Makhado Local Municipality

Integrated Waste Management Plan

Draft

Development of municipality integrated waste management plans for Makhado Local Municipality for a period of six months

Project reference: 301/2024

Date: 28 February 2025

Development of municipality integrated waste management plans for Makhado Local Municipality for a period of six months

Prepared for:

Prepared by:

MOSA GREEN
CONSULTING

Sponsored by:

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
ECONOMIC DEVELOPMENT, ENVIRONMENT & TOURISM

Project information & Document Control

Project information	
Project Title	Development of municipality integrated waste management plans for Makhado Local Municipality for a period of six months
Document title	IWMP
Document ID	MOSA_EDET_MLM_003
Report status	Draft

Quality Control				
	Name	**Designation**	**Signature**	**Date**
Author	**Karabo Phogole Tjale**	Senior Environmental Scientist		24/02/2025
Review	**Lehlogonolo Moseri**	Senior Environmental Scientist lead specialist		24/02/2025
Review & Approval	**Judith Mbharima**	Waste Management & Sustainability specialist		27/02/2025

Client Distribution and Approval				
Name	**Organisation**	**Designation**	**Signature**	**Date**
T. Maselela	LEDET	Deputy Director: General Waste Management		

TABLE OF CONTENTS

List of tables

List of figures

Table 1: List of abbreviations/acronyms

List of Abbreviations / Acronyms	
DFFE	Department of Forestry, Fisheries and the Environment
NDP	National Development System
NWMS	National Waste Management Strategy
IDP	Integrated Development Plan
IWM	Integrated Waste Management
IWMP	Integrated Waste Management Plan
LEDET	Limpopo Economic Development, Environment and Tourism
NEMA	National Environmental Management Act, Act No. 107 of 1998
NEM: WA	National Environmental Management: Waste (Act 59 of 2008)
HCRW	Health Care Risk Waste
MEC	Member of Executive Council
SAWIC	South African Waste Information Centre
SAWIS	South African Waste Information System
MLM	Makhado Local Municipality

DEFINITIONS

Table 2: Table of definitions

Word	Description
Department of Forestry, Fisheries and the Environment	This is a government department responsible for managing and regulating various aspects of South Africa's environment, including forestry, fisheries, and environmental protection.
National Development System	The NDP is a long-term vision document that outlines South Africa's development goals and strategies for achieving a more equitable and prosperous society. It covers a broad range of sectors, including education, healthcare, employment, infrastructure, and environmental sustainability. The NDP is often considered the cornerstone of South Africa's national development framework.
National Waste Management Strategy 2020	The NWMS is a strategic plan that guides waste management policies and practices in South Africa. It outlines the country's goals for sustainable waste management, including waste reduction and recycling targets.
Integrated Development Plan	An integrated development plan is a strategic planning document used by South African municipalities to outline their development goals, objectives, and
Integrated Waste Management	An integrated waste management is a holistic approach to waste reduction, which includes the reduction, collection, disposal, and recycling of waste in an environmentally responsible and sustainable manner
Integrated Waste Management Plan	An integrated waste management Plan is a comprehensive strategy that outlines how a municipality or organization intends to manage its waste, including waste reduction, recycling, and disposal methods.

Word	Description
Limpopo Economic Development, Environment and Tourism	LEDET is a government department in Limpopo, South Africa, responsible for economic development, environmental protection, and tourism promotion in the region.
National Environmental Management Act, Act No. 107 of 1998	NEMA is a South African environmental law that provides a framework for managing and protecting the environment, including natural resources and ecosystems.
National Environment Management: Waste Act, 2008	This is an environmental law in South Africa that focuses on the management of waste and aims to promote responsible waste management practices.
National Environmental Management: Waste Act, 2014	This is an updated version of the NEMWA that strengthens regulations and provisions related to waste management in South Africa.
Health Care Risk Waste	This refers to waste generated in healthcare facilities that may pose a risk to human health or the environment, such as infectious materials or hazardous chemicals.
South African Waste Information Centre	The South African Waste Information Centre (SAWIC) is a centralized and comprehensive information hub dedicated to collecting, managing, and disseminating data and information related to waste management and environmental conservation. SAWIC serves as a repository for various types of waste-related data, including statistics on waste generation, recycling rates, landfill usage, and other pertinent information. This organization's primary goal is to provide reliable and up-to-date waste-related information to government agencies, organizations, researchers, and the public, supporting evidence-based decision-making and policies aimed at improving waste management and environmental sustainability in South Africa.

Word	Description
South African Waste Information System	The South African Waste Information System (SAWIS) is a comprehensive and integrated data management and reporting system used in South Africa to collect, manage, and analyse information related to waste generation, disposal, recycling, and other aspects of waste management. SAWIS is designed to provide accurate and up-to-date data for decision-making, monitoring compliance with environmental regulations, and developing strategies for sustainable waste management practices in South Africa.

EXECUTIVE SUMMARY

The Integrated Waste Management Plan (IWMP) for Makhado Local Municipality (MLM) provides a structured and strategic approach to addressing the municipality's waste management challenges while aligning with provincial and national waste management objectives. Developed in collaboration with the Department of Economic Development, Environment, and Tourism (LEDET), this initiative supports municipalities in designing and implementing waste management strategies in accordance with national legislative mandates.

A comprehensive Situational Analysis was conducted to assess the municipality's waste landscape, taking into account demographic trends, waste generation patterns, and existing infrastructure. The IWMP establishes clear, measurable objectives, focusing on enhancing waste service delivery, strengthening institutional capacity, and ensuring regulatory compliance.

Stakeholder engagement has played a pivotal role throughout the IWMP's development, ensuring an inclusive, consultative process that incorporates diverse viewpoints. Key recommendations include expanding public awareness initiatives, improving waste management infrastructure, and promoting waste reduction, reuse, and recycling strategies to drive sustainable waste practices. To ensure the plan's effectiveness and adaptability, a robust monitoring, evaluation, and review framework is essential. Annual reviews are recommended to assess progress, maintain stakeholder engagement, and refine strategies as needed.

Ultimately, the IWMP serves as a strategic roadmap for establishing a resilient and sustainable waste management system in MLM. Through collaborative efforts, regulatory compliance, and proactive waste management interventions, the municipality aims to create a cleaner, healthier environment while fostering long-term sustainability and community well-being.

1. INTRODUCTION

The Limpopo Department of Economic Development, Environment, and Tourism (LEDET) is committed to supporting seven municipalities in the development of their Local Municipal Integrated Waste Management Plans (IWMPs). This initiative aligns with Section 11(4) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) and is designed to assist municipalities in establishing effective, compliant, and sustainable waste management strategies. By aligning these plans with the National Waste Management Strategy (NWMS), LEDET aims to foster an integrated and environmentally responsible waste management system across the province.

As part of this initiative, Makhado Local Municipality has been selected to develop its IWMP, with Mosa Green Consulting appointed as the professional service provider facilitating the process. This project is a key step in helping municipalities formulate structured, long-term waste management strategies that comply with national regulations while addressing local challenges. Mosa Green Consulting will play a critical role in guiding Makhado Municipality through the development of a comprehensive, practical, and sustainable IWMP.

The primary objective of the IWMP for Makhado Local Municipality is to assess the current state of waste management and develop strategies for improvement over the next five years. In alignment with the National Waste Management Strategy (NWMS) of 2020, the plan aims to integrate and optimize waste management practices, ensuring efficiency, cost-effectiveness, and minimal environmental impact. Key focus areas include:

- Reducing waste generation at the source
- Enhancing recycling and resource recovery initiatives
- Ensuring safe and compliant waste disposal
- Strengthening institutional capacity and enforcement
- Engaging communities through public education and awareness programs

By implementing these strategies, the IWMP seeks to improve service delivery, environmental sustainability, and overall quality of life for residents of Makhado Local

Municipality. A robust monitoring and evaluation framework will be established to track progress, measure effectiveness, and refine strategies as needed.

Ultimately, the IWMP serves as a strategic blueprint for building a resilient, sustainable, and well-regulated waste management system in Makhado. Through collaboration, innovation, and community engagement, the municipality aims to achieve long-term sustainability and environmental stewardship.

1.1. Definition of waste

The Waste Act defines waste as follows:

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

b) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste-

I. once an application for its re-use, recycling or recovery has been approved or, after such approval once it is, or has been re-used, recycled or recovered;

II. where approval is not required, once a waste is, or has been re-used, recycled or recovered;

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

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

1.2. Integrated Waste Management Plan Development Process

The primary aim of IWMPs is to consolidate and streamline waste management planning within the province to maximize effectiveness while minimizing environmental impacts and financial costs. This effort also seeks to enhance the overall quality of life for all South Africans. In addition to the Waste Act, two documents were considered when developing this IWMP. The first is the Department of Environmental Affairs (DEA) Guideline for the Development of Integrated Waste Management Plans (IWMPs). Below is the adopted process in order, which was used for integrated waste management planning.

1. Situational analysis
2. Desired and state
3. Identify and evaluate alternatives
4. Select preferred alternatives
5. Implementation plan
6. Monitoring & Review

The second is a guideline titled "Integrated Waste Management Planning (IWMP), A Guide for Waste Management Planning", developed by DEA&DP which consists of two volumes:

- Volume 1: Conducting a Status Quo Analysis; and,
- Volume 2: Section A: Identification of Waste Management Needs and Objectives

  Section B: Development, Implementation and Evaluation of IWMPs

2. SITUATIONAL ANALYSIS

2.1. SCOPE AND PURPOSE OF THE SITUATION ANALYSIS

The initial phase of any Integrated Waste Management Plan (IWMP) involves a comprehensive situation analysis. It's crucial to recognize that this analysis provides a snapshot of the present state of waste management. Given the dynamic nature of legislative adjustments and continuous operational shifts, the situation analysis is in a constant state of evolution. It is imperative to conduct a thorough review of the situation analysis, at least aligning with the five-year IWMP review, considering all facets of waste management, encompassing aspects such as waste infrastructure, institutional capacity, and the financial aspects of waste management services.

2.2. METHODOLOGY

The investigation into the situational analysis followed the subsequent methodology:

(i) Comprehensive records from the Municipality's Waste Management Section were acquired for the study's purposes.

(ii) Municipality site visits occurred on November 8th and 9th, with interviews conducted with relevant representatives.

(iii) On the specified dates, all areas within the study were personally visited to gain first hand insights into the current status of waste management services.

(iv) Site visits on the same dates included inspections of waste infrastructure, particularly waste disposal sites.

(v) Waste characterisation studies were done on the municipal landfills

(vi) Financial details pertaining to waste management were extracted from the Final Reviewed IDP Budget 2022/2023.

(vii) General information was gathered as part of the investigative process obtained from the Makhado Local Municipality Final IDP (2022/2023) and STATS SA 2022 data

(viii) Mosa Green Consulting ensured that this situational analysis report includes the following information, as outlined in Chapter 3, Section 12 of the Waste Act.

3. GEOGRAPHIC AREA

Spanning an extensive area of 8,567.38 km² within the Vhembe District in Limpopo Province, South Africa, Makhado Local Municipality is bordered by Musina to the north, Thulamela to the east, Collins Chabane to the southeast local municipalities (see Figure 1). Its major towns include Louis Trichardt, Dzanani, Waterval, and Vleifontein.

According to the 2022 Census, Makhado has a population of approximately 502,397, making it the second most populated municipality in the district after Thulamela. The demographic composition is predominantly Black African at 96.6%, followed by White at 2.4%, with Indian and Coloured populations representing 0.7% and 0.3%, respectively. Furthermore according 2011 Census, the majority of residents in the municipality speak Tshivenda as their first language (67.3%), followed by Xitsonga, spoken by 21.9% of the population, Sepedi, Afrikaans and English and others making up the small percentage of the languages spoken there.

The municipality has a diverse economic base, with key sectors including Agriculture, forestry & fishing, Mining & quarrying, Manufacturing, Construction, Wholesale & retail trade, catering & accommodation, Transport, storage & communication Finance, insurance, real estate & business services, General government, Community, social & personal services. Tourism which falls under catering & accommodation has become increasingly significant in Makhado, supported by the municipality's rich cultural heritage and natural beauty, along with its proximity to the N1 highway. Notable attractions include the Schoemansdal Museum, Albasini Dam, Dzata Ruins, and the Breathing Stone. Makhado also features several tourism routes, such as the Ivory Route, Ribolla Open Africa Route, Greater Mapungubwe Route, Soutpansberg Birding Route, and Wyllie's Poort route, offering travellers scenic detours to enjoy the beautiful landscapes unique to Makhado.

