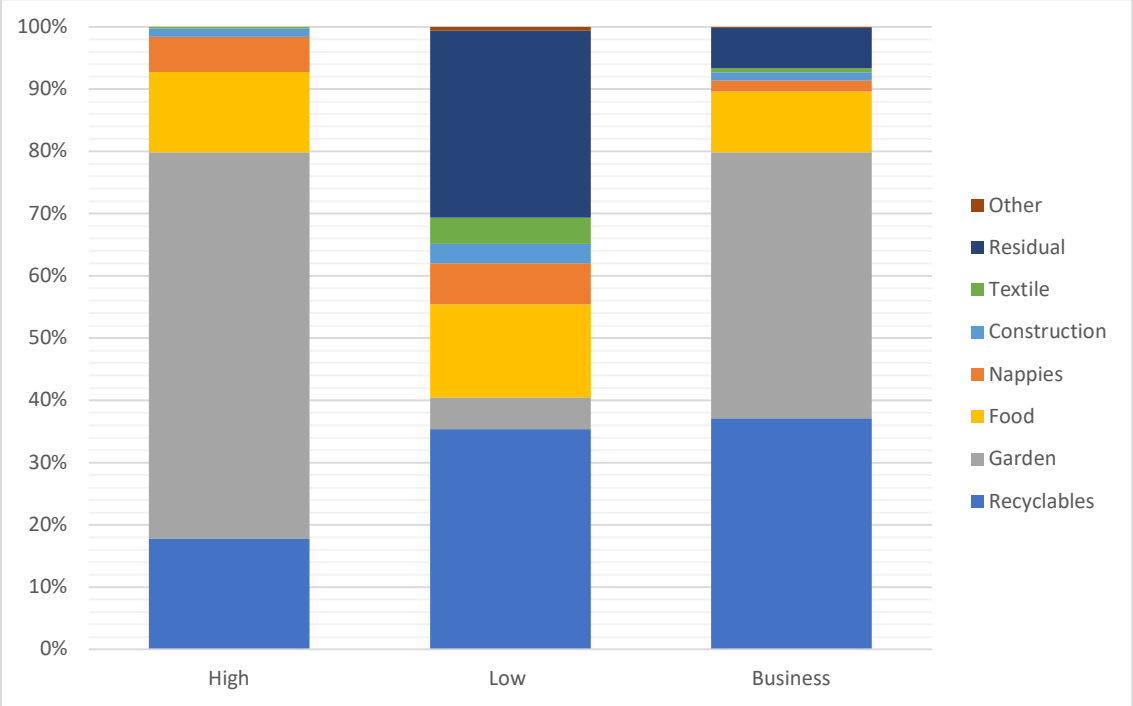


Figure 2-27: Comparison of waste characterisation for high income, low income, and business samples

A different approach may be required for low-income areas, where focus is mainly placed on diverting the recyclable fraction. The organic waste fraction for low-income areas, when compared to high-income and business areas, was low at 20%. Despite this, the food waste fraction was noted to be unusually high.

The largest waste fraction from the low-income area samples was residual waste at 30%. This was made up of wet sediment and broken fractions of glass, wood and small pieces of paper and plastic.

Comparison to previous waste characterisation study

Prior to the 2023 study, a waste characterisation study was conducted by Aquila Environmental for SM in 2017, the results of which were analysed by JG Afrika and compiled in the form of a waste characterisation report in 2019. This formed a key focus of SM's 3rd Generation IWMP. The characterisation focused on residential/household waste and excluded commercial and business waste.

Table 2-12 and **Figure 2-28** show a comparison of the results of the 2017 and 2023 studies. The following differences must be noted when comparing the two studies:

- The 2017 study followed a different methodology and included a much larger sample size covering most of the wards in the municipality.
- The 2017 study also took place in a different season i.e. from August to October as opposed to May which can influence the percentage of garden/green waste.
- The 2017 study focused on residential/household waste and not commercial or business waste.

Table 2-12: Comparison of the 2017 and 2023 waste characterisation results

Waste categories	2017		2023	
	kg	%	kg	%
Plastic	3388.77	22.96	559.9	12.8
Metal	371.01	2.51	44.78	1.0
Glass	1562.33	10.58	319.87	7.3
Paper & Cardboard	3002.08	20.34	471.94	10.8
Organics & Leachate	3667.44	24.85	587.32	13.5
Garden Waste	909.70	6.16	1048.88	24.1
HHW & E-Waste	48.85	0.33	7.56	0.2
Other/residual	1110.91	7.53	1094.48	25.1
Ash, furniture & clothing	698.84	4.73	223.61	5.1
TOTAL	**14759.93**		**4358.34**	

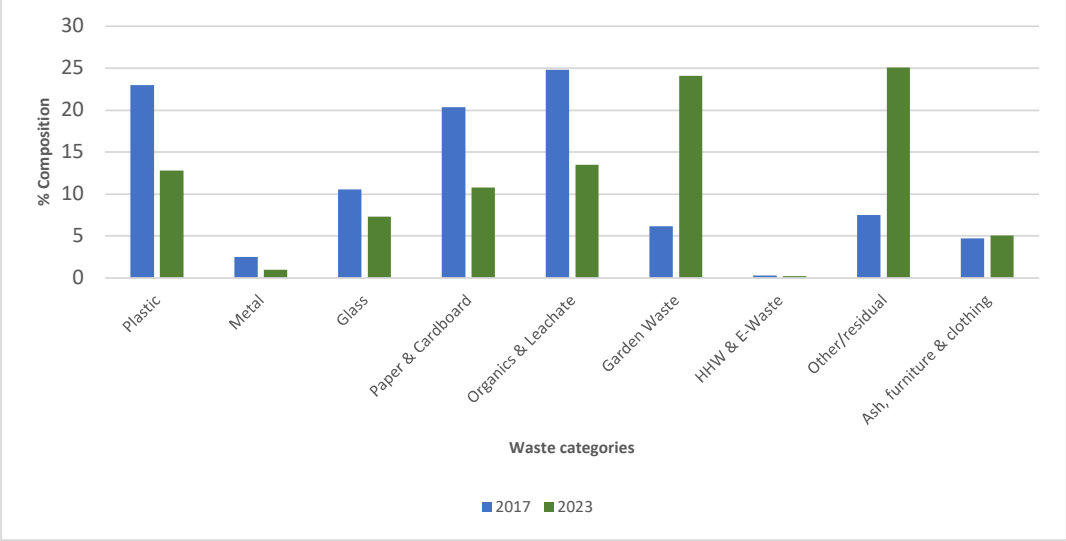


Figure 2-28: Comparison of the 2017 and 2023 waste characterisation results

Recommendations

The 2023 waste characterisation results indicate that diverting recyclables along with garden waste, can increase overall diversion rates to approximately 55% and potentially up to 80% in certain income areas.

However, this would depend on the level of contamination and quality of recyclables and therefore a three-bag system (recyclable, non-recyclable, and organic waste) for separation at household level would be recommended. Certain areas could also be provided with a targeted garden waste collection system.

The waste characterisation results provide the SM with an opportunity to consider separation and diversion of the organic and recyclable materials. At a high level the graphical representation of the waste characterisation data indicates the following as a minimum:

- There is a variation in the waste character per area. Therefore, waste diversion interventions must be context specific. A "one size fits all" approach would not be effective, as different interventions may be required in different areas.
- A system for diversion of garden waste should be considered, either separate household bin and collection, targeted drop-off areas, or provision of composting bins, where appropriate.

2.4.3 General waste quantities

The waste tonnages and type of waste reclaimed and disposed of are reported to the Western Cape Integrated Pollutant and Waste Information System (IPWIS). The following waste activities are registered on the IPWIS:

- Stellenbosch Garden Waste WIR number D04073-04
- Stellenbosch Recovery D04073-02
- Stellenbosch Disposal D04073-01

2.4.3.1 Stellenbosch Landfill Facility

The waste tonnages received at the SLF from July 2020 till June 2021 as shown in **Table 2-13** and **Figure 2-29**, indicate that the highest amounts of waste that was received at the landfill was building rubble (27 900 tons). Industrial refuse (2 377 tons) was the lowest amount of waste received. The total amount of waste received for the period is 74 536 tons.

It should be noted that only the area cleaning tonnages are disposed at the landfill currently. The other waste streams are either processed for beneficiation or diverted for disposal i.e. Vissershok (VHK) Landfill until 2024 when Cell 4 is operational.

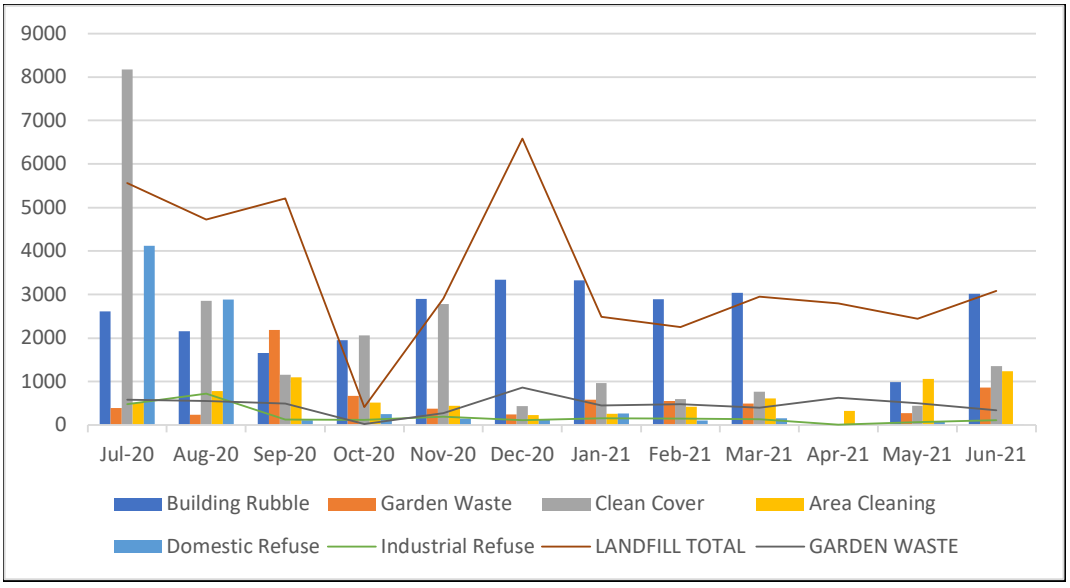


Figure 2-29: Waste received at SLF from July 2020 - June 2021

Table 2-13: Waste Tonnages – SLF (July 2020 till June 2021)

Waste Type	Received (tons)	Destination
Building Rubble	27 900	Crushed & sold
Garden Waste	6 888	Chipped for composting
Clean Cover	21 585	Cover material on site
Area Cleaning	7 496	Disposed at the SLF
Domestic Refuse	8 290	Diverted for disposal at VHK
Industrial Refuse	2 377	Diverted for disposal at VHK

2.4.3.2 Vissershok Landfill

The general waste tonnages transported for disposal to the Vissershok Landfill from August 2019 till June 2023 are shown in **Table 2-14** and **Figure 2-30**. The highest amount of waste received was in November 2019 (3 946 tons), the lowest amount of waste received was in September 2022 (2 696 tons). The low tonnage received in August 2019 (420 tons) was during the start-up phase of waste disposal via KTS.

An average of 3 130 tonnes of waste generated in SM is disposed of at VHK landfill site per month. This is what can be expected per month for disposal at SLF Cell 4 from June 2024.

Table 2-14: General Waste Disposed at Vissershok Landfill (Tonnages) from August 2019 to June 2023

Year	Month	Tonnage
2019	August	420
	September	1643
	October	2944
	November	3946
	December	3389
2020	January	3650
	February	3310
	March	3086
	April	2614
	May	3170
	June	3089
	July	3179
	August	3114
	September	3101
	October	3187
	November	3198
	December	3417

Year	Month	Tonnage
2021	January	3012
	February	2925
	March	3522
	April	3162
	May	3188
	June	3275
	July	3222
	August	3187
	September	3258
	October	3229
	November	3313
	December	3601
2022	January	3145
	February	2986
	March	3461
	April	3045
	May	3171

Year	Month	Tonnage
2022	June	3259
	July	3087
	August	3276
	September	2696
	October	3324
	November	3283
	December	3556
2023	January	3235
	February	3230
	March	3620
	April	3125
	May	2875
	June	3414

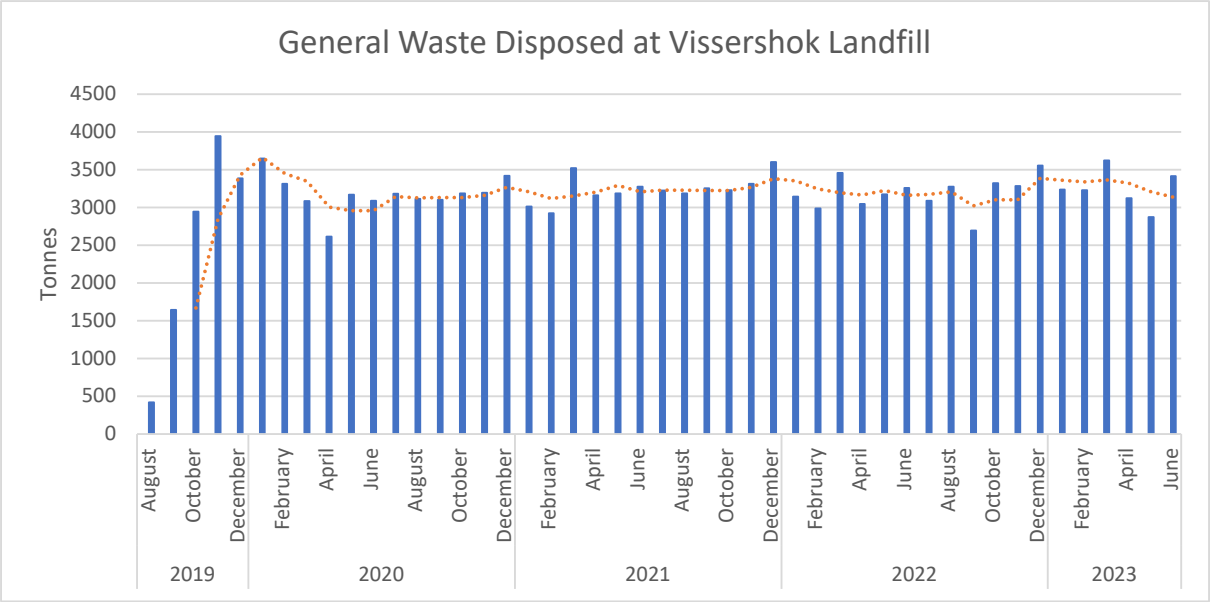


Figure 2-30: General Waste Disposed at Vissershok Landfill (Tonnages) – (August 2019 – June 2023).

2.4.3.3 Stellenbosch Integrated Waste Management Facility

The total amount of waste received at the SM IWMF as indicated in the Waste Monitoring Report 2022/2023 are shown in **Figure 2-31**. The highest amount of waste received was in November 2021 and December 2022 with the lowest amounts of waste received in August 2021 and April 2021 indicating some seasonality. The recyclables received in 2023 indicate an increased tonnage which can mainly be attributed to residential collections. The graph shows a seasonal but relatively consistent participation rate from the residential kerbside collection programme but the drop-off and Franschhoek tonnages show more variance on a month-to-month basis, and not much growth.

The contract includes areas into which the programme will be expanded each year from July 2023 (Year 1 – Groendal, Mooiwater and La Motte; Year 2: Kayamandi North and Kayamandi South and Year 3: Klapmuts and Lanquedoc) which should result in increased tonnages.

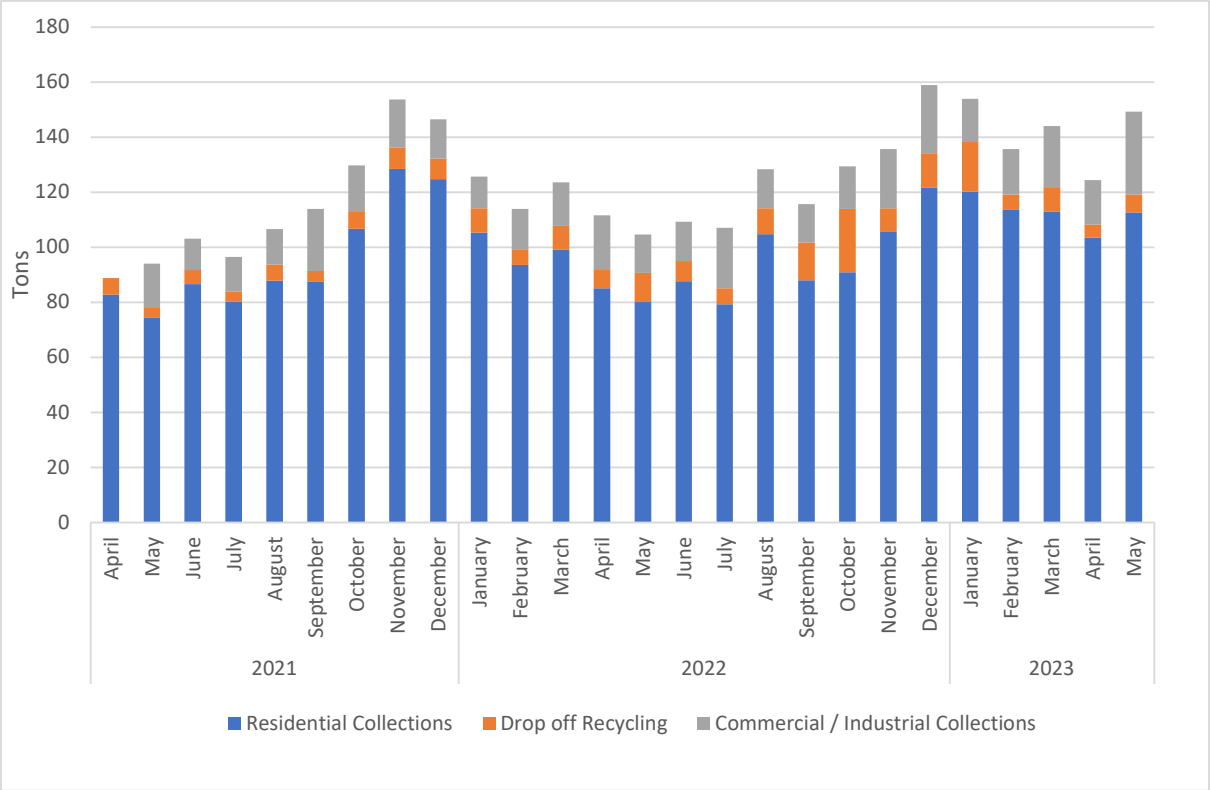


Figure 2-31: Split of waste received at the IWMF from April 2021 - May 2023

2.4.3.4 Organic Waste Tonnages

The incoming green waste tonnages from 2016 to 2023 are presented in **Figure 2-32**. There does appear to be seasonality across the year and the tonnages have declined slowly over the years. The 2017 waste characterisation indicated a split of 6% garden waste and 24 % food waste in the waste stream while the 2023 characterisation indicated a shift to a much higher garden waste percentage, at 24 % and a lower food waste percentage at 13.5% (see Section 2.4.2.2).