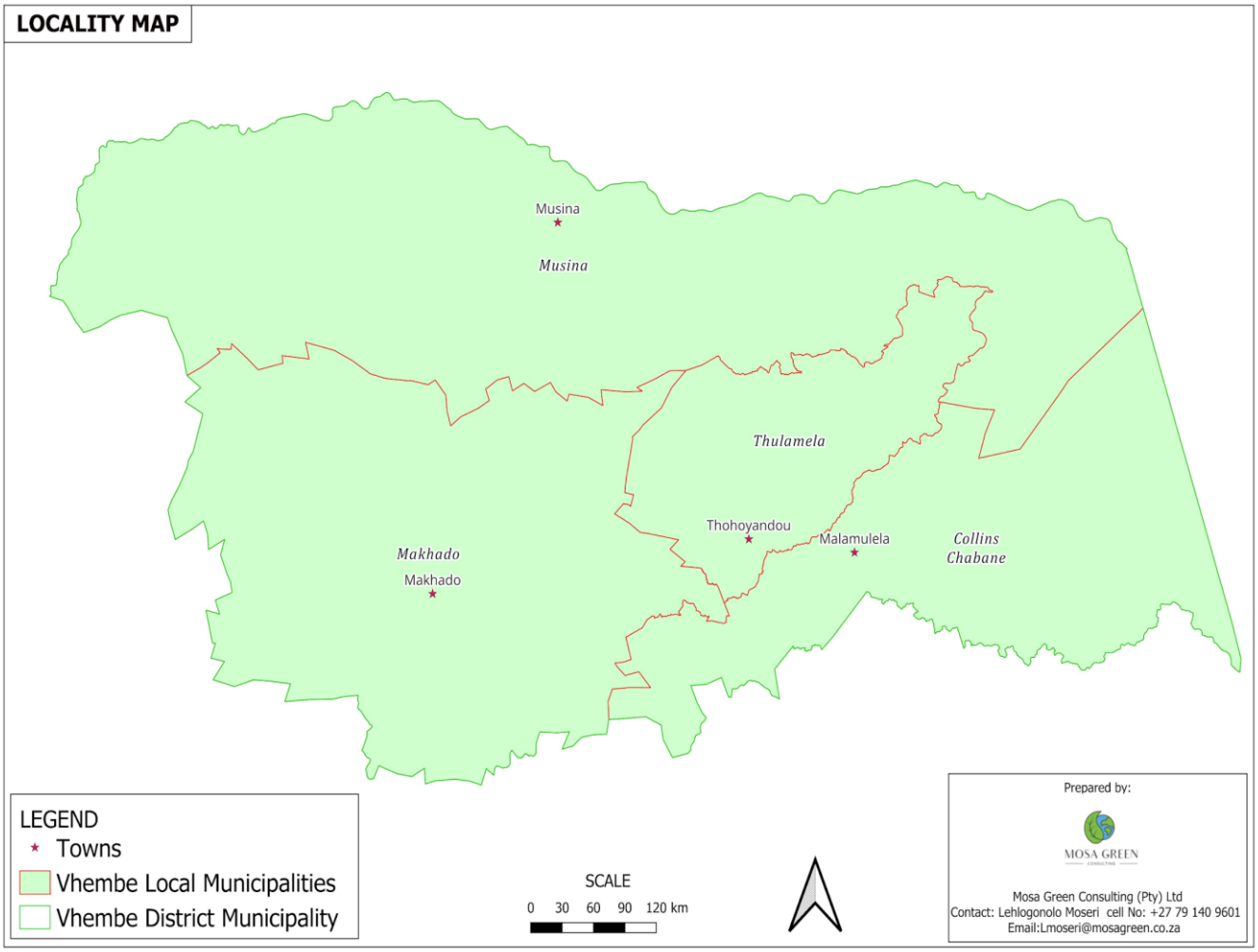

Figure 1: Vhembe District Municipality locality map

3.1. LOCALITY OF MAKHADO LOCAL MUNICIPALITY

Makhado Local Municipality covers an area of 8,567.38 km² within the Vhembe District in Limpopo Province, South Africa. It is bordered by Musina to the north, Thulamela to the east, and Collins Chabane to the southeast. Major towns include Louis Trichardt, Dzanani, Waterval, and Vleifontein.

Tourism being the emerging sector is supported by Makhado's rich cultural heritage, natural beauty, and proximity to the N1 highway. Key attractions include the Schoemansdal Museum, Blouberg Nature Reserve Albasini Dam, Dzata Ruins, and the Breathing Stone. The municipality also features tourism routes like the Ivory Route, Ribolla Open Africa Route, Greater Mapungubwe Route, Soutpansberg Birding Route, and Wyllie's Poort route.

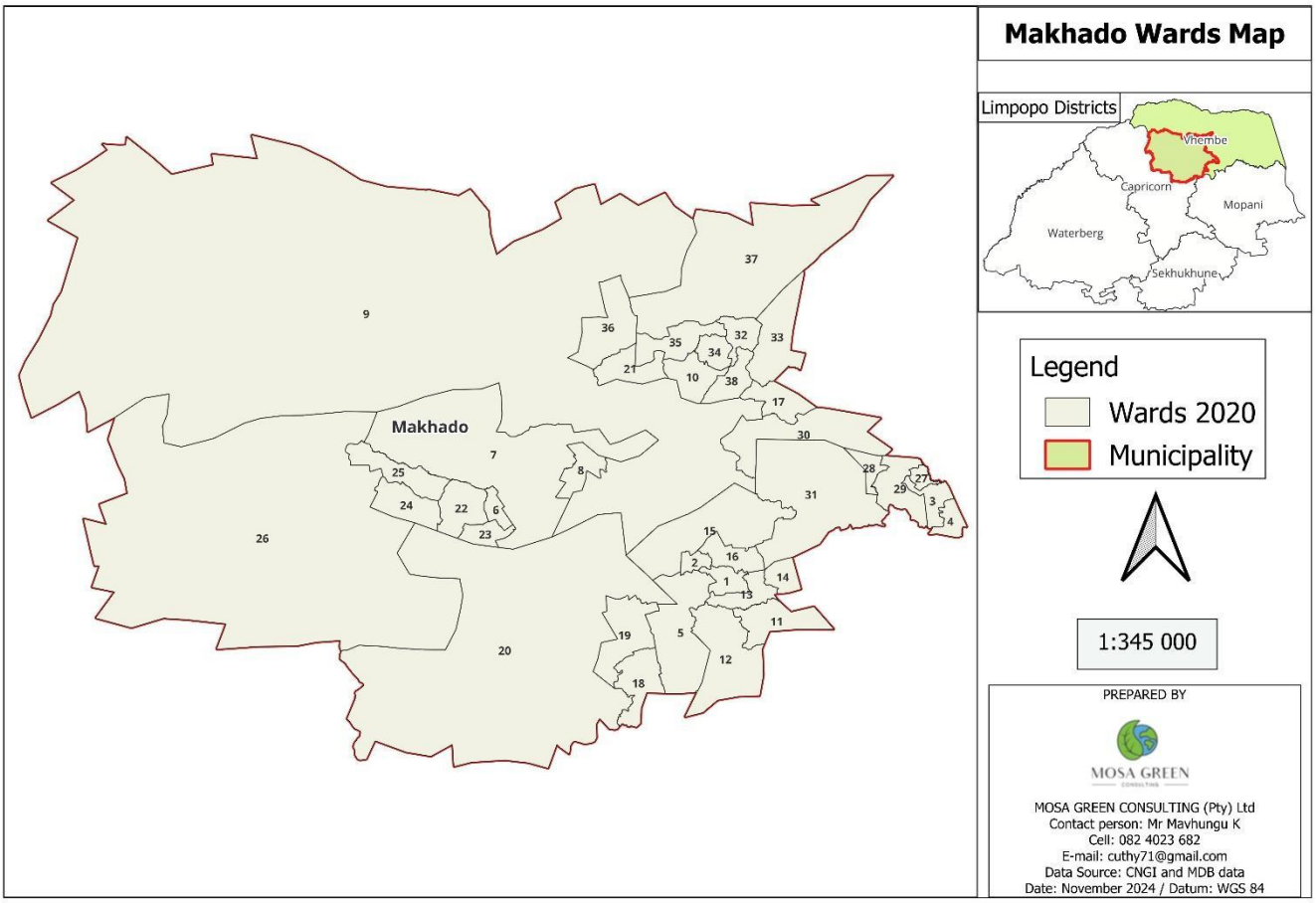

Figure 2: MLM locality map & wards

3.2. DEMOGRAPHICS AND POPULATION GROWTH

3.2.1. DEMOGRAPHIC – POPULATION AND PROFILE

The demographic landscape and developmental characteristics of Makhado Local Municipality together offer a comprehensive depiction of its population. Demographics encompass a diverse set of elements that portray the makeup of a population in a specific time and place. These elements include gender, race, age, socioeconomic status, household distribution, poverty rates, educational attainment, and employment status, among others.

In the context of waste management, demographic data plays a crucial role in accurately forecasting both current and expected waste volumes. This information is vital for various reasons, including the precise assessment of present waste generation and the anticipation of future trends in waste production.

As per the guidelines outlined by the Department of Environmental Affairs (DEA) Integrated Waste Management Plan (IWMP) in 2009, demographic data is indispensable for projecting current and future waste quantities. Moreover, this data is essential to:

- Ensure the inclusion of previously underserviced areas, such as informal settlements and sparsely populated rural regions.
- Form the foundation for estimating waste volumes and types in the projections.
- Evaluate the potential for financial recovery in waste management initiatives.
- Assess the necessary resources for providing waste management services and developing related infrastructure.

3.2.1.1. POPULATION SIZE AND DISTRIBUTION

The information has been sourced from Statistics South Africa, specifically the 2022 Census records and the Makhado Local Municipality (MLM) IDP Final Review (March 2024).

According to Stats SA's 2022 Census data, MLM has a total population of 502 397 across 140 338 households. This represents a 22% increase from the 2011 population of 411 353. This population growth is likely influenced by the municipality's recent economic development, notably with the establishment of the Makhado and Madombinzha malls.

The demographic data for Makhado Local Municipality from 2011 to 2022 indicates a notable growth in the total population. In 2011, the population stood at 411 353, it experienced a substantial increase to 502 397 by 2022. This growth may be indicative of a range of factors such as migration patterns, natural population increase, or local economic development initiatives.

Furthermore, in table 3 the examination of gender distribution within the population shows a slight increase in the male population, as reflected in the sex ratio (calculated as the number of males per one hundred females). In 2011, the sex ratio was 86.3, meaning there were 86.3 males for every one hundred females. By 2022, this ratio had risen to 88.7, indicating an increase of approximately two males per hundred females from 2011's sex ratio. This rise in the male population suggests potential demographic shifts or gender-specific factors.

The upward trend in the sex ratio points to a shift in the demographic composition, possibly influenced by factors such as economic opportunities, social dynamics, or migration patterns attracting a greater number of males to the municipality.

Table 3: Sex ratio 2022 and 2011 (Stats SA 2022)

Year	Sex ratio
2022	88,7
2011	86,3

Table 4 and figure 3 below demonstrate the demographic breakdown by racial groups in the population reveals a predominantly Black African composition, accounting for a substantial 96,6% of the total. The White population represents 2.4%, the Indian/Asian demographic comprises 0.7% while Coloured community make up a minimal 0.3%, and a negligible fraction falls under the "Other" category. This distribution highlights a significant majority of Black African residents within the community. While the representation of other racial groups is comparatively lower, acknowledging this diversity is crucial for fostering inclusivity and understanding the demographic fabric of the population. It also emphasizes the importance of considering the unique needs and perspectives of each racial group in the formulation of policies and services to ensure equitable and comprehensive community development.

Table 4: Racial distribution of the MLM population

Racial Group	Frequency	Percentage (%)
Black African	484 729	96,6
White	12 118	2,4
Indian/Asian	3 368	0,7
Coloured	2 991	0,3
Other	195	0,0

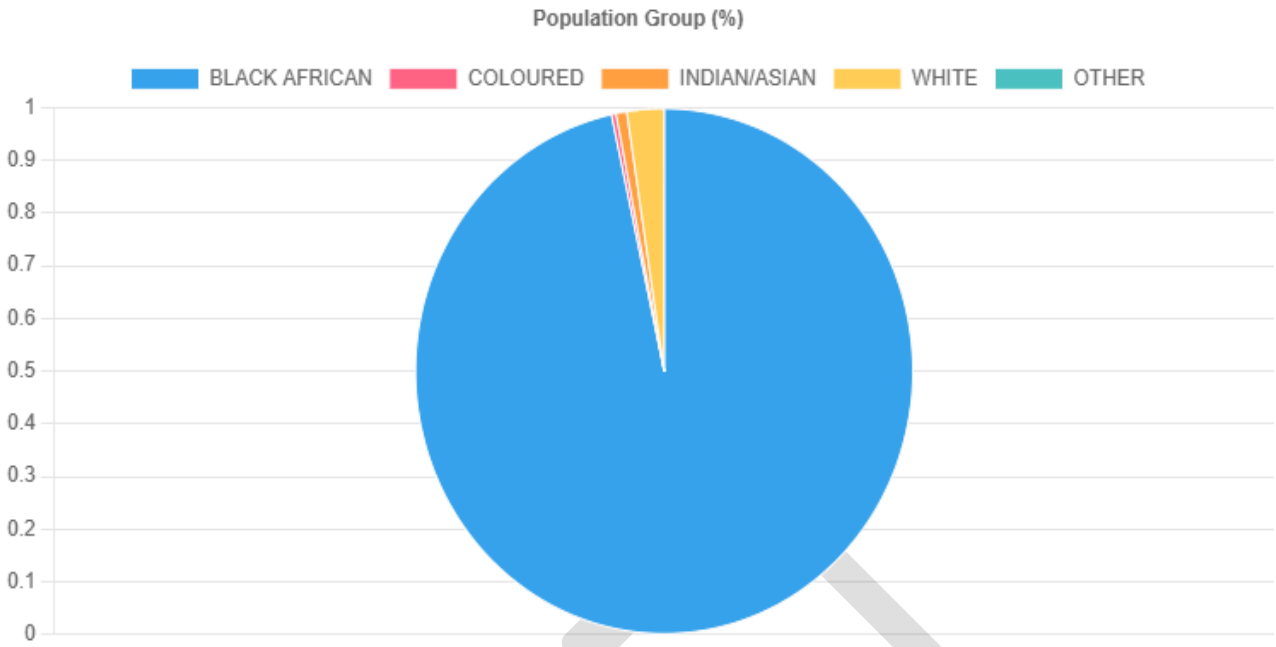

Figure 3: Graph of the race population distribution

3.2.1.2. HOUSE HOLDS AND LIVING CONDITIONS

Table 5: Number of households (Stats SA 2022)

Year	Number of Households
2022	140 338
2011	107 733

Table 5 above indicates the data on the number of households in Makhado Local Municipality indicates a substantial increase from 107 733 households in 2011 to 140 338 households in 2022. This significant growth, representing a surge of about 30.26% The possible reason for the increase in population at that rate is that include the growth in economic development within the municipality notably with the introduction of shopping centres in recent years such as Makhado and Madombinzha malls . The rise in the number of households carries implications for various aspects of municipal planning and service provision.

The increased demand for housing implies a need for corresponding infrastructure development, including utilities, waste management, and social services. This growth highlights the importance of adaptive urban planning and resource allocation to accommodate the expanding residential areas. Additionally, it prompts

considerations for sustainability, environmental impact, and community welfare, necessitating a comprehensive approach to municipal development.

The municipality may benefit from a thorough examination of the specific factors contributing to this surge in household numbers. Understanding the drivers behind this growth can guide targeted policies and initiatives, ensuring that the infrastructure and services provided align effectively with the evolving needs of the population. Regular updates and assessments of such demographic data are crucial for informed decision-making and sustainable development within the municipality.

Table 6: Formal dwellings (Stats SA 2022)

Name	Frequency	%
Formal dwelling	132 944	94,7
Traditional dwelling	4 469	3,2
Informal dwelling	2 664	1,9
Other	261	0,2

Note: Formal dwellings include houses or brick structures on separate stands or farms, flats, cluster houses in complexes, townhouses, semi-detached houses, backyard rooms, and flatlets or servants' quarters. Natural dwellings structures built from natural materials using techniques passed down through generations. Informal dwellings include shacks in backyards, squatter settlements, or on farms. Other dwellings include caravans, tents, and similar structures.

The table 6 reveals that the municipality has a high rate of formal housing, with 94.7% of residents living in formal dwellings. This majority figure suggests robust infrastructure and urban planning within the municipality, with most residents residing in stable, permanent housing such as standalone houses, apartments, and other formal structures.

In contrast, traditional dwellings make up 3.2% of the housing, typically constructed with indigenous materials and methods and commonly located in rural areas. The presence of traditional dwellings, it reflects a degree of cultural retention and serves

populations in more rural parts of the municipality where traditional building practices remain relevant and accessible.

Informal dwellings make up 1.9% of the housing types, including shacks and other non-permanent structures in backyards or informal settlements. While this percentage is relatively low, other housing types, such as caravans or tents, comprise just 0.2% of the population, highlighting that only a very small segment of residents relies on temporary or unconventional dwellings.

3.2.1.3. AVERAGE HOUSE HOLD INCOME

Table 7: Average household income (Socio-Economic Profile Makhado Municipality,2021)

	Average household income (2019)	Average household income growth (2016-2019)
Makhado	R936	1.94%
South Africa	R166,641	1.83%

Table 7, illustrates the average monthly household income (in current prices) within the Makhado Municipality compared to South Africa's national average in 2019, while also analysing their growth rate from 2016 to 2019. During this period, households in Makhado Municipality experienced an annualized growth rate in average monthly income of 1.94%, surpassing the national growth rate of 1.83%.

These findings highlight the ongoing economic development within the municipality, providing valuable insights for municipal planning and resource allocation to address varying economic needs effectively. A comprehensive understanding of these income dynamics is crucial for designing targeted social programs and promoting equitable development throughout the municipality.

3.2.1.4. AGE AND GENDER DISTRIBUTION

Referring to Table 8 provided below, a substantial majority (89.5%) of the population falls within the youthful age bracket of 0–64 years , while the minority aged 65 and older make up only 10.5% of the population (Census, 2022). This age distribution highlights the need for government departments and the municipality to prioritize significant budget allocations to Social Development Facilities. Such allocations are essential to meet the needs of the predominantly youthful population and to support skill development, guiding individuals in this age group toward becoming productive with thus ensuring economic growth.

Additionally, a critical component of the municipality's developmental agenda—executed in collaboration with sectoral departments such as Education, Health, Public Works, Roads, and Transport must focus on creating expanded job opportunities to support the economic integration of this demographic.

Table 8: Age vs gender distribution (Stats SA 2022)

Age	**0-14**		**15-19**		**20-39**		**40-59**		**60-85+**	
Gender	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Percent (%)	15,7	15,6	4,3	4,1	14,7	15,6	8,6	10,9	3,8	6,7

3.2.1.5. EDUCATION AND EMPLOYMENT STATUS

Table 9 and Figure 4 below present a breakdown of the educational attainment levels within the Makhado Local Municipality, detailing the number of individuals with primary, secondary, and tertiary qualifications, as reported by the 2022 STATS SA Census. This data provides a comprehensive view of the community's educational profile, highlighting both its strengths and areas that warrant improvement.

The distribution of educational levels reveals that a considerable portion of the population has completed only "Some Secondary" education, suggesting a potential gap in secondary school completion rates. Additionally, the prevalence of individuals with "No Schooling" or only "Some Primary" or "Completed Primary" education levels signals areas requiring targeted attention to strengthen foundational academic skills.

To address these educational challenges, a multifaceted strategy is recommended. Key initiatives should aim to enhance access to primary education, promote higher secondary school completion rates, and create accessible pathways to tertiary education. This approach could involve community outreach programs, advocacy for supportive educational policies, and partnerships with external stakeholders, such as non-profit organizations and businesses. Additionally, specific efforts should focus on identifying and addressing any disparities in educational attainment to ensure equitable opportunities for all community members.

Developing a robust monitoring and evaluation system will be essential to track progress and adapt strategies as educational needs evolve. Ultimately, a comprehensive approach addressing the full educational spectrum—from primary to tertiary education—will be critical in cultivating a well-educated, empowered community.

Table 9: Educational levels of population (Stats SA 2022)

Name	Frequency	%
No Schooling	43 864	16,2%
Some Primary	18 223	6,7%
Completed Primary	9 186	3,4%
Some Secondary	87 690	32,5%
Grade 12/Std10	81 290	30,1%
Higher Education	27 302	10,1%
Other	2 451	0,9%

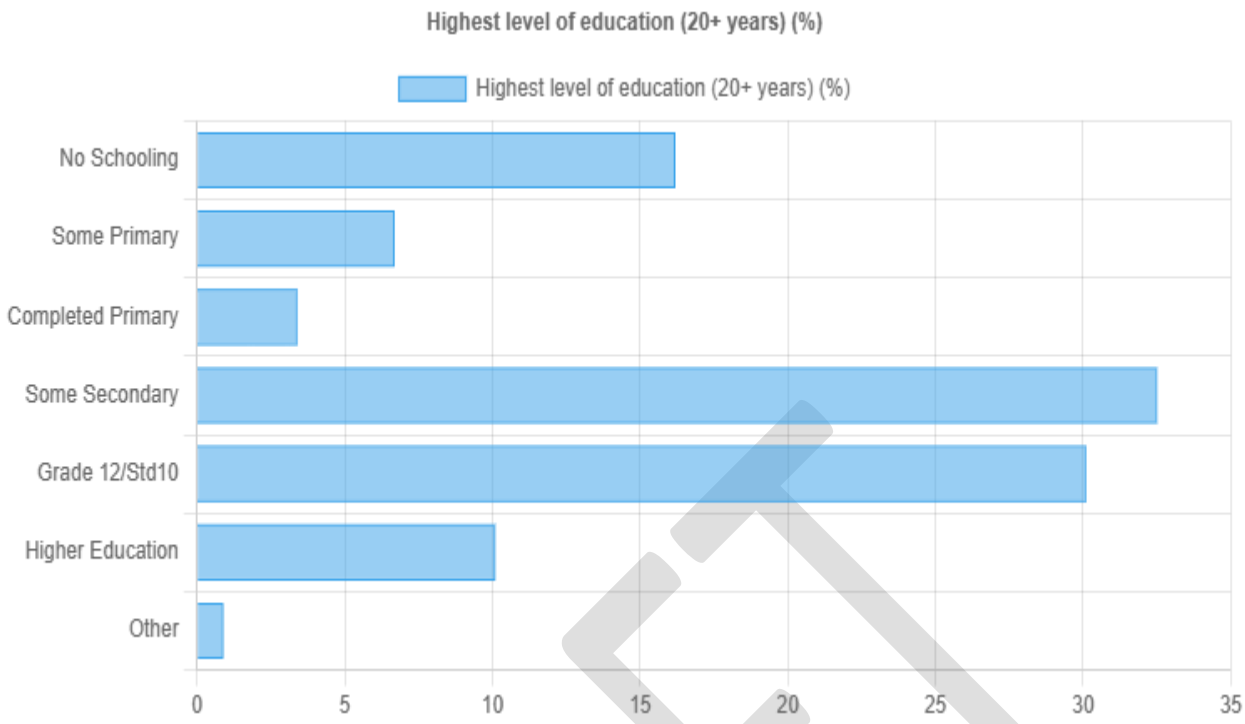

Figure 4: Graph of the highest level of education acquired (Census 2022)

3.2.1.6. ECONOMIC AND SOCIAL STATUS

Employment Status

Table 10 outlines key labour indicators—unemployment rate, labour force participation rate, and labour absorption rate—between Makhado Municipality and South Africa for 2019. Under Statistics South Africa's narrow definition, the unemployment rate is the percentage of individuals in the labour force who are unemployed. The labour force participation rate represents the share of the working-age population (ages 15 to 64) that is economically active, while the labour absorption rate reflects the proportion of this group that is employed.

In 2019, Makhado Municipality reported an unemployment rate of 35.91%, which is lower than the national rate. Additionally, 45.11% of the municipality's working-age population was economically active, and 28.13% were employed. As illustrated in Figure 5, the Makhado Municipal area employed a total of 75,955 people in 2019.

Table 10: Unemployment profile, 2019 (Socio-Economic Profile Makhado Municipality,2021)

	Unemployment Rate	Labour force participation rate	Labour absorption rate
Makhado	35.91%	45.11%	28.13%
South Africa	38.26%	44.3%	26.56%

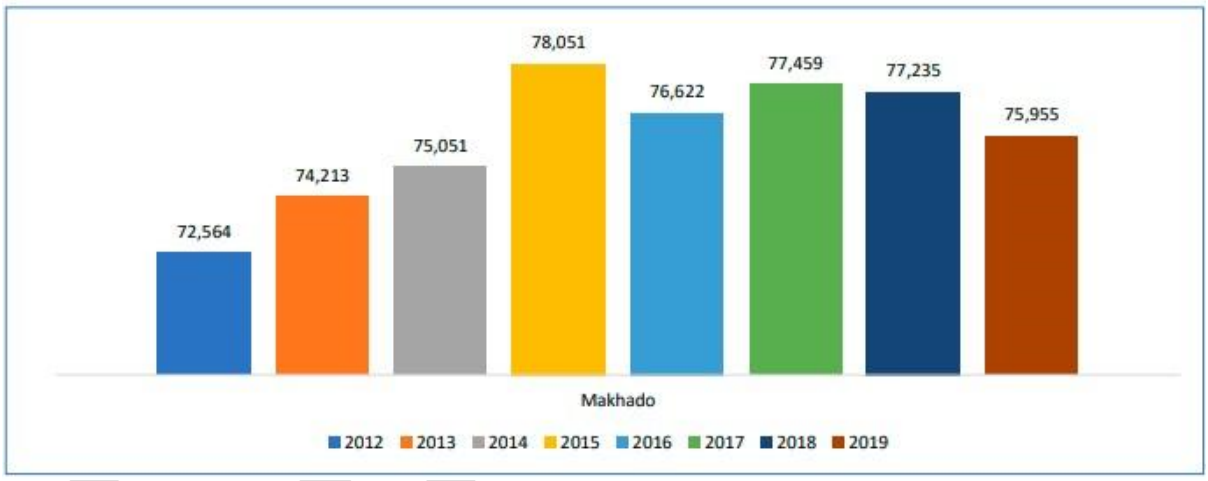

Figure 5: MLM number of jobs, 2012-2019(Socio-Economic Profile Makhado Municipality,2021)

4. WASTE GENERATION AND CHARACTERISATION

4.1. WASTE CHARACTERISATION

Waste characterisation is defined as the process of defining, identifying, categorizing, and quantifying the various types of waste generated in a specific area. The primary aim of waste characterisation is to establish a comprehensive understanding of the composition of the waste stream, a critical factor for facilitating effective waste management and informing environmental planning strategies.