This does indicate a need to focus on garden waste as a priority before addressing the food waste at household level. Food/organic waste should however be addressed at a business (specifically hospitality etc.) and industry level.

The estimated waste tonnages that will be produced in the Municipality have been calculated from 2022 (the first year with a target of 50% diversion) using an annual 2.2% increase in tonnages based on a 2.2% population growth rate (see Section 2.2) and is presented in **Table 2-15**. The tonnages to be diverted have been calculated using the updated 2023 waste characterisation percentages for food/organic and green waste.

Based on the actual organic waste diversion tonnages, it is clear that the SM needs to put measures in place to increase diversion. It is also important to consider that private diversion/composting programmes may be in place which SM is not able to report on and may impact on tonnages and data.

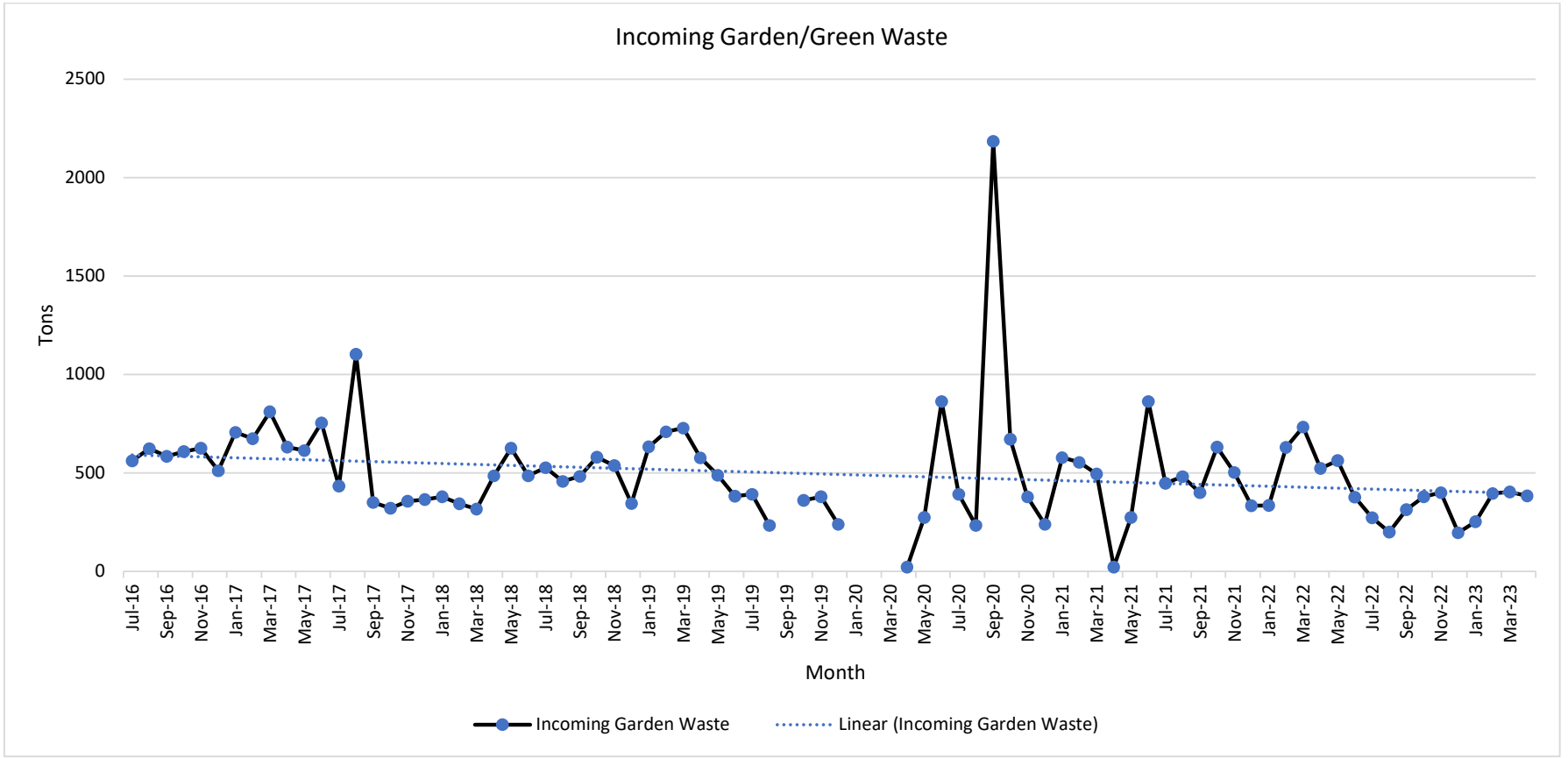


Figure 2-32: Incoming Green Waste Tonnages from July 2016 to March 2023

Table 2-15: Estimated waste tonnages for the period 2023 to 2027 with estimated diversion tonnage targets

	2018	2019	2020	2021	2022 (50%)	2023	2024	2025	2026	2027 (100%)
Waste disposed to Landfill (excl builder's rubble) (tonnes)	78 964	56 426	47 767	38 894	38 289	39 750	39 131	40 624	39 992	41 518
Green Waste diverted (tonnes)	5 571	5 272	6 937	5 585	4 929	4 310				
Green Waste diverted (%)	**7.10%**	**9.30%**	**14.50%**	**14.36%**	**12.87%**	**10.84%**				
Estimated Organic Waste tonnage	18 951	13 542	11 464	9 335	5 169	5 366	5 283	5 484	5 399	5 605
Estimated Green Waste tonnage	4 738	3 386	2 866	2 334	9 189	9 540	9 392	9 750	9 598	9 964
Total Organic waste (30%)	**23 689**	**16 928**	**14 330**	**11 668**	**14 358**	**14 906**	**14 674**	**15 234**	**14 997**	**15 569**
Actual Organic Waste Diversion %	24%	31%	48%	48%	34%	29%				
Diversion Target (tons)					7 179.19					15 569

Notes:

- Organic and Green waste tonnages have been estimated based on the Waste Characterisation data.
- Green waste tonnages diverted is actual data from the SM's records.
- 2023 data has been extrapolated based on the Jan to Apr information provided.
- An increase of 2.2% has been applied to the waste data from 2024 using 2022 as the baseline.

2.4.3.5 Summary of waste tonnages handled by Stellenbosch Municipality

The tonnage of waste being recycled from January 2021 to April 2023 is an average of 2% of the total waste being handled by SM and 3% of household waste being disposed of at VHK. In terms of the Waste Data the tonnages provided for July and August 2020 disposed of at SLF should be queried.

Based on the Waste Characterisation, the diversion of waste by targeting recyclables can be increased. If combined with diversion of organic waste, even more so, and thereby extending the lifespan of Cell 4.

If 32% of households (12 500 households out of the 38 500 in total that are provided with a waste management service) are being provided with a separation at source/clear bag service for recyclables, the low diversion rate needs to be better understood and participation at household level increased.

The tonnages of waste handled by SM (excluding recyclables diverted at the IWMF) are illustrated in **Figure 2-33.**

No household hazardous waste tonnages were recorded for 2022/2023.

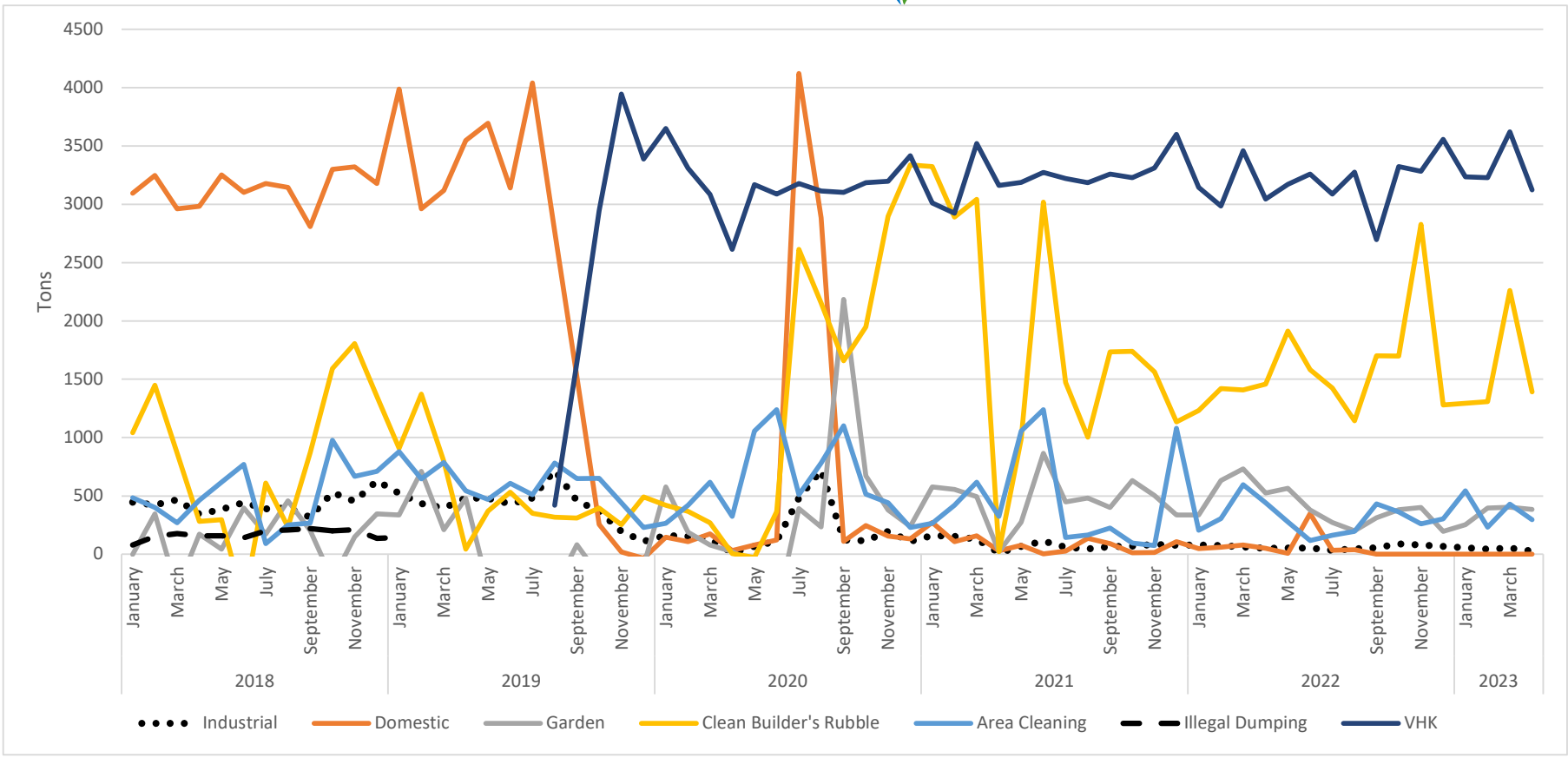
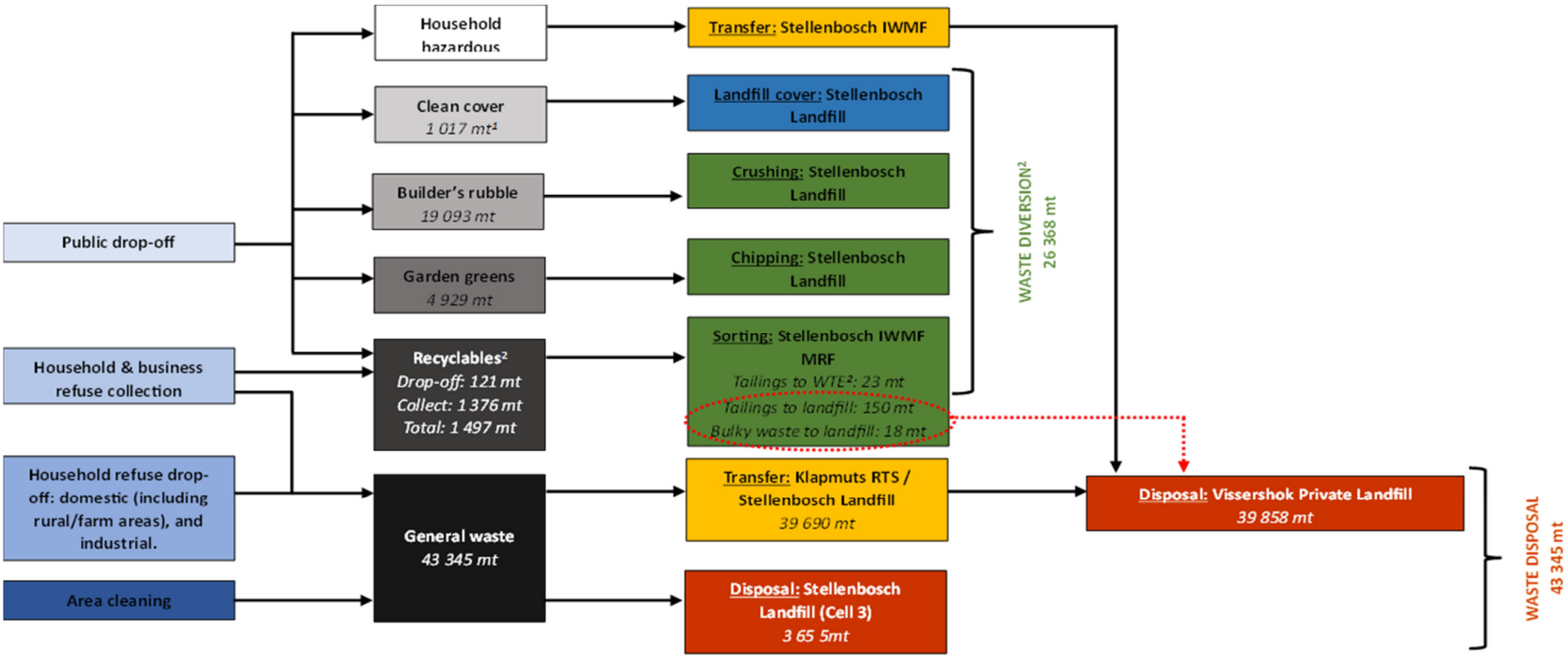


Figure 2-33: Waste tonnages handled by Stellenbosch Municipality from January 2018 to April 2023

2.4.3.6 Summary of waste flows and tonnages within the Stellenbosch Municipality



Notes:

[1] Metric tonnes (mt)

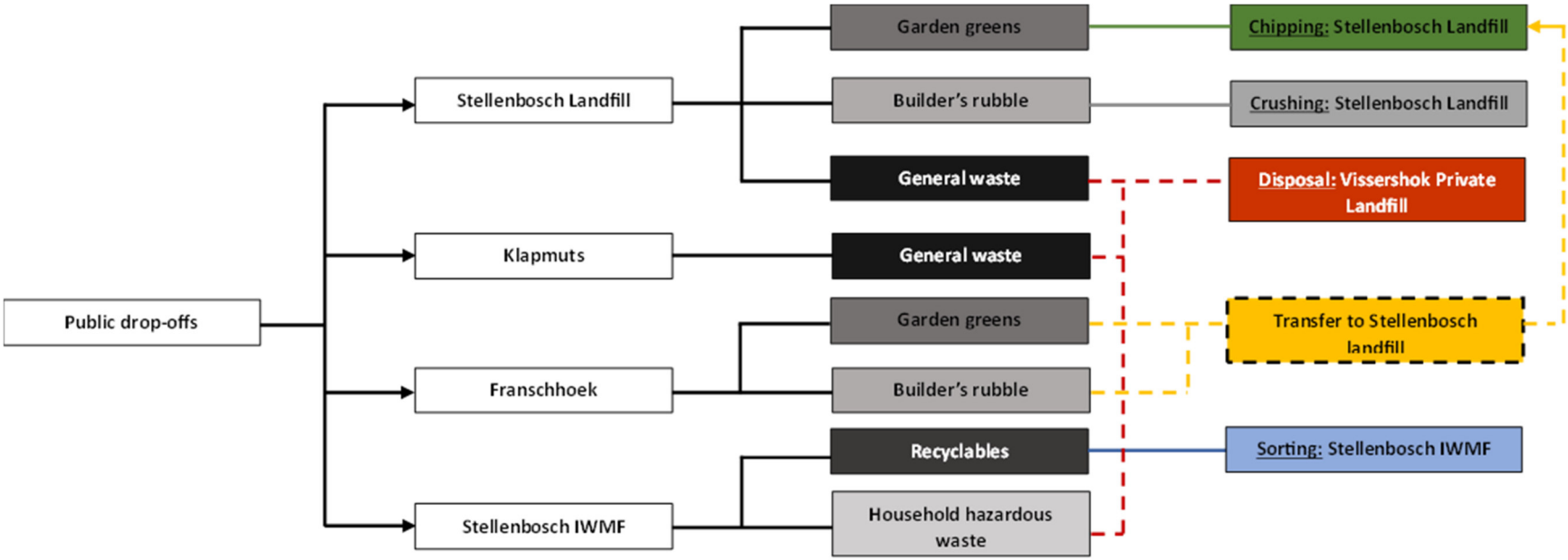
[2] Figures represent recyclables received and does not account for wastage.