The waste characterisation process was conducted to determine the weight percentage of each sub-category within the waste stream, such as various types of plastics and paper. This initiative offers a detailed breakdown of the composition of waste collected from households or commercial outlets, specifically highlighting the proportions of different materials present.

Mosa Green Consulting determined the quantities, and the types of waste generated in the municipality. This involved establishing the current quantities of waste generated, recycled, treated and disposed of. Waste quantities were measured by mass (kilograms or tons).

4.1.1. WASTE PROFILE (WASTE QUANTITIES & TYPES)

As outlined in the Guidelines for the development of Integrated Waste Management Plans (IWMPs), the Municipality is responsible for identifying and quantifying the various categories of waste within its administrative boundaries. This entails evaluating the present volumes of waste produced, recycled, treated, and disposed of, usually quantified in terms of mass, measured in kilograms or tons.
Data was collected from various sources, including:

- Municipal Waste officials on December 5th, 2024.
- Examination of Integrated Development Plan (IDP) and municipal records (**IDP 2022/2023).**
- A waste characterization study conducted by the Mosa Green Consulting team at the MLM landfill site.

Various waste types, including plastic (including PET and HDPE), paper, food, metal, cardboard, diapers, glass bottles, textile, mixed waste, and polystyrene, are classified as general waste. These are generated within the Makhado Local Municipality (MLM) and disposed of at the Makhado Landfill site.

4.1.2. WASTE CHARACTERISATION METHODOLOGY

The following is a short description of the waste characterisation methodology followed in the execution of the project:

I. Data Collection Methodology

There was weighbridge at the landfill site, MLM utilized the DEA&DP gate control sheet to record waste entries. This sheet had been developed to assist municipalities without weighbridges in quantifying their waste.

- Samples were taken from various trucks arriving from different locations throughout the municipality.
- From each truck, the contents were separated into different waste streams (waste types) using black bags, which were then weighed.
- The results of the waste characterization were presented below.

II. Projections and Future Waste Quantities: Based on the study's findings, projections for future waste quantities by considering population growth, economic trends, and other relevant factors was made. This will aid in long-term waste management planning.

Table 11: Mass of waste types

Waste Category	Amount of waste (Kg)	%
PET	38,60	6,02
HDPE	41,40	6,45
mixed plastic	23,40	3,65
white paper	34,40	5,36
mixed paper	36,00	5,61
food waste	36,10	0,69
Alu cans	4,40	0,69
Cardboard	33,50	5,22
Diapers	41,00	6,39
Glass	16,60	2,59
Textiles	22,40	3,49
Mixed Polystyrene	7,80	1,22
food waste	56,00	8,73
nonrecyclables)	250,00	38,97

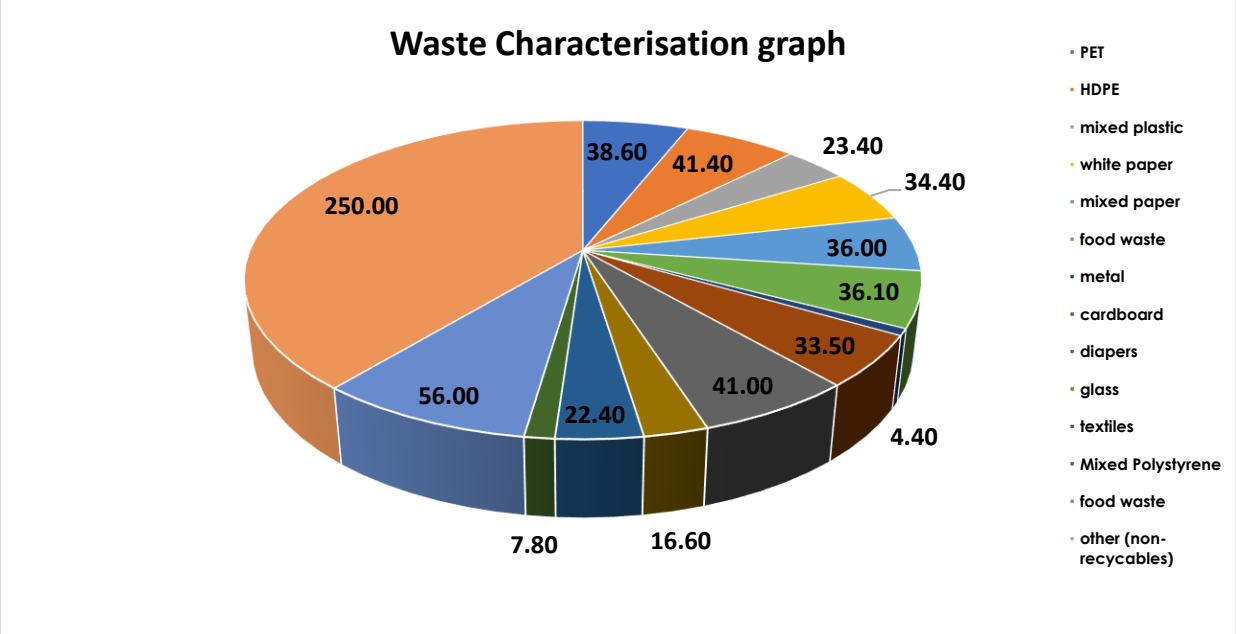

Figure 6: Waste characterisation chart

Table 12: Mass of various waste types

Waste Category	Mass (KG)	%
PET	14,4	9,50
HDPE	17,4	11,49
mixed plastic	16,7	11,02
white paper	1,4	0,92
mixed paper	10,5	6,93
food waste	12,4	1,39
Alu cans	2,1	1,39
Cardboard	4,5	2,97
Diapers	18,6	12,28
Glass	15,6	10,30
Textiles	12,8	8,45
Mixed Polystyrene	0,7	0,46
food waste	16,9	11,16
(non-recyclables)	7,5	4,95

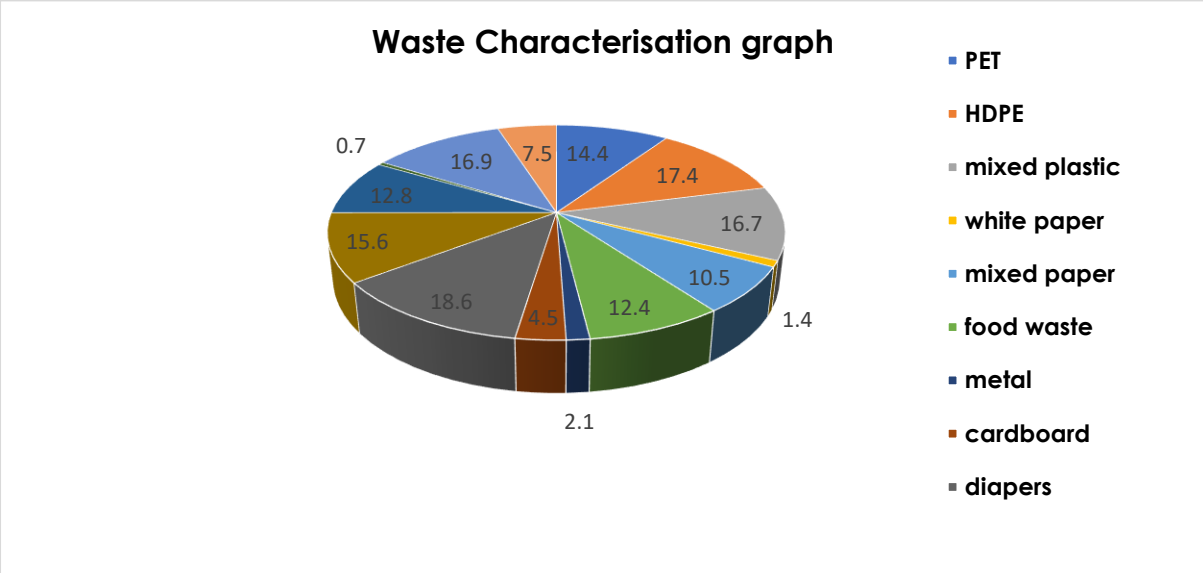

Figure 7: Waste characterisation chart

Table 13: Mass of various waste types

Waste Category	Mass (KG)	%
PET	16,1	10,90
HDPE	4,8	3,25
mixed plastic	11,2	7,58
white paper	2,8	1,90
mixed paper	3,6	2,44
food waste	15,7	0,00
Cardboard	23,6	15,98
Diapers	12,2	8,26
Glass	21,6	14,62
Mixed Polystyrene	0,9	0,61
food waste	22,6	15,30
other (non-recyclables)	12,6	8,53

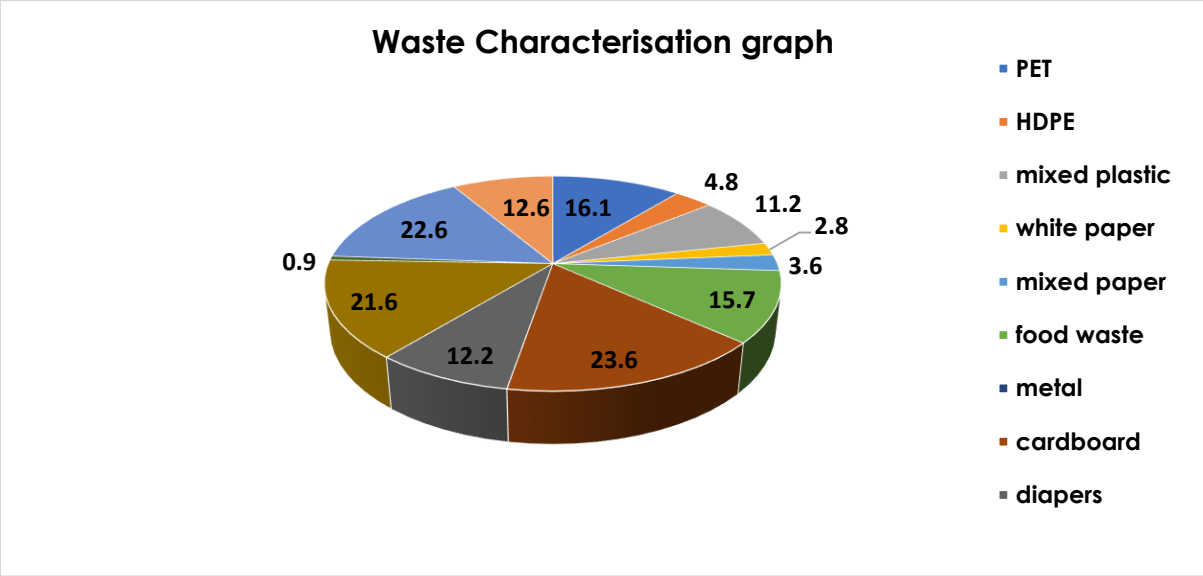

Figure 8: Waste characterisation chart

4.1.3. WASTE CHARACTERISATION DATA ANALYSIS

The presented tables and figures outline the predominant components of the Municipality's waste stream, highlighting the prevalence of plastic materials, food waste, non-recyclables, and inclusion of diapers. Across all data, it is discerned that approximately 52.8% of the waste stream comprises non- recyclable materials. The responsibility lies with the municipality to prioritize the management of the packaging stream, encompassing paper, plastic, and glass, recognizing the potential for substantial job creation through the effective handling of these materials. The waste characterization study underscores the feasibility of diverting a significant proportion of waste away from landfills. Noteworthy is the comparatively low presence of certain materials such as cardboards, metals, and white papers, possibly attributed to recycling companies operating within the municipal area that collect these materials before the municipal fleet's scheduled collection.

It is essential to note that the summarized findings are specific to the waste samples collected on a particular day and may vary over time. The primary objective of this initiative is to redirect recyclable waste away from landfills, while concurrently addressing challenges posed by food waste and non-recyclables. The overarching goal aligns with national and global legislations promoting a zero-waste-to-landfill approach, necessitating strategic measures to optimize waste management practices within the municipality.

Furthermore, these records assist in determining waste generation however there are still gaps in the data:

- Not all of the households in the MLM receive a collection service, A number of households use their own refuse dumps or another method of refuse service. The waste from these households would therefore not reach landfill sites;
- Some households are very far from landfill, and in gravel roads, that the municipality waste delivery services doesn't cover the areas.
- As with most, if not all, municipalities in South Africa illegal dumping of waste occurs within the MLM. While clean-up campaigns are undertaken, not all illegally dumped waste will enter a landfill site where it is recorded;

4.2. WASTE GENERATION

4.2.1. DETERMINING THE CURRENT DOMESTIC WASTE GENERATION PER CAPITA

This section presents a theoretical calculation of the likely total quantity of waste generated in the MLM using population data and published "per capita" waste generation rates.

Waste generation quantities can be calculated using the following three methods:

- Option 1: Weighbridge - Using a weighbridge the municipality must record the amounts of waste entering its waste disposal facility, by weighing the vehicles at the point of entry and again on the way out. The difference in the mass of the vehicle between the 'in' and 'out' provides the mass of the waste.
- Option 2: Without a weighbridge - municipality can estimate the amount of waste generated by using a volume density-based estimation. This requires accurate records.
- Option 3: The Waste Calculator Estimation technique can be used to calculate waste generation. This technique derived from the South African Waste Information System Guideline which governed by the R.625 National Environmental Management: Waste Act (59/2008): National Waste Information Regulations, 2013. The municipality must record waste quantities that are being disposed of at the landfill site according to the National Waste Information Regulations.