[2] Waste to Energy (WTE)

[3] Tonnages for HHW have not been provided separately and therefore could not be included.

4.No household hazardous waste tonnages were recorded for 2022/2023.

Figure 2-34: Summary of waste management tonnages with the SM



KEY	
———	**On-site disposal / management.** *Preferred as it is efficient.*
- - - -	**Transferred to another site for disposal / management.** *Requires intervention as waste is double handled and there are additional transport and disposal (where applicable) costs.*

Figure 2-35: Summary of current waste flows within the SM

2.5 Education and awareness initiatives

2.5.1 Material Recovery Facility open day events

To commemorate National Recycling Week in September, SM Waste Department invites schools, communities, and government officials to visit the MRF (located at the IWMF) and participate in 2 open day events.

On open day events, the public are exposed to the MRF processes of recyclable materials from receiving, weigh bridge, sorting, packaging, and transportation of the recyclables.

The activities of the day include two demonstrations, DIY water bottle using a recyclable plastic bottle, and making eco-bricks using plastic bottle packed tightly with clean and dry, non-biodegradable waste. These bottles can then be used as building materials to create insulative structures and colourful furniture. There is also a 'Yes' and 'No' table where the public is given a challenge of separating recyclable material from non-recyclable waste.

The aim of the activities is to allow the public to be hands on in making something valuable using recyclable materials. Learners can implement the information learned and received in their personal lives, at home, school, and in their communities.

2.5.2 Waste Awareness Event: Swop Shop

A Swop Shop initiative is held at the Klapmuts Multipurpose Centre to promote waste awareness and categorising of recyclable waste and reduce waste by sorting at source, promoting a cleaner area in the community.

The aim is to:

- Educate the community on the need for recycling, and the value of recyclables.
- Inform them on how to deal with their waste in a proper manner.
- Promote recycling service.
- Minimise the waste that ends up in open spaces / rivers.
- Empower the community and have them realize that it is within their ability to make a positive change in their living environment.

The items for the Swop Shop were purchased by SM and included chips, lollipops, washing powder, soap and two-minute noodles.

2.5.3 Flyers and Brochures

The SM provides recycling brochures and flyers to residents and communities during recycling education and awareness events that undertaken by the Green Minds staff.

2.5.4 School recycling initiative programme

The Municipality provides 3 schools, namely Rhenish Girls High, Rhenish Primary, and Eikestad Primary with collection services of recyclable materials which is collected by the service provider at their schools and transported to the MRF in addition to the normal kerbside collection.

The Municipality plans to extend the school recycling initiative programme to other schools within the municipal jurisdiction by undertaking the following:

- Ensure that the Strategy includes waste awareness campaigns to be undertaken at all schools so that all learners are provided with opportunity to be educated on good waste management practices.
- Develop a programme to roll waste awareness out to remaining schools within the Municipality.

- Provide all schools with an opportunity to participate in a recycling programme whether municipal or private.

2.5.5 Continuous education, awareness, and training by the Municipality

It must be noted that more work is always required in the waste minimisation and recycling area and that residents should be encouraged to separate all waste items accordingly. The SM must therefore consider increasing the separation at source project to more wards and areas.

Public awareness and education on recycling must be a continuous requirement and the current work done by the SM must continue and expand wherever possible.

In addition, provision must be made for the continuous training and education of the SM waste management employees. Waste management information sharing/capacity – building events such as the Departmental Waste Forum, Waste Khoro, and the Institute of Waste Management of Southern Africa's (IWMSA) WasteCon should be attended by waste management employees determined by the SM.

2.6 Status of economics and finances of solid waste management practices

As part of JG Afrika's *Pre-Feasibility Study into Anaerobic Digestion (AD) of the organic fraction in Municipal Solid Waste (2022) for Stellenbosch Municipality*, a thorough status quo assessment was undertaken to consider the financial position of the SM and determine the baseline or "businesses as usual" case. The below is an overview of the findings of this study and allows the Municipality to understand its ability to incur additional financial commitments or sets the baseline for comparison for introduction of diversion, and alternative disposal methodologies in the future.

Additionally, it assessed whether the Municipality's current revenue budget sufficiently covers its expenditure.

2.6.1.1 Snapshot of the Municipality's Financial Position

Table 2-16 provides a snapshot of the financial health of SM, which provides insight into the Municipality's creditworthiness and ability to access to finance.

Table 2-16: Financial position of the Stellenbosch Municipality[6]

Audit Outcome	Cash Balance[7]	Cash coverage – Operating Expenditure	Fruitless and Wasteful Expenditure	Liquidity Ratio	Current Debtors Collection Rate	Reliance on equitable share and grants
Unqualified with no findings (FY 2020/21	R2,821,977,638 (2021)	10.9 months (2020)	1.9% (2020)	2.08 (2021)	96% (2021)	11% (2021)

The following observations on the creditworthiness of the Municipality and its eligibility for debt finance can be made:

- The metrics presented show that the Municipality is in a strong position financially, is managing its working capital cycle well and has a low reliance on grant funding.
- The Municipality will be able to raise finance at competitive rates from commercial banks.
- These findings are preliminary and are subject to confirmation and due diligence by future lenders.

[6] Source: 2020/21 Annual Report and https://municipalmoney.gov.za

[7] The movement of cash into and out of the municipality. Section 71-level aggregation of mSCOA data from 2019-20 onwards

2.6.2 Overview of Capital Expenditure (CAPEX) Plans

The above assessment must be reviewed in context of the Municipality's direct plans/committed funds to Capital Expenditure.

Table 2-17 and Table 2-18 provide a detailed breakdown of the SM Waste Management Capital Budget for the next ten financial years, highlighting the allocated capital budget in terms of overall capital expenditure plans for the Municipality as well as split in capital spend planning internal to Waste Management Directorate.

From this data, it can be seen that Waste Management has only been allocated just under 14% of the capital expenditure budget for the next 3 financial years by the Municipality, with investment in Electrical (27.36%), Water (25.22%) and Sanitation (13.78%) infrastructure being a clear priority for the Municipality.

Of the **R274 086 278** budget allocated to Waste, close to 42.66% of this budget has been allocated to Disposal, in particular the expansion of the existing landfill site, with a further 23.32% of the budget being allocated to the Landfill Gas to Energy project at the landfill site, leaving 13.89% or R38 066 812 to cover capital spend in upgrading and developing new Drop-Offs, 15.07% for procurement of new collection vehicles, 2.13% of the budget is allocated for waste minimisation projects, and 1.28% for upgrading the existing MRF amongst other smaller commitments.

Funds for covering capital expenditure will be sourced mainly from loans with 77% of the overall spend being financed, with the remaining 22% being sourced from the Municipality's own capital reserves, and 1% from excess direct revenue. In the medium-term, based on projected excess revenue, it may be possible to pay off these loans on an accelerated basis or cover the finance costs associated with the loans.

Table 2-17: Stellenbosch Budget Provision (as % split) for Solid Waste Management for next 10 FY

	BUDGET PROVISION (AS % SPLIT)										
Year	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	**TOTAL**
Cleaning	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	**0.36%**
Collections	1%	0%	2%	0%	0%	1%	0%	0%	0%	0%	**0.78%**
Disposal/Landfill	78%	45%	4%	0%	0%	0%	0%	81%	83%	0%	**42.66%**
Drop-Offs	2%	14%	47%	53%	3%	0%	0%	0%	0%	0%	**13.89%**
Equipment	6%	4%	12%	45%	63%	20%	82%	0%	0%	94%	**15.07%**
Minimisation	0%	1%	2%	0%	0%	3%	11%	13%	10%	6%	**2.13%**
MRF	1%	3%	0%	0%	0%	4%	0%	0%	0%	0%	**1.28%**
Transfer Station	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**0.00%**
Strategy	0%	0%	0%	0%	0%	0%	1%	6%	6%	0%	**0.51%**
Waste To Energy	11%	33%	34%	2%	34%	72%	6%	0%	0%	0%	**23.32%**

Table 2-18: Stellenbosch CAPEX Budget for Solid Waste Management for next 10 FY

STELLENBOSCH LM | CAPEX BUDGET SPLIT FOR FY 2023 --> 2033		
Cleaning	R 1 000 000.00	0.36%
Collections	R 2 147 338.00	0.78%
Disposal/Landfill	R 116 929 608.00	42.66%
Drop-Offs	R 38 066 812.00	13.89%
Equipment	R 41 295 000.00	15.07%
Minimisation	R 5 850 032.00	2.13%
MRF	R 3 500 000.00	1.28%
Transfer Station	R -	0.00%
Strategy	R 1 390 225.00	0.51%
Waste To Energy	R 63 907 263.00	23.32%
Total	**R 274 086 278.00**	**100.00%**

2.6.3 Overview of Operational Expenditure (OPEX) Plans

Table 2-19 below provides a breakdown of the SM Waste Management Operational Budget for the next 3 financial years, highlighting the areas where costs are incurred in terms split in operational spend planning internal to Waste Management Directorate.

From this data, Waste Management incurs 42% of operational spend within disposal operations, with 34% associated with the costs of collections. The remaining 18% is allocated to the costs of street cleaning.

Reviewing the last 8 years of data in **Table 2-20**, the trend of increasing cost of disposal vs. collections, however 2021 and 2022 seems to go against this trend. No data is recorded for the KTS costs before 2023/24 Financial Year; therefore, these costs might be merged into the overall disposal costs which might explain the drop in disposal costs recorded for the 2023/24 and 2024/25 financial years.

It is expected that after the construction of the new landfill cells at SLF, the current operational costs currently being incurred to truck waste to Vissershok Landfill should drop significantly, which may make funds available for investment in creating capacity to drive diversion projects, in particular organics diversion which is a key Provincial Waste Management target in the medium term.

Table 2-19: Stellenbosch OPEX Budget for Solid Waste Management for next 3 FY

STELLENBOSCH LM | OPEX BUDGET SPLIT FOR FY 2023 --> 2026		
Collections	R 129 064 660.00	33.83%
Disposal	R 164 034 400.00	42.99%
Klapmuts Transfer Station	R 69 600 000.00	18.24%
Street cleaning	R 18 841 661.00	4.94%
Total	**R 381 540 721.00**	**100.00%**

Table 2-20: Stellenbosch OPEX Budget Split for Solid Waste Management showing trend in growth over 7 FY

	ACTUAL COST (AS % SPLIT)					BUDGET PROVISION (AS % SPLIT)		
Year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Disposal	41%	53%	54%	58%	54%	34%	41%	55%
Collections	40%	27%	29%	24%	26%	30%	32%	44%
Street cleaning	19%	19%	18%	18%	21%	11%	1%	1%
Klapmuts Transfer Station	NR	NR	NR	NR	NR	24%	26%	0%

2.6.4 Expected Performance of Solid Waste Management Directorate over the Short Term

Historical performance and future budgets for Solid Waste Management in Stellenbosch are presented in **Table 2-21**. There was a noticeable change in performance from 2019/20 – 2021/22 where the waste management expenditure was (and is currently) considerably higher than the revenue. This coincides with the SLF closing and puts into stark perspective the rapid increase in costs (85% increase from 2018/19 – 2021/22) incurred to haul waste to an alternative site. To narrow the deficit the municipality has increased tariffs at well above inflation, with an annual average increase of 20% between 2018/19 and 2022/23.

Table 2-21: Financial Performance of the Municipality 2018/2019 – 2024/25 (from NT mSCOA accounts)

Budget Parameter	2018/19 Audit	2019/20 Audit	2020/21 Audit	2021/22 Audit	2022/23 Forecast	2023/24 Forecast	2024/25 Forecast
(Figures in R thousands)							
Total Revenue (excl. capital transfers & contrib.)	R79 088	88 804	106 035	121 589	133 289	144 453	156 584
Total Expenditure	R79 846	118 829	116 723	147 785	131 508	140 658	139 819
Surplus / Deficit	-R759	-R30 025	-R10 687	-R26 197	R1 781	R3 795	R16 765

The forecast budgets show a stabilising of operating expenditure from 2023/24. Presumably the landfill site will be operational by this time, effectively eliminating the logistics costs it is currently incurring, so it is unclear what will be maintaining this cost.

Due to tariffs being unlikely to be adjusted downward once the landfill becomes operational, the Municipality is projecting a significant over recovery of revenue from 2023/24. This is potentially good news for waste diversion efforts as the likely short-term increase in costs to implement projects (including separation at source efforts) may be sufficiently covered by the excess revenue projected.

Table 2-22 shows the historic and projected domestic waste management tariffs for the Municipality.

Table 2-22: Change in (domestic) waste management tariffs 2016/17 – 2022/23 (mSCOA data)

	Audited	Audited	Audited	Adjusted	Forecast	Forecast	Forecast
	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Effective Refuse Tariff *(ZAR / month / household)*	127	127	135	181	211	246	287
Effective Tariff Increases		0%	6%	34%	17%	17%	17%

It is important to realise that the above inflation increases are placing a growing burden on the local community and are unlikely to be justified once the landfill is operational. Tariff charges are the primary external revenue source for waste management in the Municipality currently.

The Municipality is currently earning revenue by charging a gate fee to private users of the site (above certain mass thresholds), however for domestic users the disposal cost will continue to be internalized in the refuse removal tariff. In other words, there is increasingly limited scope to increase revenue should the projected over recovery be insufficient, especially considering the as yet unknown cost of implementing a separation at source programme needed to support organic waste and recycling projects. For households the tariff charge does not vary by the amount of waste generated (below 250 litres[8]).

2.6.5 Expectations for Future Changes in Investment and Operational Cost

In the medium and long term, a focus of the municipality in terms of waste management strategy would conceivably be focused on waste diversion and waste minimization methods as future landfill airspace becomes depleted. It follows therefore, that operational costs in the diversion and recycling area of the solid waste management directorate should increase with an associated drop in costs in disposal as waste tonnages for disposal decrease, depending on the level of success in implementing the municipalities diversion strategy.

[8] Each household is provided with a 240l bin

There would also be increased expenditure towards disposal of residual materials to CCT or another regional site, unless a suitable new landfill site can be sited and permitted in the long term to service the municipality.

Table 2-23: Stellenbosch Municipality Waste Management Capital Budget

STELLENBOSCH LM | CAPEX BUDGET SPLIT FOR FY 2023 → 2026			
1	Electrical Services	R 376 626 517.28	0.02%
2	Water and Wastewater Services: Water	R 347 250 000.00	13.60%
3	Water and Wastewater Services: Sanitation	R 189 640 350.00	27.36%
4	Waste Management: Solid Waste Management	R 187 244 985.00	2.15%
5	Transport Planning	R 95 578 000.00	25.22%
6	Roads and Stormwater	R 90 250 000.00	13.78%
7	Traffic Engineering	R 60 279 950.00	6.56%
8	Project Management Unit (PMU)	R 29 530 000.00	4.38%
9	Infrastructure Services	R 225 000.00	6.94%
	TOTAL	**R 1 376 624 802.28**	

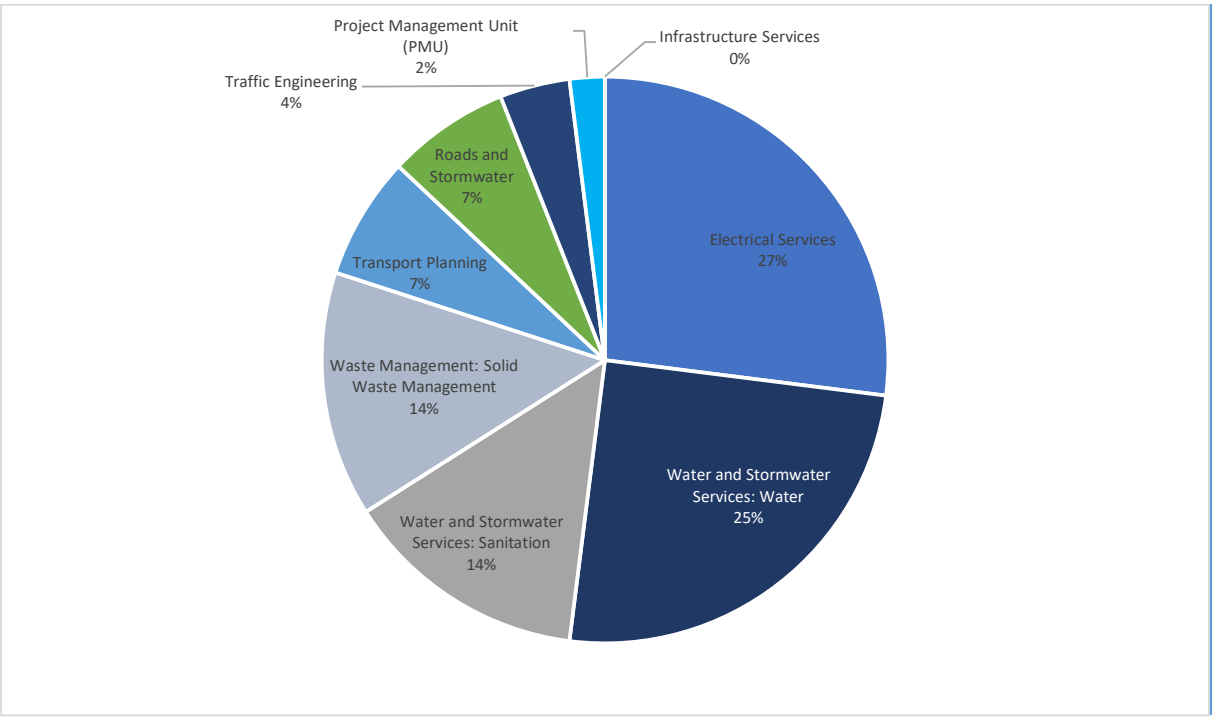


Figure 2-36: CAPEX Budget Split – By Division for FY 2023-2026.