The South Africa State of Environmental Report, 2006 (SOER) calculates waste generation volumes per income level as follows, estimating that each individual person generates about 0,7 kg of waste a day. This is further categorised into different income brackets as follows:

Estimations on the amount of waste generated can be calculated per week, per month or per year. The 2006 State of the Environment Report (SOER) indicated that South Africa generated 42 million m^3 of solid waste per year. This amounted to 0,7kg's per person per day. The generation rates were further broken down into generation rates per income category and the results were as follows:

- Low income= 0.41kg/per person/day or (0.41kgx365 days)=149.65kg/person/year
- Middle income=0.74kg/per person/day or (0.74kgx 365days) = 270.1kg/person/year
- High income= 1.29kg/person/day or (1.29kgx365days) = 470.85kg/person/year

The MLM SOER figures for waste generation are also used in the Department of Environmental Affairs Guideline for the Development of Integrated Waste Management Plans (IWMPs). The DEA IWMP guideline also presents the following income brackets:

- Low income R 0 – R74,999 per year;
- Middle income R 75,000 – R 999,000 per year; and
- High income R 1 million + per year.

The MLM income profile was determined based on STATs SA records (Census 2011) and the MLM DP (2021/2022). A population of 502 397 persons was used (Stats SA 2022) to calculate the waste tonnages presented in the table below.

Table 14: Estimation of waste volumes produced per household (Community Survey 2016)

waste generation/income group	Income group	% population	number of persons	waste generation per Kg/day	waste generation per Kg/annum	Waste generation, tonnes/annum
low income R 0 – R74,999 per year; (0,41 kg/person/day) (149.65kg/person/year)	no income	40,05	64174	26311,34	9603639,1	9603,64
	R 1 - R 400	24,73	39623	16245,43	5929581,95	5929,58
	R 401 - R 800	4,98	7981	3272,21	1194356,65	1194,36
	R 801 - R 1 600	13,85	22191	9098,31	3320883,15	3320,88
	R 1 601 - R 3 200	3,76	6019	2467,79	900743,35	900,74
	R 3 201 - R 6 400	2,25	3600	1476	538740	538,74
	subtotal	**89,61**	**143588**	**58871,08**	**21487944,2**	**21487,94**
Middle income R 75,000 – R 999,000 per year; (0,74 Kg/person/day) (270.1kg/person/year)	R 6 401 - R 12 800	2,14	3429	2537,46	926172,9	926,17
	R 12 801 - R 25 600	1,30	2086	1543,64	563428,6	563,43
		0,33	529	391,46	142882,9	142,88
	R 51 201 - R 102 400	0,09	143	105,82	38624,3	38,62
	subtotal	**3,86**	**6187**	**4578,38**	**1671108,7**	**1671,11**
High income R 1 million + per year (1,29 kg/person/day) (470.85kg/person/year)	R 102 401 - R 204 800	0,05	75	96,75	35313,75	35,31
	R 204 801 or more	0,04	69	89,01	32488,65	32,49
	subtotal	**0,09**	**144**	**185,76**	**67802,4**	**67,80**
Total		**93,57**	**149919,00**	**63635,22**	**23226855,30**	**23226,86**

In light of the analysis presented in Table 14, a conservative estimate suggests that the annual domestic waste generation in amounts to 23,226.86 tons. This calculation is derived from the data provided in the Integrated Development Plan (IDP) for the year 2021/2022. The estimation takes into account individuals falling within various income brackets, providing a comprehensive overview of the anticipated domestic waste output in the specified area.

4.3. ESTIMATING FUTURE WASTE GENERATION RATES AND QUANTITIES

4.3.1 FUTURE DOMESTIC WASTE GENERATION

Anticipating future waste generation is crucial for effective waste planning and should be a key consideration in an Integrated Waste Management Plan (IWMP). The table provided below offers estimates for waste generation over both a five and ten-year timeframe. Projections for waste generation rates take into account historical data as well as expected population growth.

The planning of waste management in MLM will be significantly impacted by factors such as the pace of urbanization, population growth, and immigration from neighbouring countries like Zimbabwe. Although a substantial increase in population growth is not anticipated in the next decade, proactive waste management planning by the local municipality remains crucial. A notable shift in the waste collection landscape within MLM is expected due to the growth and expansion of urban centres, driven by rural-to-urban migration and the development of these areas. This transformation also necessitates careful consideration in the overall waste management planning process.

This may materialize in the following ways:

- Influx of undocumented foreign Nationals;
- Mining and Tourism;
- The development of MLM as Special Economic Zone (SEZ), as stated in the Musina-Makhado Special Economic Zone (SOC) – five year Strategic plan for 2020/21 – 2024/25 (final version March 2020)

- Informal settlements (if the migration is not managed);
- Increased service-based industry to support the demands of the influx of people and the development of the region in general; and
- Peri-urban type settlements along the main transport corridors.

Table 15: Future waste volumes estimation produced er capita (Community Survey 2016)

Type of settlement	Base population	Future Population estimates	Current domestic waste generation rates per capita (In Kg)	Future domestic waste generation rates per capita (in 10 years) (In kg)	Future domestic waste generation rates per capita (in 10 years) ,(In tonnes)
Low Income	143588	146704	21487944,2	21954232,59	21954,23
Middle income	6187	6321	1671108,7	1707371,759	1707,37
High Income	144	147,1248	67802,4	69273,71208	69,27

To estimate the future waste generated per capita , the following guidelines by the DFFE were used :

- Assuming that the population growth rates will remain constant for the next 10 years
- Assuming that the per capita waste generation rates would be according to the 2006 State of the Environment Report for all income categories:

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

Considering a population growth rate of 2.17% over the next 10 years, the conservative estimate presented in Table 15, suggests that the future domestic waste in MLM is projected to be approximately 21 954.23 tons, 1 707.37 tons and 69.27 tons per year for low, middle, and high-income rates respectively. These projections account for the expected changes in population size and offer insights into the potential waste generation trends within different income brackets in the MLM region over the specified period.

4.4. WASTE RECYCLING, TREATMENT AND DISPOSAL

4.4.1. WASTE RECYCLING

Recycling of waste is located above recovery, treatment and disposal in the waste management hierarchy in terms of best practise waste management. Over the last five years, the South African Government has enacted several waste-related legislations , such as the National Waste Management Strategy 2020. This updated strategy, the NWMS 2020, is a revision and enhancement of the 2011 strategy. It draws upon the achievements and insights gained from implementing the previous strategy. The NWMS 2020 has a comprehensive emphasis on waste prevention and diverting waste from landfills. It utilizes the Circular Economy concept as a driving force to foster sustainable and inclusive economic growth and development within the waste sector. Concurrently, it aims to mitigate the social and environmental impacts associated with waste.

In South Africa, the term "waste recycling" is frequently misapplied. True waste recycling involves a comprehensive process encompassing material collection, sorting, transportation, and the subsequent transformation into a new material. To illustrate, the act of the public depositing cardboard boxes at a recycling centre does not constitute recycling. The boxes are considered recycled only when they undergo the process of being converted into a new product, such as new boxes or packaging.

This report employs the term "facilities" to encompass organizations involved in one or more stages of the recycling process, such as recycling companies engaged in sorting recyclables, recycling drop-off facilities where recyclables can be deposited, and buy-back centres. Buy-back centres are locations where individuals can exchange recyclable materials for compensation.

At present, three (03) companies participate in the recycling process, primarily focusing on collecting recyclables sourced from local waste pickers. These entities function as local and independent buy-back centres. Subsequent to acquiring the materials, they typically transport them to Johannesburg, where the materials undergo conversion into new products, thereby finalizing the recycling process. Please see Appendix A for the list of waste recycling companies

4.4.2. MATERIAL RECOVERY FACILITIES

Within the MLM, aside from recycling, no other waste treatment activities are currently underway. Regarding recycling activities in the MLM area, both formal and informal sectors play a role. The informal sector primarily comprises waste pickers, with 40 currently operating within the Makhado landfill. On the other hand, participants in the formal sector include traders, dealers, and users, with the majority of recycling companies/groups operating within the municipal jurisdiction at present the total number of waste recyclers is three (3) refer to appendix A, for the list of the registered recycling companies within the MLM.

4.4.3. TREATMENT AND DISPOSAL

Table 16: Makhado landfill profile

Location	Portion of Farm Rietvyl No.276-LS, Vhembe District Municipality, Limpopo province
Site classification	Class: G:M:B
License type/use	Permit: 12/9/11/L413/5
Date issued	26 January 2011
Estimated remaining life	40 years
Estimated size of facility	20 Ha
Access control and signage	There is adequate access control. Signage, gate and a fence present
Surrounding land use	Farming, 4 km away lies a residential area Tshikota Village
Facilities	Adequate facilities available
Plant used on site	Compactor, Tipper, Truck, TLB, Water tanker
Description of waste management	Public are directed to drop off area. There is designated area for different waste types , e.g. garden waste and food waste etc .
Waste accepted on site	General waste (domestic Waste)
Use of cover material	Yes
Storm water management & drainage system	Present, with the availability of a leachate dam
Recycling	Waste is separated at the landfill site , mainly by informal reclaimers
Informal reclaimers present?	Yes
Operating hours	Monday – Friday: 07h00 – 17h00 Saturday:07h00-16h00 Public Holidays: 07h00 – 13h00
Estimated cost for closure	There is currently no estimated costs for closure
Challenges	• There is quite a high amount of recyclables sent to the landfills , i.e. lack of separation at source in the households and other facilities

	• The waste reclaimers on site ae not registered

The images below, illustrate aspects of Makhado Landfill site.

Makhado Land Fill site – landfill signage

Makhado landfill- entrance way- weighbridge

Makhado landfill site

Makhado landfill site – waste compaction

Makhado landfill site- cell

Figure 9: Makhado landfill images

4.4.3. TRANSFER STATIONS

MLM currently operates one functional transfer stations and six drop off areas. Dzanani Refuse transfer station. The transfer station plays a crucial role in waste sorting, ensuring that recyclable materials are separated from general waste. It also helps minimize the amount of waste sent to the landfill, directing only essential items for disposal. Additionally, the facility aids in diverting waste pickers from the landfill. Another key benefit is its proximity to residential areas, which can help reduce illegal

dumping. Moreover, the compactor trucks can operate more efficiently, as they need to travel less frequently between the transfer station and the landfill.

Furthermore, In 2012, the National Department of Environmental Affairs funded and developed six drop-off points in the Kutama/Sinthumule area to help address the backlog of waste collection in rural communities. These drop-off points were strategically located to ensure that the entire community could access them without having to travel long distances. Each facility is designed to handle up to 60m³ of non-hazardous waste and was established in the villages of Madombidzha, Ramahantsha, Ravele, Madodonga, Tshikwarani, and Maebani.

4.4.4. ILLEGAL DUMPING

Makhado Local Municipality has identified various illegal dumping sites within its jurisdiction. These sites are located across different wards. The distribution of illegal dumping sites appears scattered, making it challenging to maintain accurate records of their numbers. This pattern is likely attributed to these areas having the highest population density per household. The predominant waste found at these illegal dump sites consists of domestic and garden waste. MLM encourages communities to utilize plastic refuse bags for proper waste disposal, but the prevalence of backyard rooms in many households, coupled with an increasing number of people per household, contributes to a higher volume of generated waste. This, in turn, results in an uptick in illegal dumpsites, particularly in instances where households face challenges in purchasing refuse bags. Some locations have signage indicating the presence of illegal dumps; however, these signs are being disregarded by the communities.

4.5. STATUS OF WASTE COLLECTION SERVICES

4.5.1 WASTE COLLECTION STATUS

According to the 2022 Census, the Municipality is home to an estimated 140 338 households, with 29 101 of these households receiving waste collection services from MLM. Table 17 below provides a breakdown of how waste removal is managed in the area. As per Stats SA (2022), 20,7 % of households receive waste collection services

either from the local authority or a private company. Conversely, 69,0 % % of residents do not have access to household waste removal services.

Table 17: Household refuse disposal (Census 2022)

Name	Frequency	%
Removed by local authority at least once a week	29 101	20,7%
Removed by local authority less often	1 257	0,9%
Communal refuse dump	2 776	2,0%
Communal container/central collection point	3 109	2,2%
Own refuse dump	96 780	69,0%
No Rubbish Disposal	5 998	4,3%
Other	1 317	0,9%

Challenges encountered in waste collection services include:

- Very long distances from villages to the landfill site.
- Unpaved/ gravel roads within the villages.
- Illegal dumping of waste.
- Insufficient backup plant and equipment.
- Incidents of waste and skip bins being set on fire.

Makhado town, the Air Force Base, and the surrounding townships (three R293 towns) have an established waste management collection system with adequate capacity to meet short- to medium-term needs. However, the lack of proper waste disposal facilities has led to illegal waste disposal, such as burning, which negatively impacts air quality and contributes to air pollution.

It is important to note that the municipality is responsible for the operation and maintenance of waste management services, including solid waste collection, storage, and management at both household and business levels. The Limpopo Provincial Department of Health oversees the monitoring and management of Health Care Risk Waste (medical waste), while the National Department of Environmental Affairs (DEA) is responsible for the monitoring and management of hazardous waste.

In the Kutama/Sinthumule area and along the tarred Williespoort to Siloam road, waste collection is managed through a basic system. Additionally, there are plans to develop at least two more waste drop-off terminals in other regions annually. Table 17 provides information on the number of households receiving waste management services, whether in full or in part, as well as those not receiving the service at all.

5. WASTE COLLECTION TRANSPORT /FLEET

Ensuring efficient waste service delivery within the Municipality depends significantly on the selection and proper maintenance of vehicles in the waste management department. Presently, the MLM waste management department has a fleet comprising 15 vehicles. This fleet includes 10 compactor and 6 skip truck, as outlined in detail in Table 18 for specific quantities and operational statuses. Notably, breakdowns have rendered some of these vehicles non-functional, posing a potential challenge to the seamless provision of waste delivery services. It is imperative to scrutinize the availability and functionality of MLM Waste management fleet & equipment, emphasizing key considerations such as the development of a comprehensive breakdown response plan, adequate inventory management, and the allocation of sufficient budgetary resources for acquiring additional vehicles. These aspects are vital in ensuring the uninterrupted and efficient removal of refuse services.

Table 18: MLM waste management fleet information

#	Vehicle Type	Quantity	Operational status
1.	compactor trucks	10	Operational
2.	Skip truck	5	Operational

6. FINANCING OF WASTE MANAGEMENT

A detailed understanding of both operational and capital costs in waste management is crucial for ensuring accurate financial planning. When delving into the financing of waste management, it is necessary to account for operational costs, capital costs, recapitalization costs, and rehabilitation costs.

The Municipal Systems Act, Act no. 32 of 2000 (Chapter 8, ss73-86A), mandates that municipalities ensure proper budgeting to fulfil their constitutional obligations regarding waste services provision. For successful implementation of an Integrated Waste Management Plan (IWMP), a municipality must assess its current available resources, encompassing finances, human resources, and technical skills to meet the municipality's mandate. This includes the execution of goals and targets outlined in the plan, such as the development of by-laws, as well as securing funding for operational and maintenance costs for effective waste service delivery and the establishment of waste disposal facilities. Effective financial management and budgeting are crucial, aiding in the identification of future resource needs, especially in scenarios like an increase in households requiring waste collection services, necessitating additional resources for service delivery.

Table 19: MLM budget allocation for waste management services

Activity	**2022/2023**	**2023/2024**
Revenue generated	R14 096 000.00	R16 264 000.00
Operational expenses	R 38 703 912,07	R 40 581 234,70
Surplus/deficit	- **R 24 607 912,00**	- **R 26 485 234,70**

The waste management budget on table 19 reveals significant deficits for the 2022/2023 and 2023/2024 financial years. Revenue generated was R14,096,000.00 in 2022/2023 and R16,264,000.00 in 2023/2024, but operational expenses greatly exceeded these amounts, reaching R38,703,912.07 in 2022/2023 and R40,581,234.70 in 2023/2024. Consequently, the department faced deficits of R24,607,912.00 for 2022/2023 and R26,485,234.70 for 2023/2024. These figures underscore the urgent need to improve cost management or enhance revenue generation to address the financial imbalance. The operational expenses in the waste management budget

cover employee salaries, landfill management (including contractor fees and day-to-day operational costs), services required for daily operations, and maintenance costs

6.1 BUDGETING FOR WASTE SERVICES AND TARIFF SYSTEM

One of the fundamental principles for sustainable waste management in a municipality is the aim for services to be financially self-sustaining. While this poses a significant challenge for MLM given the prevalent high levels of poverty and a low-income base, it remains imperative to establish a systematic process for accurate accounting of waste services.

The Department of Environmental Affairs (DEA) has introduced a Solid Waste Tariff Model and Solid Waste Tariff Setting Guidelines for Local Authorities. MLM should consider adopting these guidelines to assist in waste management budgeting. Achieving proper accounting for waste services involves determining the revenue generated annually. For compliance purposes, municipalities must maintain records of income and expenditure. The Municipal Systems Act No. 32 of 2000 (Chapter 8, s 73-86A) mandates municipalities to ensure proper budgeting to fulfil their constitutional mandate regarding waste services provision. This should encompass considerations such as the number of indigents within the municipality and their allocation.

MLM's Integrated Development Plans (IDPs) outline various sources of revenue and income, including proper rates, service charges, investment revenue, transfers recognized as operational, and other own revenue. It is strongly recommended that MLM adopts key financial management guidelines when contemplating a tariff review, such as the Municipal Solid Waste Tariff Strategy (2012) and the National Pricing Strategy for Waste Management Charges (2014).

7. INSTITUTIONAL MATTERS

The organizational structure is instrumental in assessing the human resources available for delivering waste services. This structured representation delineates the number of staff allocated to specific sections, encompassing management responsibilities, planning, waste collection, recycling, disposal, and enforcement. This organizational framework serves as a valuable tool for identifying gaps, particularly in areas necessitating new functions to meet the requirements stipulated by the Waste Act. Through the organogram, it becomes evident that additional capacity is imperative for the comprehensive fulfilment of waste management and enforcement mandates. It is emphasized that the waste management staff must undergo proper training to proficiently execute their duties. Periodic monitoring of their performances is also essential to ensure the effective and compliant functioning of the waste management system.

Figure 10-13 offer a visual representation of the organizational structure, or organogram, for waste management services within MLM. This structure encompasses both refuse removal and landfill management. It sheds light on the various positions and the corresponding responsibilities of personnel, all contributing to the effective execution of refuse removal and landfill management operations.

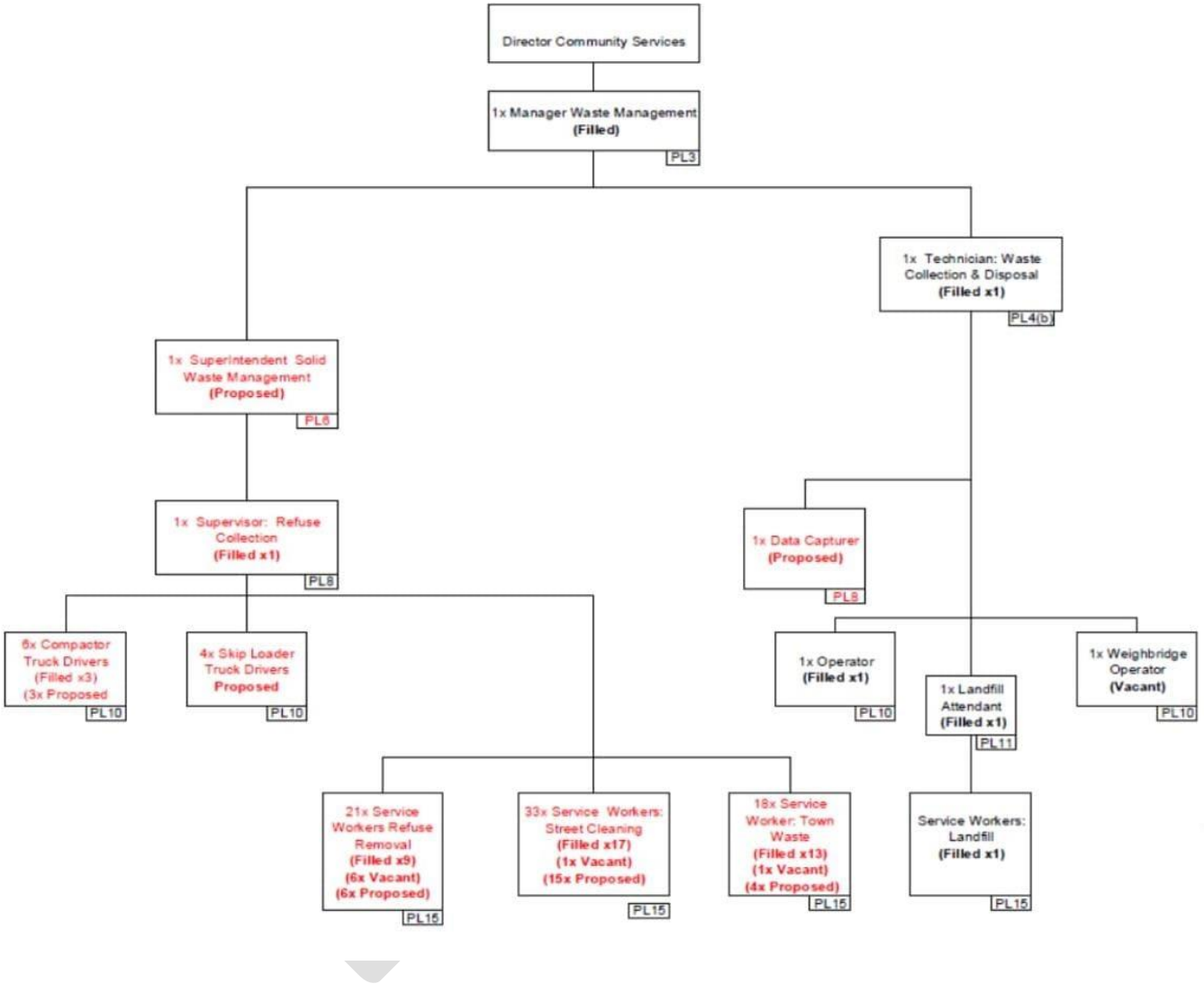

Figure 10:Community services (waste management)

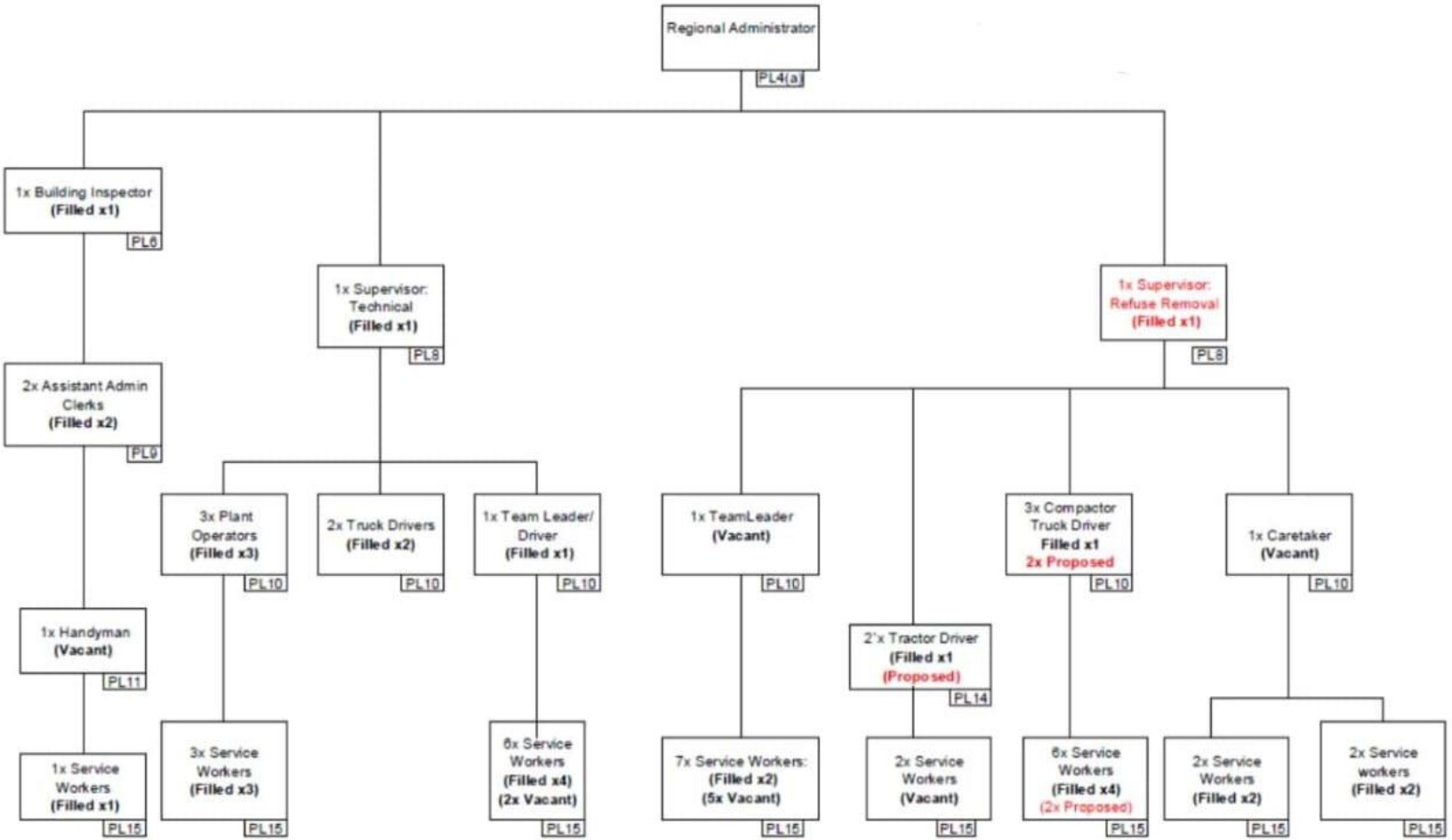

Figure 11:Dzanani regional office (infrastructure services)