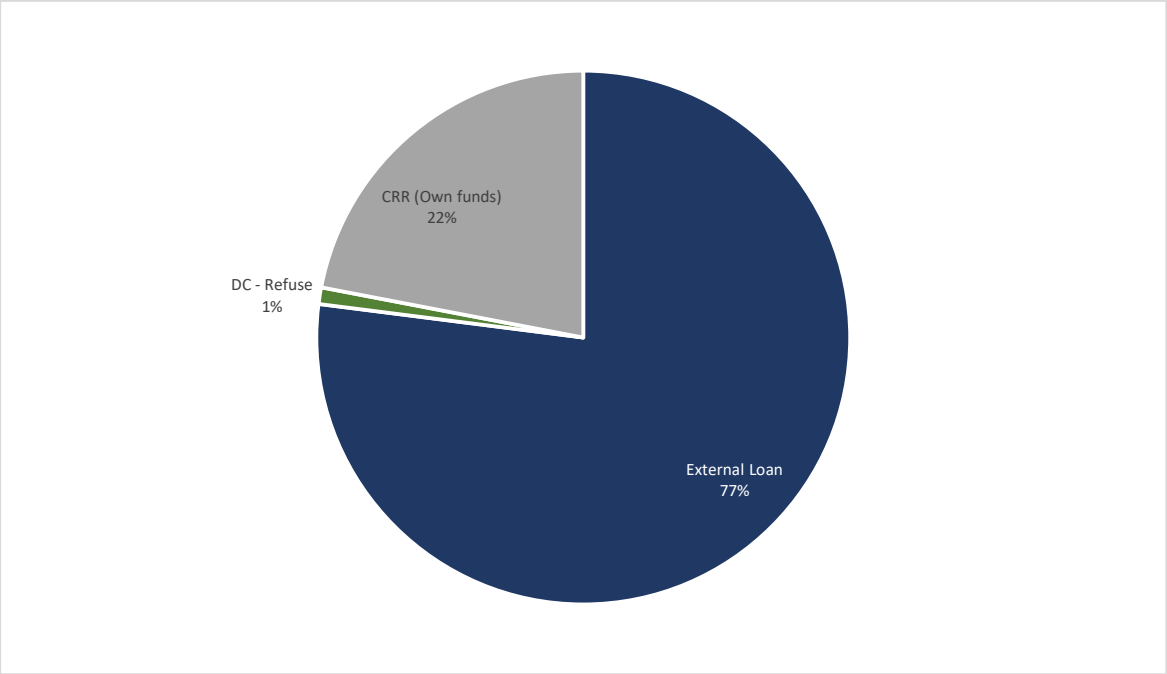


Figure 2-37: CAPEX Budget by Investor Source.

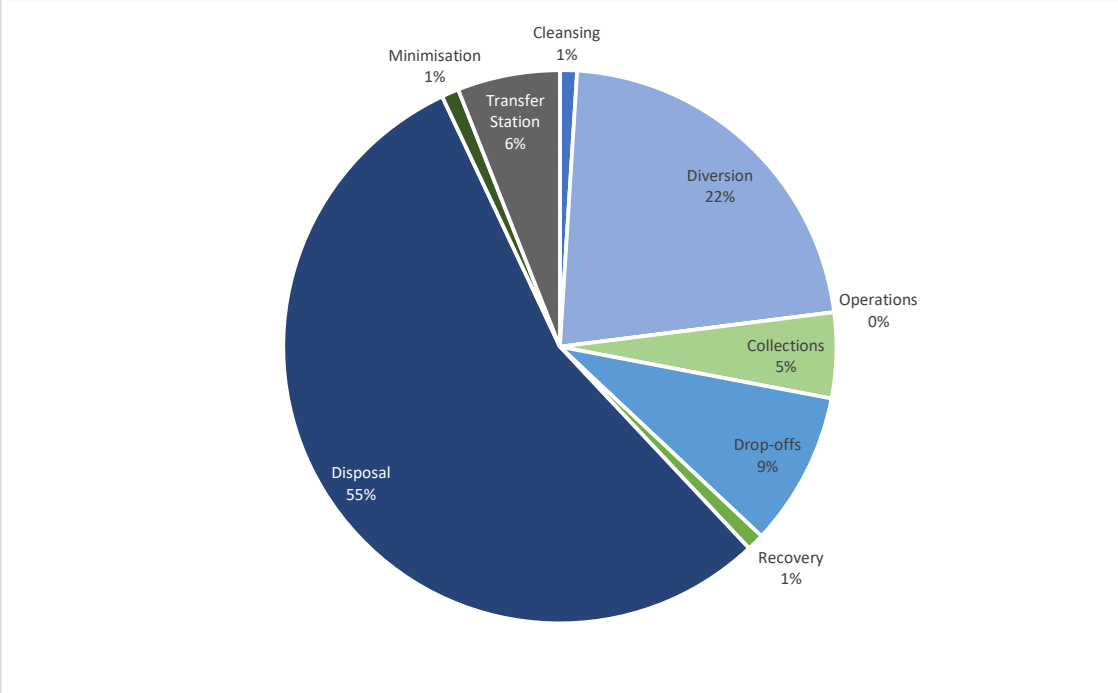


Figure 2-38: CAPEX Budget by Investment Area.

2.6.6 Tariffs

Table 2-24 provides the Refuse Removal Tariffs for the period 01 July 2023 to 30 June 2024 and **Table 2-25** provides the Disposal Tariffs for the Period 01 July 2023 – 30 June 2024.

Table 2-24: Refuse tariffs for the period 1 July 2023 - 30 June 2024

STELLENBOSCH MUNICIPALITY					
WASTE MANAGEMENT TARIFFS FOR THE PERIOD 1 JULY 2023 TO 30 JUNE 2024 Applicable to services rendered from 1 July 2023					
	SERVICES RENDERED	**UNIT**	**COMMENTS**	**Tariff 2022/2023 (VAT Excl.)**	**Tariff 2023/2024 (VAT Excl.)**
Residential Waste Collection (Households, Flats, Hostels, Retirement homes, Churches, Schools, Welfare Organisations, etc.)					
	Definition: 1 refuse unit = 240ℓ = 3 standard refuse bags				
	Indigent subsidy: A monthly subsidy (to be determined by Council) to be credited to a registered indigent consumer's account				
	Black bags (only where wheelie bins have not been introduced and/or stolen or lost)				
	Single residential properties for indigenthouseholds.	per month	Account payable by property owner. Max 3 closed bags. No other extras. Service will cancel when 240ℓ bin is issued.	R 248.08	**R 270.41**
	Basic residential collection based on 3 standard refuse bags once per week - 1st refuse unit - One dwelling on erf	per month	Account payable by property owner. Max 3 closed bags. No other extras. Service will cancel when 240ℓ bin is issued.	R 248.08	**R 270.41**
	Basic residential collection based on 3 standard refuse bags per dwelling (1 refuseunit) for additional dwellings on same erf	per refuseunit per month	Account payable by property owner. Max 3 additional closed bags. No other extras. Per fixed arrangement - not variable. Service will cancel when 240ℓ bin is issued.At cluster housing, flats, etc. 1 refuse unit to be charged for every living unit (per month)	R 248.08	**R 270.66**
	Additional collection based on an additional 3standard refuse bags once per week	per month	Account payable by property owner. Max 3 additional closed bags.	R 248.08	**R 270.41**

	- 2nd refuse unit or more		No other extras. Per fixed arrangement - not variable. Service will cancel when 240ℓ bin is issued.		
	Mobile bins (240ℓ Wheelie bin)				
	Black Bin (Black lid Black bin)				
	Basic residential collection based on 1 X 240ℓ per week - 1st bin - one dwelling per erf	per month	Account payable by property owner. No extras beside bin. At cluster housing, flats, etc. (units to be charged per quantity of bins used. Only WC024 bins will be collected	R 248.08	**R 270.41**
	Basic residential collection based on 1 X 240ℓ per week for additional dwellings on same erf	per refuse unit per month	Account payable by property owner. No extras beside bin. At cluster housing, flats, etc. Units to be charged per quantity of bins used. Only WC024 bins will be collected.	R 248.08	**R 270.41**
	Basic residential collection based on 1 X 240ℓ bin per week for additional dwellings	per refuse unit per month	Account payable by property owner. No extras beside bin. At cluster housing, flats, etc. Units to be charged per quantity of bins used. Only WC024 bins will be collected.	R 248.08	**R 270.41**
	Blue Bin (Blue lid Black bin)				
	Three times per week removal with a blue lid 240ℓ refuse bin (sectional title, residential zoned i.e., Hostels, Flats, Old age/retirement villages - NOT HOUSEHOLDS)	Per add 240ℓ bin per month	Account payable by property owner. No extras beside bin. (Sectional title, residential zoned i.e., Hostels, Flats, Old age/retirement villages.(Businesses to be charged per quantity of bins)	R 880.24	**R 959.46**
Non Residential Waste Collections (Business and Commercial)					
	Definition: 1 refuse unit = 240ℓ = 3 standard refuse bags				

	Black bags (Only where Wheelie bins have not been introduced)				
	Collection based on three (3) standard refusebags once (x1) per week	per month	Account payable by business owner. Max 3 closed bags. No other extras. `Black BAG Service will cancel when 240ℓ bin is issued.	R 293.41	**R 319.82**
	Collection based on 3 standard refuse bags 3 xper week - three refuse units per month	per month	Account payable by business owner. Max 3 closed bags. No other extras. Service will cancel when 240ℓ bin is issued.	R 880.24	**R 959.46**
	Additional collection based on additional refuse bags, once (x1) per week - measured inthe number of additional refuse units ((3) standard refuse bags) per week	per month	Account payable by business owner. No other extras. Per fixed arrangement - not variable. Service will cancel when 240ℓ bin is issued.	R 293.41	**R 319.82**
	Additional collection based on an additional refuse bags, 3 x per week - measured in thenumber of additional refuse units (3 standard refuse bags) per week	per month	Account payable by business owner. No other extras. Per fixed arrangement - not variable. Service will cancel when 240ℓ bin is issued.	R 880.24	**R 959.46**
	Mobile bins (240ℓ Wheelie bin)				
	Blue Bin (Blue lid Black bin)				
	Collection based on 1 X 240ℓ once (x1) perweek measured as one blue bin.	per month	Account payable by business owner. No other extras. Per fixed arrangement - not variable.	R 293.41	**R 319.82**
	Additional 240ℓ removal/s once per week - measured as the number of additional bluebins	per month	Account payable by business owner. No other extras. Per fixed arrangement - notvariable.	R 293.41	**R 319.82**
	Collection based on 1 X 240ℓ three times per week measured as one blue bin.	per month	Account payable by business owner. No other extras. Per fixed arrangement - notvariable.	R 880.24	**R 959.46**
	Additional 240ℓ removals three times per week - measured as the number of additional blue bins	per month	Account payable by business owner. No other extras. Per fixed arrangement - not variable.	R 880.24	**R 959.46**
	Mobile bins (240ℓ Wheelie bin)				
	Red Bin (Red lid Black Bin)				

	Collection based on 1 X 240ℓ five times per week measured as one red bin.	per month	Account payable by business owner. No other extras. Per fixed arrangement - not variable.	R 1 467.03	**R 1 599.06**
	Additional 240ℓ removals five times per week - measured as the number of additional bluebins	per month	Account payable by business owner. No other extras. Per fixed arrangement - notvariable.	R 1 467.03	**R 1 599.06**
Charges and Levies					
	Solid Waste availability charge	per annum	Vacant erven and to all households, **farm dwellings**, businesses, flats, developments not making use of municipal collection services	R 1 556.36	**R 1 696.43**
Collection of garden waste					
	Collection of clean garden waste placed in green refuse bags.	per collection of a maximum of 6 refusebags	Limited to household properties only	R 93.90	**R 102.35**
Cleaning of private erven					
	Hiring of plant, equipment and staff to cleanprivate erf/ erven	per hour	Residents will be required to pay per hourfor the clean-up operation of all general waste including green waste builder's rubble	R 1 296.00	**R 1 412.64**
	Disposal waste from cleaning operation	per ton	All waste will be transported and disposed of at a licenced waste disposal facility and will be charged per ton.	R 1 137.24	**R 1 239.59**

Table 2-25: Disposal Tariffs for the Period 01 July 2023 – 30 June 2024

STELLENBOSCH MUNICIPALITY				
SUNDRY TARIFFS FOR THE PERIOD 1 JULY 2023 TO 30 JUNE 2024 **Applicable to services rendered from 1 July 2023**				
DIRECTORATE: INFRASTRUCTURE SERVICES				
SERVICES RENDERED	**UNIT**	**COMMENTS**	**2022/23**	**2023/24**
Waste Management Services			**R VAT excl**	
Stellenbosch Landfill Site (Devon Valley Site) and Klapmuts Waste Transfer Station (General waste only - NO Medical or Hazardous				

Waste)					
	Residents and private companies working within WC024				
	Disposal of clean garden waste (ONLY grass cuttings, leaves etc.) *If it contains any other waste then it will be deemed contaminated garden waste and classified as general waste	Per metric ton or part thereof	**Vehicles with a carrying capacity up to 1,5 tons**. Must show the latest account that reflects WC024 residency or proof of where in WC024 work is being done. Limited to 3 loads per day.	Free	Free
	Disposal of clean garden waste (ONLY grass cuttings, leaves etc.) *If it contains any other waste then it will be deemed contaminated garden waste and classified as general waste	Per metric ton or part thereof	**Vehicle with a carrying capacity exceeding 1,5 tons.** Must show proof of where in WC024 work is being done.	R 23.47	**R 25.22**
	Disposal of clean builders' rubble(No plastic, iron, wood,etc.) *If it contains any other waste then it will be deemed contaminated builder's rubble and classified as general waste	Per metric ton or part thereof	**Vehicles with a carrying capacity up to 1,5 tons.** No material other than clean builder's rubble may form part of the load (e.g., plastic, iron, wood). Limited to 3 loads per day.	Free	Free
	Disposal of clean builders' rubble(No plastic, iron, wood,etc.) *If it contains any other waste then it will be deemed contaminated builder's rubble and classified as general waste	Per metric ton or part thereof	**Vehicle with a carry capacity exceeding 1,5 tons**. No material other than clean builder's rubble may form part of the load (e.g., plastic, iron, wood).	R 23.47	**R 25.22**
	Disposal of general waste based on actual mass * contaminated garden waste or contaminated	Per metric ton or part thereof	Only waste from within WC024 allowed. Proof of origin of waste to be declared by user at disposal facility (written proof if requested)	R 717.40	R 717.40

	builder's rubble will be classified as general waste				
	Disposal of general waste based on actual mass * contaminated garden waste or contaminated builder's rubble will be classified as general waste	Per 500 kg or part thereof	Only waste from within WC024 allowed. Proof of origin of waste to be declared by user at disposal facility (written proof if requested)	R 358.70	R 358.70
	Disposal of general waste based on actual mass * contaminated garden waste or contaminated builder's rubble will be classified as general waste	Per 250 kg or part thereof	Only waste from within WC024 allowed. Proof of origin of waste to be declared by user at disposal facility (written proof if requested)	R 179.35	R 179.35
	Disposal of soil	Per metric ton or part thereof	**Vehicle with a carrying capacity up to 1.5 tons.** Only soil from within WC024 allowed. Proof of origin of waste to be declared by user at disposal facility (written proof if requested)	Free	**Free**
	Disposal of soil	Per metric ton or part thereof	**Vehicle with a carrying capacity exceeding 1.5 tons.** Only soil from within WC024 allowed. Proof of origin of waste to be declared by user at disposal facility (written proof if requested)	R 23.47	**R 25.22**
	Disposal Household Hazardous Waste	Car, trailer, LDV	**Vehicle with a carrying capacity up to 1.5 tons**. These are limited to items generated on residential properties. Proof of the latest account that reflects payment for refuse removal needs to be shown.	Free	**Free**
Interdepartmental Municipal Charges at Stellenbosch Landfill Site and Klapmuts Waste Transfer Station.					
	Disposal of general waste based on actual mass * contaminated garden waste or contaminated	Per metric ton or part thereof	All Departments within Stellenbosch Municipality must pay for the disposal of refuse.	R 717.40	R 717.40

	builder's rubble will be classified as general waste				
	Disposal of general waste based on actual mass * contaminated garden waste or contaminated builder's rubble will be classified as general waste	Per 500 kg or part thereof	All Departments within Stellenbosch Municipality must pay for the disposal of refuse.	R 344.61	R 344.61
	Disposal of general waste based on actual mass * contaminated garden waste or contaminated builder's rubble will be classified as general waste	Per 250 kg or part thereof	All Departments within Stellenbosch Municipality must pay for the disposal of refuse.	R 172.30	R 172.30
	Disposal of clean garden waste (ONLY grass cuttings, leaves etc.) *If it contains any other waste then it will be deemed contaminated garden waste and classified as general waste	Per metric ton or part thereof	**Vehicle with a carrying capacity up to 1.5 tons**. Must show the latest account that reflects WC024 residency or proof of where in WC024 work is being done. Limited to 3 loads per day.	Free	**Free**
	Disposal of clean garden waste (ONLY grass cuttings, leaves etc.) *If it contains any other waste then it will be deemed contaminated garden waste and classified as general waste	Per metric ton or part thereof	**Vehicle with a carrying capacity exceeding 1.5 tons.** Must show proof of where in WC024 work is being done	R 23.47	**R 25.22**
	Disposal of clean builders' rubble (No plastic, iron, wood,etc.) *If it contains any other waste then it will be deemed contaminated builder's rubble and classified as general waste	Per metric ton or part thereof	**Vehicle with a carrying capacity up to 1.5 tons.** No material other than clean builder's rubble may form part of the load (e.g., plastic, iron, wood). Limited to 3 loads per day.	Free	**Free**
	Disposal of clean builders' rubble (No plastic, iron, wood,etc.) *If it contains any other waste then it will be deemed contaminated builder's rubble and classified as general waste	Per metric ton or part thereof	**Vehicle with a carrying capacity exceeding 1.5 tons**. No material other than clean builder's rubble may form part of the load (e.g., plastic, iron, wood).	R 23.47	**R 25.22**
Klapmuts Transfer Station					

	Disposal of general waste	Per metric ton or part thereof	Only waste from within WC024 allowed. Proof of origin of waste to be declared by user at disposal facility (written proof if requested)	R 717.40	R 717.40
	Disposal of general waste	Per 500 kg or part thereof	Only waste from within WC024 allowed. Proof of origin of waste to be declared by user at disposal facility (written proof if requested)	R 344.61	R 344.61
	Disposal of general waste	Per 250 kg or part thereof	Only waste from within WC024 allowed. Proof of origin of waste to be declared by user at disposal facility (written proof if requested)	R 172.30	R 172.30
	Disposal of clean garden waste (ONLY grass cuttings, leaves etc.) *If it contains any other waste then it will bedeemed contaminated garden waste and classified as general waste	Per metric ton or part thereof	**Vehicle with a carry capacity up to 1.5 tons.** Mustshow the latest account that reflects WC024 residency or proof of where in WC024 work is being done. Limited to 3 loads per day.	Free	**Free**
	Disposal of clean builders' rubble(No plastic,iron, wood,etc.) *If it contains any other waste then it will bedeemed contaminated builder's rubble and classified as general waste	Per metric ton or part thereof	**Vehicle with a carrying capacity up to 1.5 tons.** No material other than clean builder's rubble may form part of the load (e.g., plastic, iron, wood). Limited to 3 loads per day.	Free	**Free**
Franschhoek Drop-off					
	Residential properties ONLY				
	Disposal of garage waste. * Garage waste is any household waste otherthan clean garden waste, clean builders' rubble, domestic waste or kitchen waste from residential properties.	Car, trailer, LDV	**Vehicles with a carrying capacity up to 1.5 tons.** These are limited to excess waste/ items that cannot fit into your household wheelie bin. Proof of the latest account that reflects payment for refuse removal needs to be shown. Limited to one load permonth.	Free	**Free**
	Disposal of clean garden waste (ONLY grass cuttings, leaves etc.) *If it contains any other waste then it will bedeemed contaminated garden waste and classified as general waste	Per metric ton or part thereof	**Vehicles with a carry capacity up to 1.5 tons**. Must show the latest account that reflects WC024 residency or proof of where in WC024 work is being done. Limited to 1 load per day, maximum 2 loads per week.	Free	**Free**
	Disposal of clean builders' rubble(No plastic, iron, wood,etc.) *If it contains any other waste then it will bedeemed contaminated builder's rubble	Per metric ton or part	**Vehicles with a carry capacity up to 1.5 tons**. Must show the latest account that reflects WC024 residency or proof of where in WC024 work is being done. Limited to 1 load per	Free	**Free**

	and classified as general waste	thereof	day, maximum 2 loads per week.		
	ALL VEHICLES WITH A CARRYING CAPACITY OF 1.5 TONS OR MORE FOR BUILDER'S RUBBLE AND VEHICLES WITH A CARRYING CAPACITY OF 2 TONS OR MORE FOR GARDEN WASTE MUST BE DISPOSED OF AT THE STELLENBOSCH LANDFILL SITE				
Stellenbosch Waste Material Recovery facility					
	Disposal of garage waste. * Garage waste is any household waste otherthan clean garden waste, clean builders' rubble, domestic waste or kitchen waste from residential properties.	Car, trailer, LDV	**Vehicles with a carrying capacity up to 1.5 tons.** These are limited to excess waste/ items that cannot fit into your household wheelie bin. Proof of the latest account that reflects payment for refuse removal needs to be shown.	Free	**Free**
	Clean recyclable waste material.	Per metric ton or part thereof	ONLY clear filled bags allowed. No filled black bags will be allowed on site. Must show the latest account that reflects WC024 residency or proof of where in WC024 work is being done.	Free	**Free**
	Disposal E-Waste	Car, trailer, LDV	**Vehicle with a carrying capacity up to 1.5 tons**. These are limited to items generated on residential properties. Proof of the latest account that reflects payment for refuse removal needs to be shown.	Free	**Free**
Replacement of bin or lid or wheel or axel					
	For bin age up to 5 years		For malicious damage where there is negligence on the part of the owner.		
	For the replacement of a complete bin	Replacement	Applicable to malicious damage Lost or stolen bin must be reported to the nearest Police Station and a case number be presented to Council before replacement commences. The replacement due to theft on refuse removal day will be excluded from this arrangement. Client still to obtain a case number from the SAPS and present it to Council before replacement will take effect. Maximum of twice per year.	Cost + 15% applicable to malicious damage, lost or theft. Must be reported tothe SAPS and a case number and payment to be presented to Council before replacement. The replacement due to theft on refuse removal day will be excluded from this arrangement (Maximum two replacement allowed during the financial year, thereafter payment to be presented before replacement). Client still to obtain a case number from the SAPS and present it to Council before replacement will take effect.	
Hiring and servicing of 240ℓ bins					
	Hiring of 240ℓ wheelie	Per bin per day	For the hiring of 240ℓ bins to a	R 65.94	**R 71.87**

	bin		third party within WC024 (includes delivery, collection and servicing of the bin). Subject to prior approval and availability.		
	Servicing of event bins	Per lift	A charge to empty an event bin.	R 57.28	**R 62.44**
	Hiring of 240ℓ wheelie bins: Basic charge for collection and/or delivery on Saturday	Once-off per event	Compulsory fee to be paid when hiring municipal wheelie bins for events taking place over a weekend in WC024	R 3 277.45	**R 3 572.42**
	Hiring of 240ℓ wheelie bins: Basic charge for collection and/or delivery on Sunday	Once-off per event	Compulsory fee to be paid when hiring municipal wheelie bins for events taking place over a weekend in WC024	R 4 320.28	**R 4 709.11**

2.7 3rd Generation (2020 – 2023) Integrated Waste Management Plan implementation

Table 2-26 presents an evaluation of the implementation progress of the gaps and needs identified in the 3rd Generation IWMP. Together with the status quo assessment, the evaluation presented in **Table 2-26** informed the gaps and needs for the 4th Generation IWMP.

Table 2-26: Implementation progress of the 3rd Generation IWMP

Gaps and Needs (SM IWMP 2020-2023)	Activity	Achieved or Not Achieved
Legislation	The Municipality's solid waste by-law has been approved by Council.	The Municipality's solid waste by-law has been approved by Council.
	The general awareness of the latest legislation has been identified as a gap. Various waste generators (especially hazardous waste) are unaware of the requirements listed in the legislation pertaining to the transport and disposal of waste.	This activity has been achieved by the Municipality and waste generators have been notified regarding the requirements that are listed in the legislation pertaining to the transport and disposal of waste. The Municipality also has a Site Notice Board at the Entrance to each facility which indicates the type of waste that can be disposed of at each site. The SM started an Accreditation Process for Waste Transporters in 2022. The accreditation is valid for 2 years and allows the Transporter's information to be pre-loaded at the weighbridge.
	The non-compliances (where applicable) at the municipal solid waste facilities need to be comprehensively assessed through internal and external audits. The overall compliance identified during audits and the enforcement of any non-compliances, are areas that need improvement. These findings must be communicated to the DEA&DP. This is not considered a gap at the moment as it is being completed, however, it is mentioned here in order to include in the upcoming implementation items	SRK Consulting (South Africa) Pty Ltd (SRK) are appointed as the independent consultant to undertake external and review audits at three waste management facilities. The review audit precedes the external compliance audit and provides an indication of progress.
	Cell 1 and 2 at the Stellenbosch landfill has been issued with a closure licence and it is required that rehabilitation commence before the dates specified in the licences in order to achieve compliance.	The rehabilitation of Cell 1 and 2 has been completed. It must be noted that erosion control measures are to be implemented on Cell 1 and 2, as stormwater runnels have been created on the sides of the Cells.

Gaps and Needs (SM IWMP 2020-2023)	Activity	Achieved or Not Achieved
	The national waste management strategy was recently updated, and the Municipality is required to stay up to date with the latest requirements from national and provincial government. Communication channels between national, provincial and local government are meant to relay this information, but in some cases these communication channels require some improvement. There exists a need for the Municipality to obtain more direct guidance from the provincial and national government on how to continuously improve waste management service delivery.	The Municipality is in contact with the relevant departments to obtain direct guidance on how to continuously improve waste management service delivery within the municipality.
Waste Generated Quantities	Excellent data is available for the generated waste quantities within Stellenbosch. Data is well recorded by the contractor operating the landfill site, but care must be taken to ensure records are kept for specific categories and not spread over too many categories in order to avoid confusion. An identified gap is the recording of waste data during the time that waste will be transported to the Vissershok Landfill. Detail records should be kept on how much waste gets collected from the households and businesses, how much waste is accepted at the Stellenbosch Landfill and Klapmuts Transfer Station, and how much waste is being transported to the Vissershok site so that a waste flow and volume balance can be established.	Records of the amount of waste collected from households and businesses from the municipal wards are kept by the municipality. The Municipality records the waste quantities and types accepted at the Stellenbosch Landfill Facility and Klapmuts Transfer Station. The Service provider provides an invoice which details the amount of waste that is being transported to the Vissershok site so that a waste flow and volume balance can be continuously established. A system for overall waste flow and volume balance has not been established. The aim would be to provide an overall picture of waste generation within the Municipality.
Waste Minimization, Recycling and Re-Use Initiatives	A new MRF (situated adjacent to the Stellenbosch Landfill) is currently operational and will address some of the waste minimisation and diversion needs of the Municipality. More work is however, always required in the waste minimisation and recycling space and residents should be encouraged to further increase separation at source at all times. **In this regard the Municipality must consider increasing the separation at source, to more wards and areas.**	The recently constructed MRF started operations on 1 April 2021. Clear bags collected in the Municipality are taken to this new facility for sorting and recycling. The MRF has the capacity to process 450 tons of incoming material per month and can employ up to 40 people. The Municipality has included new areas for each year of the contract to expand the separation at source programme i.e., to include more households in the initiative. Recyclable material that is accepted includes paper, newspapers, magazines, cardboard, glass, plastic bottles and containers, food tins, cooldrink tins, and liquid board packaging.
	There remains a need for the development of a solid waste transfer station in the Franschhoek area and this needs to be budgeted for. Previous studies to find a suitable site for development of the transfer station have been unsuccessful due to the lack of suitably sized land close enough to the town. It is recommended that another feasibility (including site selection) assessment be initiated by the municipality, in order to develop this solid waste transfer station.	This has been partly achieved. The Municipality has provided one mini public drop off located in the Franschhoek area which accepts garden waste and builder's rubble.
	The municipality needs to include more information on their website related to what is recyclable and where the public can go to find recycling centres.	The municipality website has been updated to provide information on what is recyclable and the location of the recycling facilities. This can however be improved.
Institutional and Organisational Needs	There are many vacancies in the solid waste management staff compliment, including a few in key positions. Appropriate persons should be appointed for these positions and receive adequate training. There is a need	As per the Municipality Organogram, vacant posts are still to be occupied. A better organogram is required.

Gaps and Needs (SM IWMP 2020-2023)	Activity	Achieved or Not Achieved
	for more technical staff in the waste management division and it should be made a priority to appoint suitably qualified staff to the required positions and reflect this in the municipal budget. In a recent site visit to the waste management facilities, the Municipal official indicated the need for skilled staff (i.e., mechanic supervisors) to assess with mechanical difficulties encountered with on-site equipment / vehicles and advise on corrective action. Currently all mechanical repairs on equipment and vehicles are outsourced by the municipality which has a significant cost and time implication.	The Municipal official had indicated during the site visits that the need for specifically skilled staff (i.e., mechanic supervisors) to assess with mechanical difficulties encountered with on-site equipment / vehicles and advise on corrective action. Currently all mechanical repairs on equipment and vehicles are outsourced by the municipality which has a significant cost and time implications. In addition, this can result in legislative compliance risks.
	The SM proposed establishing an IWMP Monitoring Advisory Committee to monitor the implementation of the 3rd generation IWMP. It is recommended that the Committee is established upon approval of the 4th Generation IWMP and that the monitoring and review process by the SM IWMP advisory committee, should, as a minimum, consist of: • The Stellenbosch Waste Management Officer with assistance from the Operational Services Department's Supervisors and Foremen. • The SM Deputy Director Infrastructure Services • The SM Deputy Director Operational Services • An appointed consulted (where required)	This is being undertaken by means of the IDP review process and the involvement of the Municipal Waste Officials: "Section 34 of the Municipal Systems Act requires that a municipality review its IDP annually following an assessment of its performance measures. The performance measures of the IDP are informed by municipal sectoral plans, to the extent that the deliverables of the IDP are directly linked to municipal sector plans. Like the IDP, municipal sector plans are subject to review periods. Alignment between sector plans and the IDP therefore allows for more effective performance measurement and budgeting integration for the municipality. Municipal Waste officials are responsible for providing an annual performance report, which feeds into the review of the IDP".
Identification of Alternatives	Current organic diversion rates achieved are adequate but needs to improve in order to achieve 100% diversion by 2027. The waste characterisation study needs to give additional detail to identify effective alternatives for diverting the remainder of the organic waste fraction. Possible additional treatment could include Mechanical Biological Treatment (MBT) in order to separate the organic fraction from the collected waste stream and beneficiate it. This is, in part, the intention of the planned organic waste transfer station and the detail design process for the transfer station would have to investigate the secure off-takers for the organic waste diverted by the transfer station.	An Organic Waste Diversion Plan for the SM was completed and approved by the Stellenbosch Municipality in November 2021 and is still to be implemented. It was recommended that the SM pursue a multi-pronged approach to organic waste diversion which favours and encourages separation at source, identifies a treatment option and creates an enabling environment.
Funding Mechanisms	Funding mechanisms need to be explored. The capital cost requirements of required infrastructure and possible alternatives in order to achieve the required diversion rates are too high to be funded by the solid waste department itself. As described in this report budgets have been allocated for waste management infrastructure and services but the high capital requirements of many of the required developments indicates that the Municipality will have to look outside its borders for funding. This is particularly true for the costs of landfill closure and rehabilitation.	Is still to be achieved with the Municipality. The SM plans to partner with industry bodies and PROs to promote and ensure awareness and education of integrated waste management.

Gaps and Needs (SM IWMP 2020-2023)	Activity	Achieved or Not Achieved
	Waste minimisation, including recycling, composting, and crushing of builders' rubble, will require financial support and continual public awareness and education (which is on-going and very important) is also a continuous expense.	This activity refers to waste diversion rather than minimisation and is ongoing. The Municipality provides continual public awareness and education regarding waste minimisation, including recycling, and composting which is also a continuous expense. The SM have advertised for a Technician in order to build capacity to implement this on an ongoing basis.
	The Municipality must make provision for the rehabilitation of Cell 1 and 2 at the Stellenbosch Landfill. It was however noted during the site visit, that Cells 3 and 4 are currently under development. With the requirements set in the latest issued licences (which take into account that sites were not constructed with impermeable base liner), the rehabilitation costs have become unaffordable in the short to medium term. It would be most beneficial if the funding allocation for landfill rehabilitation would come through, or be sourced by, the Provincial government systems.	Cell 3 currently receives waste from municipal area clean ups, but not general household waste as it has reached its' maximum height. The construction of a new cell, Cell 4, is planned and it is expected it will start receiving waste in 2024. Cell 4 will be developed between Cells 2 and 3 and will be filled ("piggy-backed") above the slopes of Cells 2 and 3.
Public Awareness and Education	Public awareness and education must always be a continual requirement and the current work done by the Stellenbosch Municipality must continue and be expanded wherever possible. The Municipality does good work with the schools in its jurisdiction and more work is required to ensure that the awareness and education passes through to the youth by these initiatives, can continue. The Municipality publishes an annual newspaper called "Utter Rubbish" in which it provides information to the public on waste related matters. This is a very good method of relaying important information to the general public and should be committed and improved upon where possible. A dedicated Municipal official should continuously investigate and implement public awareness and education campaigns related to waste management to ensure that the public understands the need for sustainable waste management within the Municipality. During a recent visit to the MRF, the Municipal Official suggested the development of signage (to be constructed out of colourful recyclables) which could be erected at the front gate of the MRF and make this facility more visible to the general public. This would be a simple and cost-effective public awareness strategy.	The MRF has been developed at the Stellenbosch IWMF which addresses some of the waste minimisation and diversion needs of the Municipality. The MRF is in operation and an open day was held on the 27 September 2021 which allowed residents, students, scholars and visitors an opportunity to tour the facility. The Municipality provides 3 schools, namely Rhenish Girls High, Rhenish Primary and Eikestad Primary with collection services of recyclable materials at their schools in addition to the normal kerbside collection. It must be noted that more work is always required in the waste minimisation and recycling area and that residents should be encouraged to separate all waste items accordingly, the Municipality must therefore consider increasing the separation at source project to more wards and areas. Public awareness and education on recycling must be a continuous requirement and the current work done by the Stellenbosch Municipality must continue and expand wherever possible. The municipality does good work with the schools within the area to create awareness programmes and more work is required to ensure that the awareness and education is passed through to the youth

3 Gaps and Needs

Based on the information obtained from the Status Quo assessment, a Gap Analysis and Needs Assessment has been conducted for the existing municipality's waste management practices.