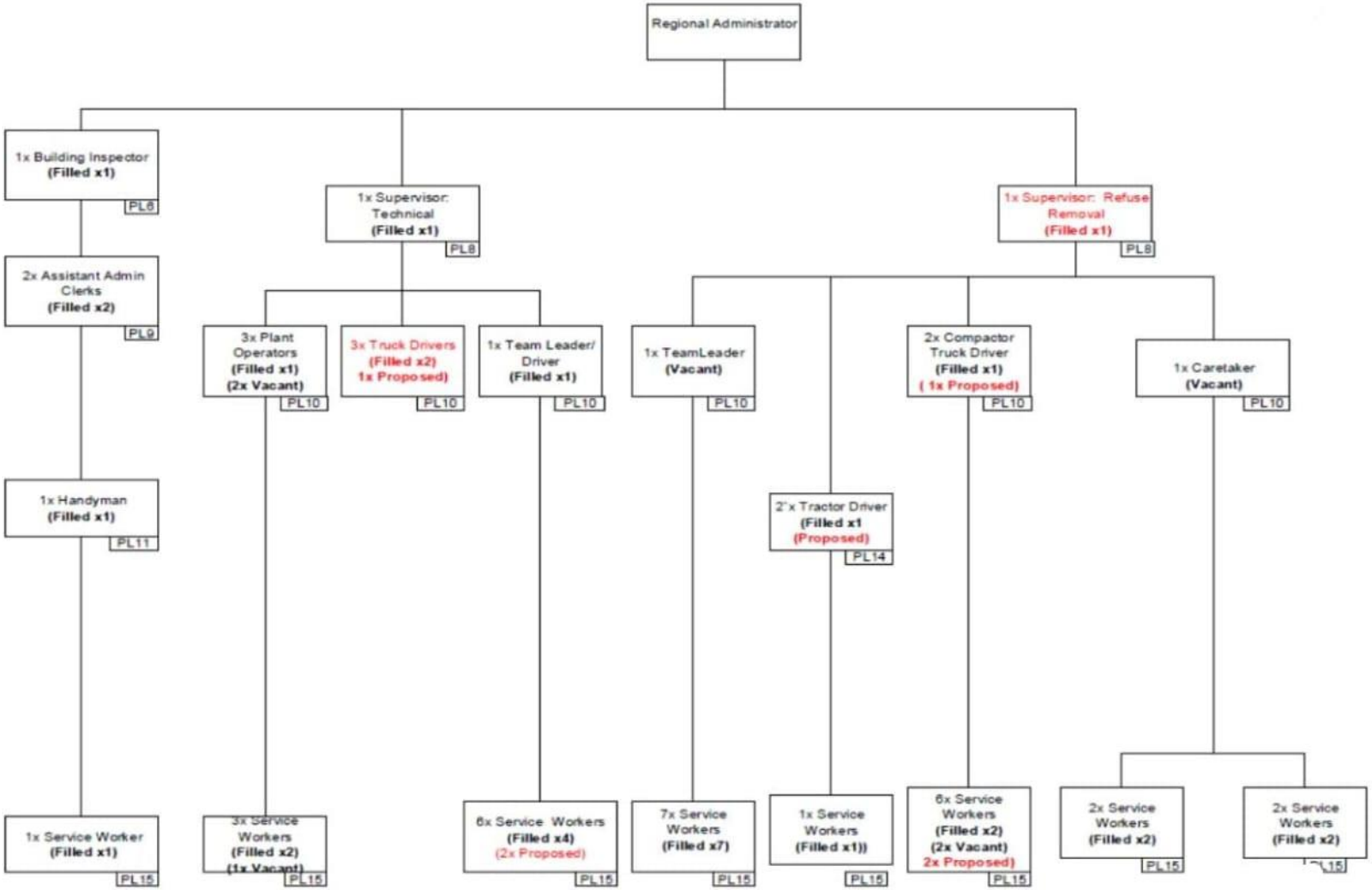

Figure 12:Waterval regional office (infrastructure services)

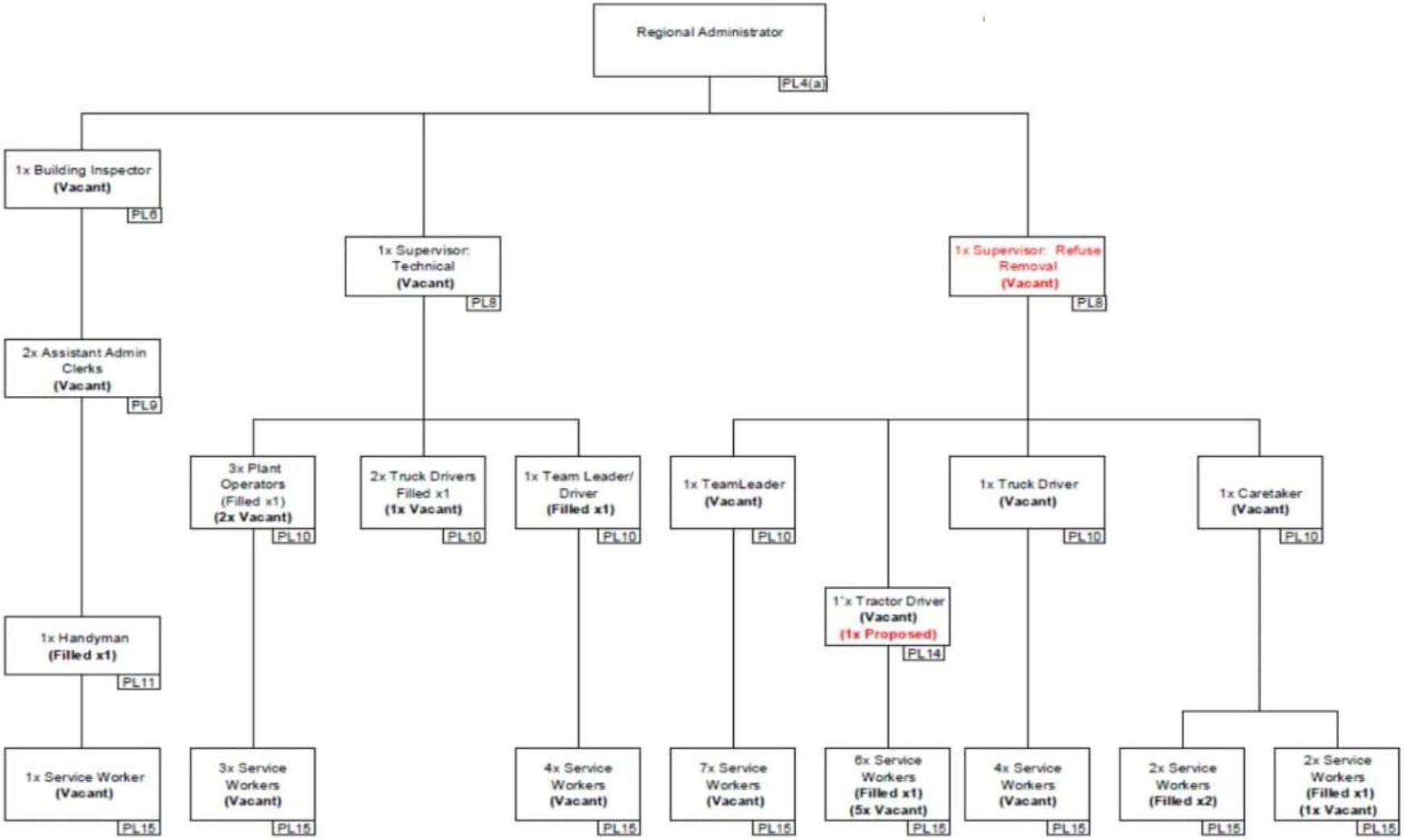

Figure 13: Luvuvhu regional office (Infrastructure services)

7.1 Roles And Responsibilities Of A Waste Management Officer

Chapter 3, Section 10(3) of the Waste Act mandates that the National Department, Provinces, and Municipalities formally designate Waste Management Officers (WMOs) in writing. A Waste Management Officer plays a crucial role in managing and implementing waste management programs to ensure proper disposal and recycling of waste materials.

The specific duties and responsibilities may vary depending on the organization and the scope of the position, but generally, the role involves the following:

- **Manage stakeholders in Waste Act implementation:** This involves actively engaging and collaborating with key stakeholders, including local government authorities, waste management service providers, community organizations, and environmental groups, to ensure effective implementation of the Waste Act. The role requires coordinating meetings, sharing information, addressing concerns, and fostering a collaborative approach to waste management. Additionally, it includes managing relationships with regulatory bodies, such as the Department of Environmental Affairs (DEA), to ensure alignment with national policies and regulations, while supporting the stakeholders in adhering to legislative requirements. Effective stakeholder management also entails resolving conflicts, ensuring transparency, and facilitating public participation in decision-making processes related to waste management.

- **Liaise with EMI compliance monitoring activities in the municipality:** This responsibility involves establishing and maintaining communication channels with the Environmental Management Inspectorate (EMI) and overseeing compliance monitoring activities within the municipality. It includes ensuring that municipal waste management practices align with the requirements set out in the Waste Act and related regulations. The role entails facilitating site inspections, audits, and assessments of waste management facilities to verify compliance with environmental standards. Furthermore, it requires acting as a point of contact between municipal departments and EMI officials, ensuring any non-compliance issues are addressed promptly, and supporting the municipality in developing corrective action plans to rectify any deficiencies identified through inspections.

- **Municipal IWMP: planning and reporting cycles:** This role requires the development, implementation, and periodic review of the Integrated Waste Management Plan (IWMP) for the municipality. It involves coordinating the planning cycle by identifying key waste management objectives, setting measurable goals, and ensuring that the IWMP is aligned with both local and national waste management strategies. The role also includes overseeing the data collection and analysis processes for effective reporting, ensuring that progress against the IWMP is documented accurately and communicated to relevant authorities. Additionally, this responsibility entails ensuring that the IWMP is updated in response to changes in local waste management practices, evolving environmental standards, and shifting legislative requirements. This function is critical for ensuring that the municipality's waste management practices are sustainable, legally compliant, and continuously improving.

- **Build capacity in relation to Waste Act implementation:** Building capacity involves providing training, resources, and support to municipal staff, stakeholders, and service providers to enhance their understanding and ability to implement the Waste Act effectively. This may include organizing workshops, seminars, and awareness campaigns to foster knowledge of the Waste Act's provisions, waste minimization strategies, recycling initiatives, and waste disposal regulations. The role also entails the development and distribution of educational materials and tools to help stakeholders understand their responsibilities under the Act. Additionally, capacity building may involve the creation of mentorship or support programs to assist staff in developing the necessary technical skills to manage waste systems, ensure compliance, and contribute to long-term waste management solutions in the municipality.

- **Monitor adherence to norms and standards in the delivery of waste services:** This responsibility focuses on ensuring that all waste management services in the municipality adhere to established norms, standards, and best practices in waste collection, disposal, recycling, and treatment. It involves regularly monitoring the performance of waste management contractors and in-house service teams to assess compliance with quality standards, operational protocols, and safety

regulations. The role also includes conducting inspections and audits of waste management facilities, reviewing waste collection schedules, and ensuring that waste disposal sites operate within regulatory frameworks. Monitoring also entails evaluating the environmental impact of waste services and recommending improvements to enhance efficiency, reduce contamination, and mitigate negative environmental consequences. Furthermore, it requires preparing compliance reports and liaising with regulatory agencies to ensure that any breaches of standards are promptly addressed.

8. GAPS AND NEEDS

8.1 DESIRED END-STATE

This section aims to define the municipality's objectives in waste management, drawing insights from past and current waste management practices. Through this assessment, we formulate a strategic plan with specific goals designed to bridge gaps and cater to the community's needs. These objectives align with both the National and Provincial Waste Management Strategies. The plan also outlines a roadmap for achieving these goals, incorporating relevant waste laws and guidelines while adhering to the waste management hierarchy. Furthermore, specific targets for various waste services, including collection, recycling, recovery, and disposal, are established. These objectives and targets take into account the municipality's alignment with the National Waste Management Strategy, which sets mandatory goals for compliance with the Waste Act. It is imperative to establish a clear timeline within the five years following plan approval to ensure the municipality progresses towards these national objectives, concurrently addressing local requirements and regulatory compliance.