This phase is very important in the compilation of the IWMP as it identifies the waste management priority areas within the municipal area, and whether the targets have been achieved as set out in the previous IWMP update dated September 2020. The gaps and needs in achieving these targets will be highlighted in this report, and recommendations (solutions) proposed to address these shortcomings.

From the status quo evaluation, the gaps and needs were identified and are discussed below. The methodology used to determine these gaps and needs were through a combination of the following methods and processes:

- Gaps and needs specifically identified by the municipality's waste management officials during the meetings between JG Afrika and the SM.
- Shortcomings of the municipal infrastructure and/or systems to adhere to the national and provincial requirements of waste volume recording and reporting and management.
- Processes and practices identified that could assist the municipality to adhere to the principles of the National Waste Management Strategy and the NEMA Waste Act and its regulations.
- External and internal audit reports of waste management facilities.
- General DEA&DP comments on the other municipal IWMP reports.

Table 3-1: Gaps and Needs identified.

Waste Management Aspect	Gap	Need
Waste By-Laws and Policies	Review of By-Law	Although the current By-law is comprehensive and does not require any revisions at this stage, as new or amended national legislation comes into force, the By-law should be reviewed to ensure it complies.
Waste collection fleet	Vehicles are serviced / repaired only when authorisation is given by the Service Provider - no mechanical supervisor is present on site. Ageing fleet with more than half the compactors between 5 and 10 years old.	Investigate the appointment of a mechanical supervisor within the Department for small daily repairs and to manage the maintenance process. Ensure budget allocation for replacement of compactors in next 5 years.
Transfer Stations	Drop-offs need to be upgraded to keep up with planned growth, as well as to support decentralisation initiatives. Also, investigate including more garden / green waste drop-offs within the residential areas.	Introduce these Drop-off upgrading needs in planning and capital budgeting.

Waste Management Aspect	Gap	Need
Landfill Site Management	Landfill Airspace and Cell 4 lifespan Management of Waste Pickers	Develop a long-term planning strategy to maximise airspace. Develop a plan for waste picker management when Cell 4 becomes operational.
Increased diversion of recyclables	Only 32% of the Municipality is provided with a two-bag collection.	All residents within the SM to be included in the two-bag system.
Organic Waste Diversion	The 2021 Organic Waste Diversion Plan (OWDP) has not been implemented.	The OWDP needs to be updated and a practical plan for implementation included in the IWMP. Identify an off-take for organic waste. Provide garden waste collection in Klapmuts.
Staff	There are a number of vacant posts in the Waste Management Department creating operational capacity constraints.	Vacant posts to be filled.
Public Awareness and Education	No overarching waste education and awareness strategy for the municipality. More successful short-term projects to be implemented with schools and communities.	Municipality to develop a long-term waste education and awareness strategy. Public awareness and education campaigns must be consistent, ongoing, and implemented by the Stellenbosch Municipality. The SM to introduce/provide a circular/flyer which will provide information on the waste education awareness events that will be undertaken as well as to provide residents with information on the drop-off areas / facilities within the municipal area. The SM is planning to expand on the school programme and to approach other schools within the municipal area and to formalise the education awareness campaigns which will promote waste reduction, recycling and composting. To ensure that waste is sorted at the source i.e., by the household/generator.

4 Goals, objectives, and targets

In order to address the gaps and needs that have been identified, goals and objectives must be set. The terminology used in the goals and objectives, and implementation plan sections of this report has been aligned with the DEA&DP Integrated Waste Management Planning Guideline.

"Goals" are the long-term ends toward which programs, activities and projects are ultimately directed, while "objectives" are specific measurable intermediate ends that are achieved, and which marks the progress towards a goal. Both strategic and operational objectives can be set, and a goal may have a number of objectives and each objective may have a number of policy statements.

The objectives determined by municipalities may contribute only to the solving of local problems, but they must be aligned with the overall objectives of the NWMS.

The 2020 NWMS provides a set of goals that municipalities must achieve within a defined period. The NWMS strategic approach is based on Three Pillars, namely;

- Waste Minimisation,
- Effective and Sustainable Waste Services, and
- Compliance, Enforcement and Awareness.

Each pillar has goals and expected outcomes/targets, which set a desired level of performance and measurable achievements.

Strategic goals can be divided into:

- Immediate: 1 year,
- Short-term: 2 to 3 years,
- Medium term: 3 to 5 years and
- Long-term: 5 to 10 years.

A total of 5 goals have been identified for the SM, building on the goals from the previous IWMP and informed by the status quo, gap and needs assessment and updated legislation and provincial policies and strategies.

4.1 Goals for Stellenbosch Municipality

A total of five goals were identified for the SM. The development of these goals has been informed by the previous IWMP, situational analysis and gap and needs assessment, as follows:

Goal 1: Strengthened education, capacity and advocacy towards Integrated Waste Management.
Goal 2: Improved integrated waste management planning and implementation for efficient and financially viable waste management services and infrastructure.
Goal 3: Effective and efficient utilisation of resources.
Goal 4: Improved compliance monitoring and enforcement.
Goal 5: Increased waste diversion and recycling.

4.2 Alignment with National and Provincial Waste Management Goals

The following table identifies the alignment of these goals with the National Waste Management Strategy, 2020, the **Draft WC IWMP** and the SM's previous IWMP.

SM Goals	WC IWMP	NWMS 2020
Goal 1: Strengthened education, capacity and advocacy towards Integrated Waste Management.	Goal 1: Strengthened education, capacity, awareness and advocacy towards Integrated Waste.	Pillar 3: Compliance, Enforcement and Awareness
Goal 2: Improved integrated waste management planning and implementation for efficient and financially viable waste management services and infrastructure.	Goal 2: Improved integrated waste management planning and implementation for efficient waste services, technologies and infrastructure.	Pillar 2 Effective and Sustainable Waste Services
Goal 3: Effective and efficient utilisation of resources.	Goal 3: Effective and efficient utilisation of resources.	Pillar 1: Waste Minimisation
Goal 4: Improved compliance monitoring and enforcement.	Goal 4: Improved compliance with the environmental regulatory framework.	Pillar 3: Compliance, Enforcement and Awareness
Goal 5: Increased waste diversion and recycling.	Goal 3: Effective and efficient utilisation of resources.	Pillar 1: Waste Minimisation

4.3 Implementation Plan

The IWMP Implementation Plan is presented in a table format. A timeline, proposed budget, responsibility, and priority have been assigned to each task. These tasks should be reviewed annually by the SM and amended or adjusted accordingly. While all projects in the implementation plan should be implemented, in the event that budget for waste projects is cut the high priority projects should be implemented before low priority projects. The objectives have been aligned with the overall objectives of the NWMS and the WC IWMP (draft). The Organic Waste Diversion Plan activities have been updated and included in **Table 4-1**.

Time Frame (Financial Yr)	Key	Priority	Key	Budget Category
Ongoing		High	H	Capital
Annual		Medium	M	Operating
2024		Low	L	
2025				
2026				
2027				
2028				
2029				

Table 4-1: IWMP Implementation Plan

Objective	Actions and Targets	Priority	Timeframe	Budget	Responsibility
Goal 1: Strengthened education, capacity and advocacy towards Integrated Waste Management					
1.1 Facilitate industry responsibility in integrated waste management	• Ensure all necessary waste information is available on the municipal website in an easy to navigate format.	H	2025	Operating	SM: Waste Dept – Education and Awareness
	• Include industry and business in the overarching Waste Awareness Strategy *(see Goal 1.2)* with campaigns and a plan for execution.	M	2025	Operating	SM: Waste Dept – Education and Awareness
	• Undertake hazardous waste awareness programmes with business and industry.	M	2026	Operating	SM: Waste Dept – Education and Awareness
	• Undertake recycling and waste diversion campaigns with business and industry, including Organic Waste separation.	M	2026	Operating	SM: Waste Dept – Education and Awareness
1.2 Promote and ensure awareness and education of integrated waste management	• Develop an annual waste awareness calendar with dates for events as per the Strategy	H	Annual	Operating	SM: Waste Dept – Education and Awareness
	• Detailed records are to be kept of all waste awareness campaigns undertaken.	H	Annual	Operating	SM: Waste Dept – Education and Awareness
	• Partner with industry bodies like PROs, Plastics SA, ORASA, etc. for training programmes, workshops etc.	M	Annual	Operating	SM: Waste Dept – Education and Awareness
	• Develop a **5 Year Waste Awareness Strategy** with annual and ongoing campaigns with plans for execution.	H	2025	Operating	SM: Waste Dept – Education and Awareness
	• Include the development of a Household Hazardous Waste and Organic Waste Diversion communication and awareness plan as part of the overarching Strategy	H	2025	Operating	SM: Waste Dept – Education and Awareness
	• Develop sufficient awareness materials for the waste awareness campaigns, and update as required	H	2025	Operating	SM: Waste Dept – Education and Awareness

Objective	Actions and Targets	Priority	Timeframe	Budget	Responsibility
	• Ensure personnel undertaking the Waste awareness campaigns are trained and experienced personnel.	H	Ongoing	Operating	SM: Waste Dept – Education and Awareness
	• Ensure that the Strategy includes waste awareness campaigns to be undertaken at all schools so that all learners are provided with opportunity to be educated on good waste management practices. ○ Develop a programme to roll waste awareness out to remaining schools within the Municipality. ○ Provide all schools with an opportunity to participate in a recycling programme whether municipal or private.	H	2027	Operating	SM: Waste Dept – Education and Awareness
1.3 Build and strengthen waste management capacity	• Attend DEA&DP, DFFE and other industry body (e.g., IWMP) seminars, training, conferences and forums.	H	Ongoing	Operating	SM: Waste Dept – WMCO
	• The WMCO to continue to attend provincial forums such as the Cape Winelands Provincial Waste Forum, The Western Cape Recycling Action Group as well as DEA&DP Waste Managers Forum.	H	Ongoing	Operating	SM: Waste Dept - WMCO
	• Outsource specific skills that might be required to consultants e.g., communication and awareness, mechanical repairs.	M	Ongoing	Operating	SM: Waste Dept/ Supply Chain
	• Develop an in-house staff training schedule detailing the training needs for staff as required. Update annually.	H	2025 Annual	Operating	SM: Waste Dept/ HR Dept
	• Update the current organogram, include job description and training/qualification requirements	H	2025	Operating	SM: Waste Dept/ HR Dept
	• Fill all vacant posts as soon as possible.	H	2025	Operating	SM: Waste Dept/ HR Dept
	• Assess whether staff have the necessary skills and what the training needs are to meet job/project requirements.	H	2025	Operating	SM: Waste Dept/ HR Dept
	• Motivate for new positions such as in-house Mechanical Repair position	M	2026	Operating	SM: Waste Dept/ HR Dept

Objective	Actions and Targets	Priority	Timeframe	Budget	Responsibility
Goal 2: Improved integrated waste management planning and implementation for efficient and financially viable waste management services and infrastructure					
2.1 Facilitate municipal integrated waste management planning	• Obtain approval for 4th generation IWMP	H	2024	Operating	SM: Waste Dept - WMCO
	• Undertake annual review of the IWMP and submit annual report along with an update of project implementation to DEA&DP.	H	Annual	Operating	SM: Waste Dept - WMCO
	• Review Waste disposal tariffs annually ensuring the process is informed by a full cost accounting. ○ This should include consideration of differentiated tariffs to incentivise separation at source and organic waste diversion or alternatively cover costs. Feedback from pilot project and existing strategies should be included in the tariff review	H	Annual	Operating	SM: Waste Dept
	• Develop a Master Plan/Strategy for long term waste management in the Municipality including infrastructure requirements to maximise lifespan of new cell at SLF.	M	2026	Operating	SM: Waste Dept - Appoint Consultant
2.2 Promote industry waste management planning and the circular economy	*Linked to Goal 1.* • Identify projects/industries or role-players in the SM and facilitate industry waste diversion initiatives that promote the circular economy principles.	L	2026	Operating	SM: Waste Dept
	• Implement a system to request Waste Management Plans from Businesses and Industry showing diversion including organic waste	M	2027	Operating	SM: Waste Dept
	• Undertake a regular Collection Service Review	H	Annual	Operating	SM: Waste Dept
	• Planning processes to be in place to ensure that key vacancies in the solid waste department are filled to ensure continued and consistent service levels.	H	Annual	Operating	SM: Waste Dept/HR Dept
	• Planning processes to be in place to ensure that service providers are timeously appointed.	H	Annual	Operating	SM: Waste Dept
	• Develop a fleet management, maintenance, and replacement strategy to allow budgeting to take place.	H	2025	Operating	SM: Waste Dept

Objective	Actions and Targets	Priority	Timeframe	Budget	Responsibility
2.3 Promote the establishment of integrated waste management infrastructure and services	• Make provision for Garden Waste drop-off at the Klapmuts RTS.	H	2025	Capital	SM: Waste Dept
	• Include budget in the 2024/25 Financial Budget for a pilot project for organic waste drop-off points at existing drop-offs and a service provider to collect and treat the organic waste.	H	2025	Operating	SM: Waste Dept
	• Develop a tender specification for a suitable off-taker for the Organic Waste from drop-offs pilot project from July 2024. Budget to include the collection and treatment fee.	H	2025	Operating/ Capital	SM: Waste Dept
	• Ensure budget allocation for ongoing upgrade and replacement of compactors over next 5 years.	H	2025	Capital	SM: Waste Dept
	• Pilot the collection of Organic Waste (including food waste) at the existing drop-off sites, commencing July 2024.	H	2025/26	Operating	SM: Waste Dept
	• Pilot the collection of Organic Waste at a selected CBD focusing on business waste to develop a costing model for future implementation.	H	2026	Operating	SM: Waste Dept
	• Install HHW collection infrastructure at all municipal drop-off facilities.	M	2026	Capital	SM: Waste Dept
	• Ensure budget allocation for ongoing upgrade and replacement of compactors over next 5 years.	H	2026	Capital	SM: Waste Dept
	• Construct mini-MRF in Franschhoek (based on outcome of current project to identify a site).	H	2027	Capital	SM: Waste Dept
	• Construct drop-off and mini-MRF in Klapmuts	H	2027	Capital	SM: Waste Dept
	• Initiate engagement with other departments in order to facilitate a better and more supportive understanding of roles and responsibilities, so as to improve communication and integration of services	M	2026	Operating	SM: Waste Dept
	• Enforce the implementation of organic waste separation in the Business and Industrial sector by appointing a service provider to collect and treat from all the CBD and Industrial areas.	H	2027	Operating	SM: Waste Dept

Objective	Actions and Targets	Priority	Timeframe	Budget	Responsibility
	• Ensure budget allocation for ongoing upgrade and replacement of compactors over next 5 years.	H	2026	Capital	SM: Waste Dept
	• Construct Organic Refuse Transfer Station	H	2028	Capital	SM: Waste Dept
2.4 Ensure effective and efficient waste information management	• Ensure IPWIS reporting continues and assess accuracy on a regular basis.	H	Annual	Operating	SM: Waste Dept
	• Continuous maintenance of waste infrastructure like weighbridges, updating of waste information systems (software) in accordance with a maintenance schedule.	H	Annual	Operating	SM: Waste Dept
	• Effective and ongoing training of weighbridge / waste information system operators.	H	Annual	Operating	SM: Waste Dept/ HR Dept
	• Review Municipal waste generation and management data annually to ensure a "big picture" view of waste flows within the municipality as well as if diversion targets are being met.	M	2026 Annual thereafter	Operating	SM: Waste Dept
	• Capture waste related complaints in complaints register as well as the statistics regarding the types and frequency of complaints received.	M	Annual	Operating	SM: Waste Dept
Goal 3: Effective and efficient utilisation of resources					
3.1 Minimise the consumption of natural resources and promote the circular economy	*Ties in with Goal 1 and Goal 2 – Objective 2.2* • Facilitate private initiatives such as glass reuse rather than recycling e.g., Bottle Traders	L	2028	Operating	SM: Waste Dept
	• Support local recyclers and buy-back centres	L	2028	Operating	SM: Waste Dept
3.2 Stimulate job creation within the waste economy	• Implement the waste picker integration plan (WPIP)	M	2025	Operating	SM: Waste Dept
	• Manage EPWP programme to maximise employability with the Municipality	L	2025 Every 6 months	Operating	SM: Waste Dept
	• Appoint service providers for landfill management, MRF management, waste collection and chipping which employ local residents with a focus on employing women, youth, and people with disabilities.	H	2025 Every 3 years	Operating	SM: Waste Dept
3.3 Increase waste diversion through	• Commence with the implementation of OWDP actions.	H	2025	Operating	SM: Waste Dept
	• Continue to roll-out separation-at-source to all households.	H	2026	Operating	SM: Waste Dept

Objective	Actions and Targets	Priority	Timeframe	Budget	Responsibility
reuse, recovery and recycling	• Continue to roll-out separation-at-source to all households - Groendal, Mooiwater and La Motte.	H	2025	Operating	SM: Waste Dept
	• Continue to roll-out separation-at-source to all households - Kayamandi North and Kayamandi South.	H	2026	Operating	SM: Waste Dept
	• Continue to roll-out separation-at-source to all households - Klapmuts and Lanquedoc.	H	2027	Operating	SM: Waste Dept
	• Roll out home composting programme in all suburbs/areas by 25 % increase per year until all residents have been offered the opportunity to participate.	M	2026	Capital/Operating	SM: Waste Dept
	• Roll out home composting programme in all suburbs/areas by a further 25 % increase per year until all residents have been offered the opportunity to participate.	M	2027	Capital/Operating	SM: Waste Dept
	• Roll out home composting programme in all suburbs/areas by a further 25 % increase per year until all residents have been offered the opportunity to participate.	M	2028	Capital/Operating	SM: Waste Dept
	• Allow for a garden waste drop-off at KRTS	H	2027	Capital	SM: Waste Dept
Goal 4: Improved compliance with environmental regulatory framework					
4.1 Strengthen compliance monitoring and enforcement	• Conduct required internal and external compliance audits at all waste management facilities as required, including appointing specialists to undertake monitoring of air and groundwater etc. according to licences conditions. • Submit compliance audits to DEA&DP, where required, and ensure corrective action is taken to address non-compliances.	H	Annual	Operating	SM: Waste Dept
	• Report against OWDP targets	H	Annual	Operating	SM: Waste Dept
	• Report against NMWS Diversion Targets	M	2026	Operating	SM: Waste Dept
	• Develop an Illegal Dumping Strategy	M	2027	Operating	SM: Waste Dept
4.2 Remediate and rehabilitate contaminated land and	• Capping of Cell 3 and 4. ((Cell 3 will be left dormant till closure of Cell 4 and both will be capped together)	H	2029 (TBC)	Capital	SM: Waste Dept

Objective	Actions and Targets	Priority	Timeframe	Budget	Responsibility
Waste Management Facilities					
4.3 Facilitate the development of waste policy instruments	• Expand Capital Development Budgeting to include additional Drop Off facilities.	M	2026	Capital	SM: Waste Dept
	• Review Waste By-Law to ensure relevant and up to date.	L	2026	Operating	SM: Waste Dept
	• Develop and implement a waste Infrastructure masterplan to guide the development and financing of waste facilities over the next 10 – 15 years and maximise available airspace.	H	2027	Operating	SM: Waste Dept
Goal 5: Increased waste diversion and recycling to promote a Circular Economy					
5.1 Increased diversion of recyclables	• Increase participation rates in the separation-at-source programme.	H	Ongoing	Operating	SM: Waste Dept
	• Implement pilot project to increase accessibility in terms of recycling by placing facilities/containers in parks for people to take their recyclables to - pilot project.	M	2026	Capital	SM: Waste Dept
	• Plan the continued roll-out from 2028 of the separation-at-source programme to meet the NWMS target for diversion of recyclables from landfill to 40% of waste from landfill within 5 years (and 55% within 10 years; and at least 70% of waste within 15 years.)	H	2028	Operating	SM: Waste Dept
5.2 Increase organic waste diversion from landfill to comply with mandatory national and provincial targets.	• Promote increased private sector composting.	L	2027	Operating	SM: Waste Dept
	• Implement the objectives and targets presented in the Organic Waste Diversion Plan (50% by the end of 2022 and 100% by the end of 2027).	H	2028	Operating	SM: Waste Dept
	• Collaborate with generators of organic waste in the commercial/industrial sector to ensure reduction and diversion from landfill.	M	2028	Operating	SM: Waste Dept
5.3 The diversion of household hazardous wastes from landfill.	• Develop HHW Guideline for residents which details the drop-off service provided by the Municipality.	M	2026	Operating	SM: Waste Dept
5.4 Waste picker integration	• Liaise with PRO's to facilitate the registration of Waste Pickers (WP).	L	2025	Operating	SM: Waste Dept

Objective	Actions and Targets	Priority	Timeframe	Budget	Responsibility
	• Develop a waste picker integration plan (WPIP) appropriate to the SM and in line with DFFE's guidelines upon re-opening of the landfill site as well as for street pickers.	M	2026	Operating	SM: Waste Dept

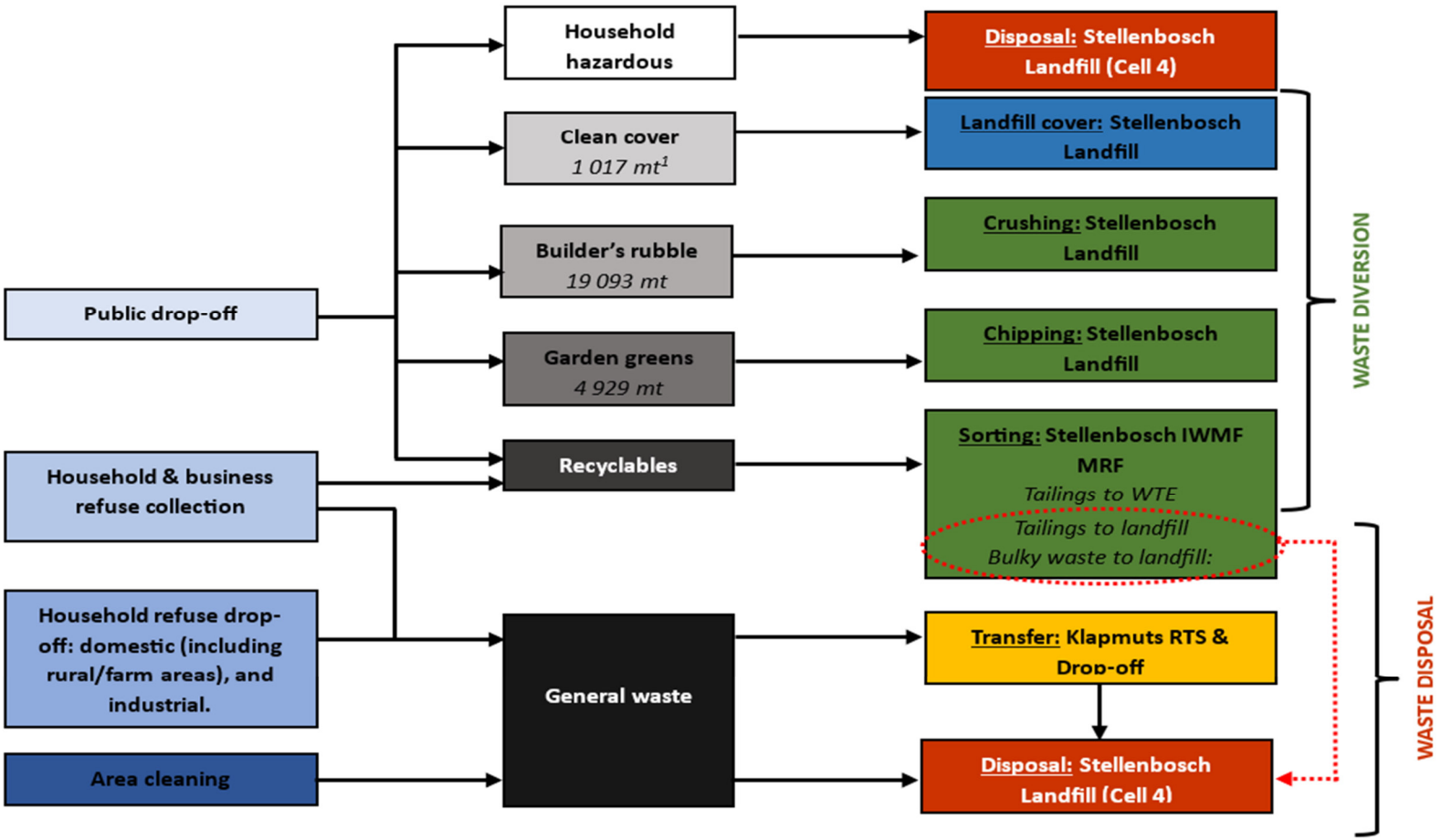


Figure 4-1: Potential/future waste management system within SM

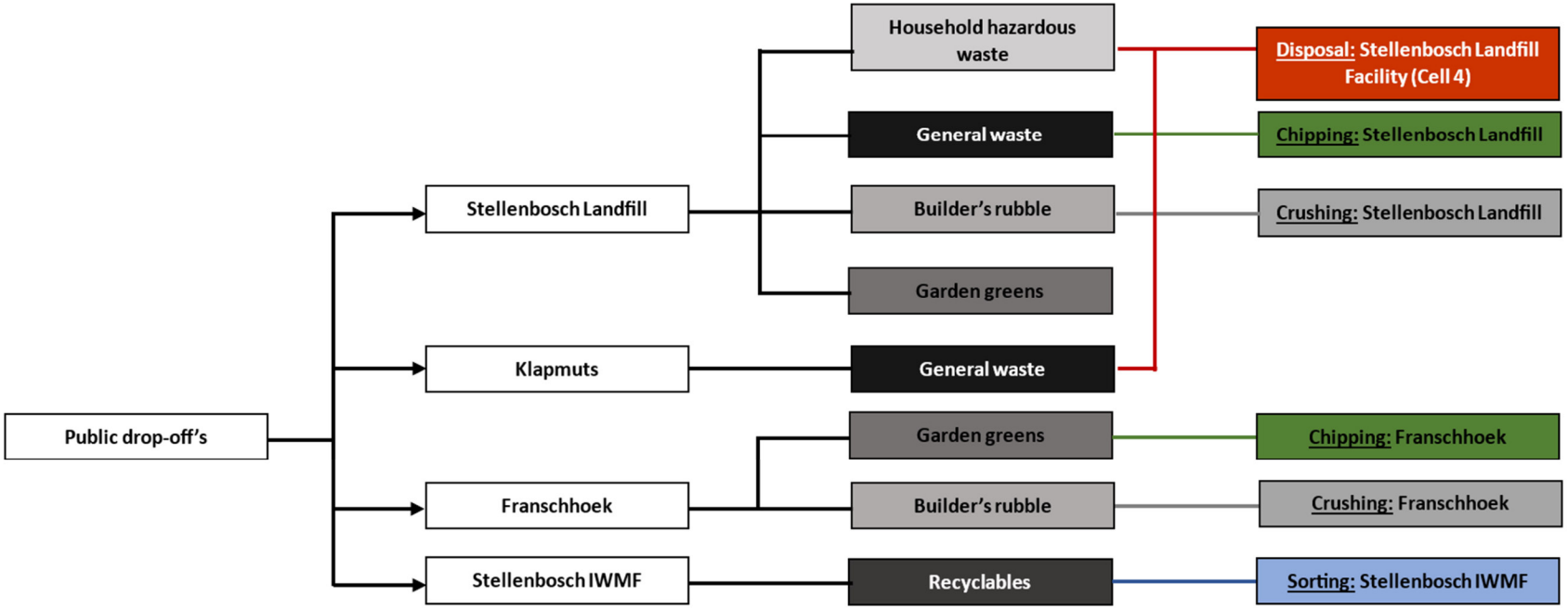


Figure 4-2: Potential future Waste flows within the SM upon implementation of the actions contained in the IWMP

5 Monitoring and review

5.1 Monitoring

In accordance with the DEA&DP IWMP guidelines titled "Towards Integrated Sustainable Waste Management: A Guide for Waste Management Planning" (IWMP guidelines) the monitoring of the IWMP should run in parallel with the agreed municipal IDP. Monitoring refers to monitoring progress towards achieving the goals and targets set in the IWMP.

Monitoring of the IWMP is essential for strategic planning, technical and financial performance assessment, compliance monitoring, and public accountability. To ensure corrective action is taken where necessary, and that long-term strategic goals are met, it is imperative that monitoring focuses on the short-term objectives of the IWMP. Monitoring also makes provision for the adjustment of the IWMP.

Monitoring of the IWMP will be undertaken by means of the IDP review process. A monitoring framework must therefore be developed by the SM to identify the different tasks of the role players in monitoring and measuring and allocating specific tasks for the gathering of data and submission of reports.

An annual performance report in terms of section 13 (1) of the NEM:WA and section 46 of the Municipal Systems Act (MSA) which contains information on the implementation of municipal integrated waste management plans must be compiled and submitted to the DEA&DP.

The annual performance report must be compiled in accordance with section 13 (2) of the NEM:WA which stipulates the following requirements for the annual performance report:

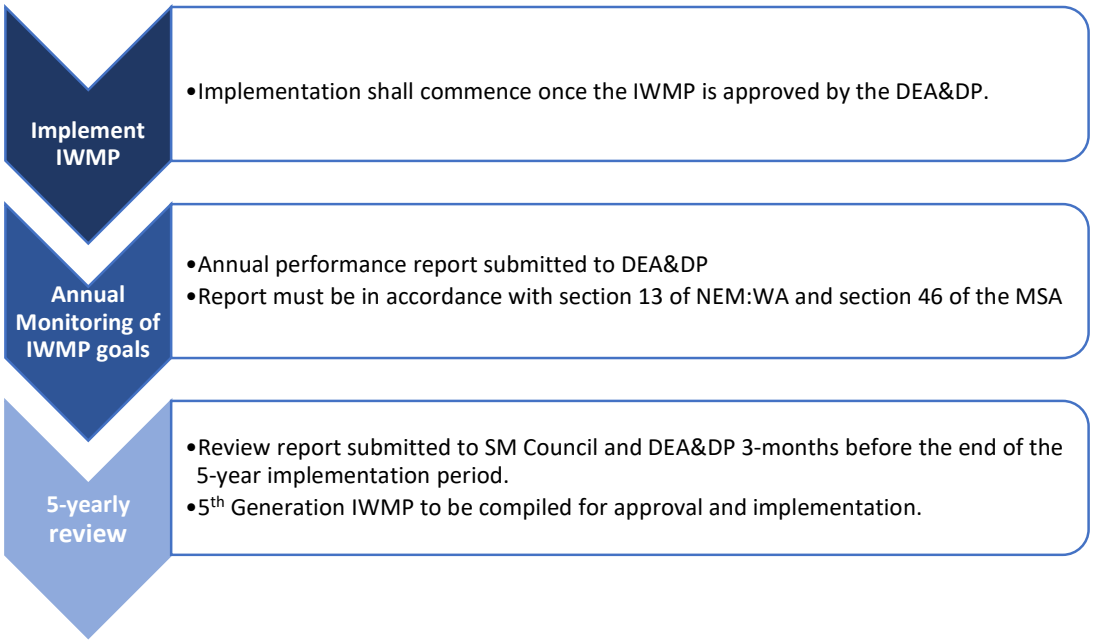
1. The extent to which the plan has been implemented during the period.
2. The waste management initiatives that have been undertaken during the reporting period.
3. The delivery of waste management services and measures taken to secure the efficient delivery of waste management services, if applicable.
4. The level of compliance with the plan and any applicable waste management standards.
5. The measures taken to secure compliance with waste management standards.
6. The waste management monitoring activities.
7. The actual budget expended on implementing the plan.
8. The measures that have been taken to make any necessary amendments to the plan.
9. In the case of a province, the extent to which municipalities comply with the plan and, in the event of any non-compliance with the plan, the reasons for such non-compliance; and
10. Any other requirements as may be prescribed by the Minister.

5.2 Review

The DEA&DP IWMP guidelines stipulate that to ensure the continued suitability, adequacy, and effectiveness of the IWMP, the IWMP must continuously be reviewed. The review of the IWMP refers to the review of the whole IWMP document as well as the IWMP projects and strategic goals.

Within 3-months of the end of the 5-year IWMP implementation period, a review report of the IWMP must be documented for formal submission to SM's Council and to the DEA&DP. The report should be made available to interested and affected parties (including the public). The review should include issues such as performance levels related to the implementation of the IWMP, improvements from baseline conditions / indicators, and the public's perceptions and opinions regarding waste management in general and its associated services.

The effectiveness of the SM 4th Generation IWMP will be reviewed 5 years post its implementation date. The IWMP will be implemented once the IWMP has been approved by the DEA&DP. The following time schedule applies for the monitoring and review of the 4th Generation IWMP.



6 PUBLIC PARTICIPATION PROCESS

The Stellenbosch Municipality had invited and provided an opportunity for the community/stakeholders to review and provide comment in connection with the Draft IWMP to the Municipality by submitting such representation on or before the **15 April 2024.**

The 30-day review and commenting period was held from the **14 March 2024** until the **15 April 2024**.

The Draft IWMP was also made available for perusal during office hours at the offices of the Stellenbosch Municipality, in the Stellenbosch, Klapmuts, Pniel and Franschhoek public libraries in the Stellenbosch Municipal Area and on the website: www.stellenbosch.gov.za from **14 March 2024** until **15 April 2024**.

6.1 Comments and Response Report

No comments were received from the communities/stakeholders during the during the commenting period (from 14 March 2024 until 15 April 2024) on the Draft IWMP.

The Comments and Responses Report (CRR) reflects the comments submitted (in writing) by the Western Cape Government Department of Environmental Affairs and Development Planning (DEA&DP) (Waste Information Management) on the Draft Stellenbosch Municipality 4th generation Integrated Waste Management Plan (IWMP). The comments, dated 9 May 2024, were submitted by Mr August Hoon.

All comments received from the DEA&DP (Waste Information Management), and responses to the comments are captured in **Table 6-1** below.

Table 6-1: Comments submitted by the DEA&DP, and responses provided by the project team

DEA&DP COMMENTS	RESPONSES PROVIDED BY PROJECT TEAM
1. Although the IWMP aligns with some municipal plans, it however does not show alignment with the Spatial Development Framework (SDF). Ensure all waste management facilities are identified in the latest Stellenbosch Municipality SDF.	The Stellenbosch Municipality Spatial Development Framework has been included as part of the list of the applicable provincial and local policies, plans, and by-laws presented in Table 2-2 of the IWMP.
2. The Municipality must ensure that the public gets an opportunity to comment on the draft IWMP before approval by Council. The IWMP must include all comments received and provide responses on how comments were addressed. Please have a separate section on the Public Participation Process (PPP) that is to be followed. The PPP is not a review process, but it should form an integral part during the development process of the Plan. The consultants must use the PPP to identify gaps and needs from the communities/stakeholders.	The public/local community was invited to submit representations in connection with the Draft IWMP to the Municipality by submitting such representations on or before **15 April 2024.** The Draft IWMP was also made available for perusal during office hours at the offices of the Stellenbosch Municipality, in the Stellenbosch, Klapmuts, Pniel and Franschhoek public libraries in the Stellenbosch Municipal Area and on the website: www.stellenbosch.gov.za from **14 March 2024** until **15 April 2024**. The Stellenbosch Municipality has confirmed that no comments were received from I&APs and stakeholders on the Draft IWMP during the commenting period from **14 March 2024** until **15 April 2024**.
3. The Municipality needs to provide specifics on how they are incorporating EPR schemes and working with relevant PROs into their plans.	In terms of the Extended Producer Responsibility Regulations, Producer Responsibility Organisations are obligated to collaborate and cooperate with municipalities to increase the recovery of identified products from municipal waste streams. As stated under Objective 1.2 of the Implementation Plan, Stellenbosch Municipality plans to partner with industry bodies like PROs to promote and ensure awareness and education of integrated waste management. This will be done by means of training programmes, workshops, and other related initiatives.
4. Are there any free services provided to residence at Drop-off facilities (see page 3).	The Refuse Removal Tariffs specify the tariffs charged for the disposal of different waste types and associated weight thresholds at each facility. Note that some

DEA&DP COMMENTS	RESPONSES PROVIDED BY PROJECT TEAM
	services are free. Refer to Table 2-23 of the IWMP.
5. Ensure that key projects w.r.t the OWDP is incorporated into the IWMP. On page 34 section 2.3.3.1 Organic Waste Diversion Plan it reads "the OWDP has not been implemented yet table 2-7 is about progress on implementation. Please clarify.	The Organic Waste Diversion Plan activities have been updated and included in the implementation plan of the IWMP. Note that the Organic Waste Diversion Plan has not been fully implemented. The IWMP has been updated to reflect this.
6. In table 2-7 on page 34 please clarify when organic waste separation and collection for all business and commercial areas will take place. Also please be aware that sludge may contain hazardous substances, and these must be analysed prior to being used to produce compost.	The implementation plan sets a target for 100% of the objectives and targets of the OWDP to be implemented by 2027. This includes the organic waste separation and collection for all businesses and commercial areas.
7. Income distributions must be included under the social profile section 2.2.1.	Noted. The income distribution of Stellenbosch Municipality has been included under section 2.2.2 *Economic indicators*.
8. The IWMP provides a comprehensive financial breakdown. However, on page 73 it is indicated that the indigent households or property owner thereof must pay a tariff. Are indigent households not supposed to receive free basic services? Kindly clarify whether this is accurate and/ or applies to indigent households that are not registered.	Indigent households received a monthly subsidy (determined by the Municipality) that is credited to their accounts. This is noted in Table 2-23 of the report.
9. Indicate the number of households that receive a free basic service.	The number of households receiving a free basic service has been included under section 2.2.2.4 *Service delivery*.
10. It is mentioned under 2.3.2, Waste collections services, that 17.9% of households not receiving solid waste collection services are located in farms/rural areas. Please provide details of these areas. Also indicate which farms/rural areas receive refuse removal services and mention the drop off facilities that they have access to.	The 17.9% not receiving solid waste collection services are located in farm/rural areas within Wards 19 and 20. According to Stats SA, majority of farm dwellings in Ward 19 and 20 (refer to Figure 2-9) receive below average refuse collection. It must be noted that the refuse collection service is offered to the farm owner and not to the farm dwellers. If the farm owners refuse the service unfortunately no service will be rendered to farm dwellers. The farms/rural areas have access to the three (3) drop off facilities in the SM: • Stellenbosch Landfill, • Klapmuts Transfer Station, and

DEA&DP COMMENTS	RESPONSES PROVIDED BY PROJECT TEAM
	• Franschhoek Waste drop off.
11. Please provide more information to Table 2-6 Municipal vehicles i.e. years in operation. Do they have a maintenance plan in place (external service provider) or do they conduct maintenance at municipal depots? Do they have a replacement policy/plan for these vehicles? Turn-around time for the servicing of vehicles.	The years in operation has been added for each vehicle listed in Table 2-6. Currently all mechanical repairs on equipment and vehicles are outsourced by the Municipality which has implications on turn-around times for servicing / repairing vehicles. Objective 2.3 of the implementation plan includes an action to develop a fleet management, maintenance, and replacement strategy to allow budgeting to take place.
12. Kindly indicate whether any informal salvaging takes place at the municipal facilities.	Currently no informal salvaging is allowed to take place at the municipal facilities. The construction of a new cell, Cell 4, at the Stellenbosch Landfill Facility is planned and it is expected it will start receiving waste towards the end of 2024. Objective 5.4 of the implementation plan relates to waste picker integration which will be achieved by developing a waste picker integration plan appropriate to the SM and in line with DFFE's guidelines upon re-opening of the landfill site as well as for street pickers.
13. Section 2.4.3.1 on page 57 mentions "VHK". Please write abbreviation out in full as well.	Noted. Vissershok Landfill (VHK) has been written out in full in Section 2.4.3.1.
14. Kindly indicate whether the two vacant Technician posts for the waste disposal section mentioned under 2.3.1.2 Technician posts have been appointed. The boxes in the organograms (Figure 2-4 to Figure 2-7) have a "T" in the corners that is not explained. How often is the Micro structure revised? The date indicated on page 27 is 21 September 2017.	The two Senior Technician posts have been filled. The "T" in the corner indicates the salary grading of the post. The Microstructure will be revised in 2024.
15. Kindly provide information on capital on historic and future expenditure forecasts as was done for operating expenditure.	Table 2-17 provides the Stellenbosch Budget Provision (as % split) for Solid Waste Management for next 10 financial years. Table 2-18 provides the CAPEX Budget for Solid Waste Management for next 10 financial years.

DEA&DP COMMENTS	RESPONSES PROVIDED BY PROJECT TEAM
16. The monitoring framework needs to be included in the final IWMP. Also, the NEMWA does not refer to an "annual monitoring report" but an "annual performance report".	The monitoring of the IWMP will be undertaken by means of the IDP review process. The detailed monitoring framework will be developed by the Stellenbosch Municipality and will be developed to align with IDP review timelines. Stellenbosch Municipality will identify the different tasks of the role players in monitoring and measuring and allocating specific tasks for the gathering of data and submission of reports. Noted. The reference to "annual monitoring report" has been amended to "annual performance report".
17. The draft IWMP addresses all the important aspects in relation to licensing and compliance of the Stellenbosch Municipality's waste management facilities. However, please include the locations for the waste management facilities where not provided.	The locations of the waste management facilities are provided as follows: – Stellenbosch Landfill Facility & Drop-off: Figure 2-10 – Klapmuts Transfer Station & Drop-off: Figure 2-11 – Stellenbosch Integrated Waste Management Facility & Drop-off: Figure 2-12 – Franschhoek Drop-off: Figure 2-13
18. The IWMP must make reference to the operational plan which addresses windblown litter; storm water, access control, compaction, water quality monitoring aspects across different facilities.	The following has been included under section 2.3.5, *Compliance audits*: *"In addition to inspecting whether the licence / permit conditions are adhered to, the external auditor reviews relevant data and information related to the specific operations and plans of each site and associated environmental impacts i.e. litter, stormwater management, access control, air & water quality monitoring etc. The auditors then recommend corrective actions to be implemented by the Municipality where partial or non-compliances are identified".*
19. The IWMP must include measures to capture waste related complaints as well as the statistics regarding the types and frequency of complaints received.	Noted. An action item requiring that a complaints register be maintained has been added to Objective 2.4 of the implementation plan.
20. Remaining airspace and lifespan have been identified as a gap and appropriate measures must be implemented to ensure that this need is realised.	Objective 4.3 includes an action to develop and implement a waste Infrastructure masterplan to guide the development and financing of waste facilities over the next 10 – 15 years and maximise available airspace.
21. The IWMP refers broadly into external audits including that as service provider has been secured for a 3-year period as well as mentions the last external audit report as being from March 2023. The last external audit report received by	Noted. *Section 2.3.5 – Compliance Audits* has been updated. External audits were undertaken by Resource Management Services on the **16**

DEA&DP COMMENTS	RESPONSES PROVIDED BY PROJECT TEAM
the Department is from November 2023. The section must be updated accordingly and must cite the issues identified as well as level of compliance in each facility. Non-compliances w.r.t internal and external audits must be mentioned as well as how these non-compliances will be addressed in the IWMP.	**April 2024** of the three waste management facilities, namely the Stellenbosch Landfill Facility (SLF), the Integrated Waste Management Facility (IWMF) and the Klapmuts Transfer Station (KTS). Compliance Assessment Tables of the Waste Facilities have been included as *Section 2.3.5.1.* Conclusions and Recommendations from External Audits (dated 16 Aprils 2024) undertaken by Resource Management Services 16 April 2024 have been included as *Section 2.3.5.2.*
22. Include the number of dumping sites, their location, period of existence as well as the costs of illegal dumping if known. Additionally, amend the graph that represents waste from illegal dumping activities to be more legible as similar colours have been used for other attributes too.	The information on the number, location, and period of existence of dumping sites is unknown. The operational cost for street cleaning, which includes illegally dumped waste, is shown in Table 2-19. Refer to Figure 2-33, the colours for the following attributes have been altered to ensure the graph is more legible: – Industrial – Illegal Dumping
23. Under 2.3.7 Projects to be undertaken in the 2023/2024 financial year please include only waste related projects.	Noted. All non-waste related projects have been removed.
24. Please note on page 51 last bullet that Under 2.4.1 waste tyres is managed by the Waste Bureau. Tyre dealers should be working with the Bureau and complying with the tyre regulations when managing their waste tyres.	Noted. The following note has been included under Section 2.4.2.1 *Updated Hazardous and Health Care Risk Waste Survey*: Waste tyres are managed by the Department of Forestry, Fisheries, and the Environment's Waste Bureau. Tyre dealers must comply with the Waste Tyre Regulations.
25. On page 54, figure 2-25 Organics is 37% whereas in the narrative above and figure 2-24 it is 38%. Please clarify.	Noted. The narrative has been updated to indicate that the major waste fraction is

DEA&DP COMMENTS	RESPONSES PROVIDED BY PROJECT TEAM
	organic waste (garden and food waste), which when combined makes up 37% of the waste sampled (by weight) for all areas.
26. On table 2-12 waste characterisation results please provide reasons for the changes in percentages of different waste categories from 2017 to 2023.	A waste characterisation provides a snapshot of the character of the waste stream at a point in time, as such studies undertaken at different times may present varying results for multiple reasons. The potential reasons for differences between the 2017 and 2023 studies are noted in the IWMP as follows: – The 2017 study followed a different methodology and included a much larger sample size covering most of the wards in the municipality. – The 2017 and 2023 studies took place in different seasons which can influence the percentage of garden/green waste. – The 2017 study focused on residential/household waste and not commercial or business waste.
27. Under 2.4.3.4 Organic Waste Tonnages, last paragraph, the municipality can compel industry/business to report on their diversion figures via their by-laws. By-laws should be amended to address this matter.	Objective 5.2 of the Implementation Plan requires the Municipality to collaborate with generators of organic waste in the commercial/industrial sector to ensure reduction and diversion from landfill. Objective 2.2 of the Implementation Plan includes an action item that requires the Municipality to implement a system to request Waste Management Plans from Businesses and Industry showing diversion including organic waste.
28. Under 2.4.3.6, page 65, Summary of waste flows, no tonnages were provided for household hazardous waste.	No household hazardous waste tonnages were recorded for 2022/2023.
29. Under 2.5.4 School recycling initiative programme, are there plans to extend the service to other schools within the municipal jurisdiction.	The following is included under Objective 1.2 of the implementation plan: – *"Ensure that the Strategy includes waste awareness campaigns to be undertaken at all schools so that all learners are provided with opportunity to be educated on good waste management practices.* – *Develop a programme to roll waste awareness out to remaining schools within the Municipality.* – *Provide all schools with an opportunity to participate in a recycling programme whether municipal or private".*

DEA&DP COMMENTS	RESPONSES PROVIDED BY PROJECT TEAM
30. Under section 2.6.11 Snapshot of the Municipality's Financial Position, 1st bullet, does the strong financial position also relate to waste management?	Section 2.6.1.1 refers to the Municipality's overall financial position. Sections 2.6.4 and 2.6.5 provide information of the financial performance of the Solid Waste Management Directorate.
31. On page 69 Table 2-17 please identify the year in which the capex budget will be spent over the 3-year period 2023 – 2026.	Noted. Table 2-17 and Table 2-18 provide a detailed breakdown of the SM Waste Management Capital Budget for the next ten financial years, highlighting the allocated capital budget in terms of overall capital expenditure plans for the Municipality as well as split in capital spend planning internal to Waste Management Directorate.
32. On pages 84 and 85, Institutional and organisational needs, please elaborate on the IDP process and the involvement of the waste officials.	Noted. The following has been added to elaborate on the IDP process and the involvement of the Municipal Waste Officials: *"Section 34 of the Municipal Systems Act requires that a municipality review its IDP annually following an assessment of its performance measures. The performance measures of the IDP are informed by municipal sectoral plans, to the extent that the deliverables of the IDP are directly linked to municipal sector plans. Like the IDP, municipal sector plans are subject to review periods. Alignment between sector plans and the IDP therefore allows for more effective performance measurement and budgeting integration for the municipality.* *Municipal Waste officials are responsible for providing an annual performance report, which feeds into the review of the IDP".*
33. On page 85 Identification of alternatives, please explain if the OWDP is approved by DEA&DP or the Municipality.	The Organic Waste Diversion Plan was approved by the Municipality in 2021. The Organic Waste Diversion Plan activities have been updated and included in the Implementation Plan of the IWMP.
34. On page 85 funding mechanisms, the municipality must consider partnerships with industry/private sector and the PROs w.r.t EPR schemes.	As stated under Objective 1.2 of the Implementation Plan, Stellenbosch Municipality plans to partner with industry bodies like PROs and other industry bodies to promote and ensure awareness and education of integrated waste management.

DEA&DP COMMENTS	RESPONSES PROVIDED BY PROJECT TEAM
35. On page 86, information from complaints register/public participation channels (IDP/Ward Councils etc) can also inform the Gaps and Needs section.	Noted.
36. On page 87 Transfer stations, has the municipality utilised the recommendations of the 2016 DEADP infrastructure report?	No, the Municipality has not utilised the recommendations of the 2016 DEADP infrastructure report.
37. In terms of waste minimisation initiatives, the municipality has a two-bag system to collect recyclables, as well as several drop-offs for recyclables, green waste, household hazardous waste, and e-waste. These sorted waste streams can be freely dropped-off to encourage use and thus diversion. They also have a swop shop and host open day events. In addition to this, it is recommended that the Organic Waste Diversion Plan (OWDP) is implemented to further divert organic waste, especially food waste.	Noted. The Organic Waste Diversion Plan activities have been updated and included in the implementation plan of the IWMP.
38. Although there are likely many private waste minimisation interventions taking place throughout the municipality, they are not listed or expanded on in the IWMP. No diversion figures from private entities are provided in the IWMP. The Municipality should obtain data from private initiatives to understand the full landscape of waste minimisation taking place throughout their municipal jurisdiction.	Objective 1.1 of the implementation plan includes an action for the municipality to undertake recycling and waste diversion campaigns with business and industry, including organic was separation. Objective 2.2 includes an action for the Municipality to implement a system to request Waste Management Plans from businesses and industry showing diversion of waste, including organic waste.
39. The IWMP has recognised the need to expand the separation at source (S@S) service and implement the Organic Waste Diversion Plan (OWDP). The need for continuous and expanded awareness is also highlighted. These gaps are supported. The MRF is operating well below capacity, so it will be good to see S@S expanded to maximise use of the facility.	Noted.
40. The Municipality has a strong waste minimisation focus and is doing well to divert many waste streams. The Municipality is encouraged to closely monitor and evaluate efforts to ensure that diversion is increasing. Effort must continue to further educate the public and ensure that services are maximised (e.g. where there is S@S, that the residents are correctly separating the items).	Objective 1.2 of the Implementation Plan details actions required to promote and ensure awareness and education of integrated waste management.

DEA&DP COMMENTS	RESPONSES PROVIDED BY PROJECT TEAM
41. Waste Pickers must be integrated by municipalities. The Municipalities or the PROs must remunerate them accordingly for services rendered w.r.t recycling. The Municipality currently has a system allowing brick reclaimers to salvage bricks from C&D waste, and this is working well.	Noted. Objective 3.2 of the Implementation Plan includes an action item for the Municipality to implement a Waste Picker Integration Plan. It must be noted that the Extended Producer Responsibility Regulations do not require municipalities to remunerate waste pickers.
42. The objectives and targets in the plan are well defined and aligned. The implementation table corresponds to the identified gaps and is reflected on Table 4-1 (starting on page 92). These are supported by the Department, and we look forward to seeing the implementation of these plans to enhance waste minimisation.	Noted.
43. The registration of waste activities is not mentioned in the IWMP; however, the municipality has three (3) waste activities registered on the IPWIS. The three (3) registered waste activities are: Stellenbosch Garden Waste WIR number D04073-04, Stellenbosch Recovery D04073-02 and Stellenbosch Disposal D04073-01. This information needs to be included in the final IWMP.	The following has been included under Section 2.4.3 *General waste quantities:* The waste tonnages and type of waste reclaimed and disposed of are reported to the Western Cape Integrated Pollutant and Waste Information System (IPWIS). The following waste activities are registered on the IPWIS: • Stellenbosch Garden Waste WIR number D04073-04 • Stellenbosch Recovery D04073-02 • Stellenbosch Disposal D04073-01