8.2 GAPS AND NEEDS IDENTIFIED

Gaps and needs were identified based on the situational analysis studies, including the waste characterisation, interviews with stakeholders, inspection of fleet and facilities, and a review of the legislative and best practice guidelines.
The Summary of the current waste management issues at MLM follows below,

Gaps and needs have been listed under the following headings:

1. Waste collection & management services
2. Waste recycling;
3. Organic waste management;
4. Waste management facilities;
5. Waste management fleet and equipment;
6. Waste management information system
7. IWMP implementation and monitoring
8. Waste generation and disposal records
9. Waste education and awareness

10. Institutional functioning;
11. Financial management
12. By-laws and enforcement of by-laws; - Legal compliance

Table 20: Waste Management Gaps and Needs Identified at Makhado Local Municipality

Legislated requirement/ best practice	Gaps	Needs
1. Waste collection & management services		
• The NWMS 2011 requires 95% of urban and 75% of rural households to have access to adequate levels of waste collection services. Non-recyclable waste must be collected weekly from households, as a minimum. • The National Policy for Provision of Basic Refuse Removal Services to Indigent Households (GN 413 of 2011) requires municipalities to provide free receptacles for waste storage to indigent houses.	• There is not inadequate municipal services and basic infrastructure within the MLM. • There is generally a lack of information on waste streams. • Waste collections services do not reach some rural areas. • There is illegal dumpsites in villages, around the CBD • The Municipality has 15 waste management fleet, encompassing ten (10) compactor trucks, five (5) skip trucks • Breakdown of waste fleet poses potential challenges to ensuring uninterrupted waste delivery services.	• Ensure that all households receive waste management collection services due to being away from town/urban areas and in villages, poor roads, etc, this households which are not receiving a service need to be identified to determine the best possible for a feasible and sustainable waste collection provision services. • The provision of collection services to informal areas needs to be improved. • Community awareness and involvement In waste management must be improvement in order to decrease illegal dumpsites. • The Municipality has 1 transfer stations Dzanani refuse station, there need to be community awareness of bet

Legislated requirement/ best practice	Gaps	Needs
		waste management practices to ensure that the transfer station and efficient sustainable waste minimisation practices are utilized to their full potential. • The municipality need to put in place a systematic and sustainable vehicle maintenance plan to ensure that breakdowns do not negatively affect the waste management services
2. Waste minimisation, recycling, and re-use initiatives		
• The NWMS, 2011 sets a target of 25% diversion rate of recyclables by 2016. • The draft 2018 NMWS sets a target of 50% diversion of waste by 2023 and 80% diversion by 2028. • Operation Phakisa sets a target of 50% diversion of municipal waste by 2023. • The Waste Act requires municipalities to put in place measures that seek to reduce the amount of waste generated, and	• The accurate % of recycled domestic, commercial and industrial waste generated within the MLM has not been determined/ established. • There is a no participation of the separation at source programme in some of the residential areas. • MLM has only 3 privately owned recycling companies.	• The quantity of waste being recycled within the MLM needs to be increased. This can be done through the following measures: • increasing participation of households in the separation at source programme – increase education and awareness regarding this programme.

Legislated requirement/ best practice	Gaps	Needs
where generated, measures to ensure that it is re-used, recycled and recovered, treated and disposed of. • The PIWMP require municipalities to provide an enabling environment for recycling.	• Recycling companies face changes such as theft, depreciation of recyclable's value, access to different funding, lack of equipment's, infrastructure and transport expenses, these, changes limit their effective functioning of waste recycling facilities. • At the Makhado landfill site, there is recycling that is done by local documented waste reclaimers, however there is also a presence of informal, undocumented waste reclaimers • MLM does not have waste infrastructures such as Buy Back Centre (but has about three transfer stations) • There is a high amount of recyclable material that goes into	⇒ Provision of easily accessible recycling drop- off facilities for households which do not use a kerbside collection service. ⇒ Increased awareness around the importance of recycling. This can be achieved through school competitions. ⇒ Ensuring the existing swop shops continue to function and raising awareness with the public around the need for donations for the swop shops. • MLM must conduct community awareness and create an enabling environment for locals to participate in waste recycling, including schools, and their gatherings etc • MLM needs to put a programme for the implementation and management of a buy-back centre,

Legislated requirement/ best practice	Gaps	Needs
	the landfill site (e.g. Plastic, Glass, Plastic cardboard, etc.). • There is limited recycling, considering the amount of recyclable material observed during waste characterisation	this may also ensure more participation of reclaimers in the municipality
2. Organic waste management		
• The National Norms and Standards for Disposal of Waste to Landfill (GN 636 of 2013) – 25% diversion rate of garden waste from landfill by 2018 and 50% by 2023. • Limpopo Provincial IWMP and National Medium Term Strategic Framework– 50% diversion of organic waste by 2022 and 100% diversion rate by 2027.	• At present, the majority of organic waste generated within the MLM is disposed of at landfill. • MLM does not have any facilities for composting of organic waste at present • The MLM do not charge companies and contractors to dispose of organic waste at the landfill and are challenged by available airspace, particularly as waste taken to this facility is not chipped.	• A regional composting facility. • Additional drop-off facilities for green waste. • As part of the community awareness programmes, household composting project needs to be rolled out • An organic waste diversion plan needs to be developed for the MLM landfill

Legislated requirement/ best practice	Gaps	Needs
	• There is no organic waste diversion plan MLM	
3. Waste Management facilities		
The National Norms and Standards for the Storage of Waste GNR 926 of 2013	• There are two landfill sites under Makhado. Makhado landfill site operational and Vondeling landfill site closed. • **NB: This assessment will be based on the Makhado landfill site as it is the one that's fully operational.** • There is no facility available for garden and organic waste at the landfill.	• A weighbridge needs to be serviced, this will ensure accurate data capturing • Consider implementing a disposal fee for contractors and garden services. • Within the landfill facility footprint, identify a site for garden and food waste disposal, • Roll out a very comprehensive and sustainable community awareness programme, encouraging locals to be part of the recycling community.
4. Waste management fleet and transportation		
The National Domestic Waste Collection Standards (GN 21 of 2011) requires that all vehicles in the waste management fleet are roadworthy and that waste is transported in closed vehicles.	• Frequent truck breakdowns, posing challenges to uninterrupted waste delivery services	• MLM must review their fleet and allocate and plan for replacement to meet the required standards. • Implement regular maintenance services

Legislated requirement/ best practice	Gaps	Needs
		• Develop a comprehensive breakdown response plan • Ensure there is an efficient spare inventory
5. Waste management information system		
5.1. IWMP development, implementation & monitoring		
The Waste Act requires that the IWMP is submitted to DFFE & DP for endorsement, it is incorporated into the IDP that annual reports of the IWMP implementation are undertaken.	• The existing IWMP was not finalised and endorsed by the MEC. • The IWMP must set realistic ambitions and targets looking at available resources in the MLM . • The IWMP should come up with short, medium and long-term solutions to waste problem in the MLM.	Once the IWMP is finalised, MLM must ensure that annual reports are prepared and submitted in line with the Municipal Systems Act (Act 32 of 2000).
5.2. Waste generation & disposal records		
The National Waste Information Records require information to be uploaded onto SAWIS on a quarterly basis.	• Waste collection rounds cover a combination of domestic and businesses. It is not possible to determine how much domestic and how much commercial and	Collect information on business / commercial waste collection using tagging system of bins.

Legislated requirement/ best practice	Gaps	Needs
	industrial waste is generated from these records. • There are gaps in the data for commercial waste.	
6. Waste education and awareness		
• The NWMS, 2016 & 2020 , sets a target that 80% of schools must undertake waste awareness campaigns. • The municipality must provide guidelines on how to separate waste.	• Lack of public awareness concerning good waste management practises. – based on the illegal dumpsites • Capacity building and training on waste minimization and recycling does not exist. • Awareness campaigns were done by youth jobs in waste/clean- up campaigns,	• Waste awareness campaigns need to be documented. • Appoint staff as waste awareness educators. • The MLM must ensure they appoint waste awareness educators who are fluent in the prevalent languages within the municipality
7. By laws and enforcement of by-laws – Legal compliance		
▪ Legal frameworks established by local governments to govern specific areas within their jurisdictions. ▪ Local Government: Municipal Systems Act ,No 32 of 2000	• There are no dedicated waste rangers to enforce waste management by-laws.	• The MLM needs to update the by-laws and they should be aligned with the Waste Act and waste management by-laws.

Legislated requirement/ best practice	Gaps	Needs
publishes the Waste Management By-Laws	• Littering and illegal dumping occurs in open areas across the MLM. • Skip sites become illegal dumpsites. • MLM needs to move toward legal compliance in terms of landfill site operations. • The powers allocated to MLM in terms of the Constitution need to be adhered to. • The MLM by-laws must be updated as there is a need to align them to the objectives and goal once the IWMP has been finalised and adopted.	• Waste rangers need to be appointed to enforce the by-laws, particularly around litter and illegal dumping. • Skip sites to be cleaned up and then manned using EPWP / temporary workers to improve control. • Community awareness campaigns for proper waste management practices, to maximise the available transfer stations
8. Institutional functional and financial management		

Legislated requirement/ best practice	Gaps	Needs
• The Waste Act requires that a WMO is designated for each municipality. • The Waste Act requires municipalities to keep separate financial statements including a balance sheet of services provided. • Full-cost accounting for waste services are to be undertaken and cost reflective tariffs implemented (NWMS, 2020)	• Additional staff are needed – waste awareness, admin and support staff. • MLM financial & capacity resources are adequate but can improve (the revenue is higher than the budget for the past financial year), but more resources still need to be allocated for waste services	• The MLM need to review the organogram and prioritise portions which need to be filled refer **Appendix B** for the recommended waste department structure that the Municipality can utilize. • The staff need to be skilled on waste awareness services and stakeholder engagement with regards to waste management and circular economy initiatives
9. Strategic Planning & IWMP development, implementation & monitoring		
The Waste Act requires that the IWMP is submitted to DFFE&DP for endorsement, it is incorporated into the IDP that annual reports of the IWMP implementation are undertaken.	The IWMP must be finalised and approved by the council then endorsed by the MEC.	Once the IWMP is finalised, the municipality must ensure that annual reports are prepared and submitted in line with the Municipal Systems Act (Act 32 of 2000).

9. SETTING STRATEGIC GOALS, OBJECTIVES, TARGETS, INDICATORS AND INSTRUMENTS FOR IMPLEMENTATION

Considering the gaps and needs identified in the MLM IWMP, a desired outcome is established. This involves defining priorities and strategic objectives that MLM aims to achieve in relation to the IWMP. The strategic goals are aligned with pertinent waste legislation and policies, adhering to the waste management hierarchy. The formulation of these strategic goals is guided by the National Waste Management Strategy (NWMS) 2020, as well as the Provincial Integrated Waste Management Plan (PIWMP) 2020-2025 which has been developed and revised to fulfil the objectives outlined in the Waste Act.

In an Integrated Waste Management Plan (IWMP), goals and objectives serve to tackle identified shortcomings or improvements needed in the existing waste management system. Goals represent long-term aspirations, while objectives are specific, measurable targets. When implemented effectively, objectives contribute to the municipality achieving its overarching goals. The terminology employed in formulating the goals, objectives, and implementation plan aligns with the Integrated Waste Management Planning Guideline for Waste Management Planning provided by the Department of Environmental Affairs and Development Planning (DEA&DP).

9.1 Alignment With National And Provincial Goals

9.1.1 The National Waste Management Strategy

The justification for NWMS 2020 is as follows:

The management of waste in South Africa falls within the mandate of the Department of Environment, Forestry and Fisheries (DFFE). This mandate is derived from Section 24 (Environment) of the Constitution of the Republic of South Africa (Act 108 of 1996) which states:

"Everyone has the right –

a) to an environment that is not harmful to their health or wellbeing; and
b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –
   i. prevent pollution and other degradation;
   ii. promote conservation; and
   iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

To implement its mandate, the Department of Environment, Forestry and Fisheries (DEFF) has formulated various policies, legislation, strategies, and programs. Notably, the National Environmental Management: Waste Act 59, 2008 (referred to as "the Waste Act") and the National Waste Management Strategy of 2011 (NWMS) are key components. The NWMS is a mandatory requirement under the Waste Act.

The NWMS serves as a comprehensive framework for executing the Waste Act, outlining the government's policy and strategic approach to waste management in alignment with South Africa's socio-economic development goals of being "equitable, inclusive, sustainable, and environmentally sound."

The current NWMS 2020, which updates the 2011 strategy, accomplishes the following:

- Aligns the strategic waste management approach with the commitments of the Sustainable Development Goals 2030 (referred to as "the SDGs") and South Africa's National Development Plan: Vision 2030 (referred to as "the NDP").
- Emphasizes waste management as a crucial element of South Africa's economy and societal framework.

- Incorporates and creates a supportive environment for the DEFF's 2017 Chemicals and Waste Economy Phakisa and the government's 2019 Good Green Deeds Programme.

The NWMS 2020 considers relevant feedback from public consultation processes on the draft version. It also reflects progress, challenges, and lessons learned from the implementation of the 2011 NWMS, taking into account the political, social, environmental, and economic context influencing the waste sector.

The NWMS 2020 considers relevant feedback from public consultation processes on the draft version. It also reflects progress, challenges, and lessons learned from the implementation of the 2011 NWMS, taking into account the political, social, environmental, and economic context influencing the waste sector.

The three goals of the NWMS 2020 that will be used to align this IWMP are as follows:

- **Goal 1**: Waste Minimisation - the aim is to prevent waste and where waste cannot be prevented, 40% should be diverted from landfill within 5 years through reuse, recycling, recovery, and alternative waste treatment: 25% of waste reduction, waste generation and 20% waste reused in the economic value chain.
- **Goal 2**: Effective and Sustainable Waste Services - this would see all South Africans living in clean communities with waste services that are well-managed and financially sustainable.
- **Goal 3**: Waste Awareness and Compliance - the aim is to create a culture of compliance with zero tolerance for pollution, litter, and illegal dumping.

The NWMS is based on a framework consisting of three goals, normally called strategic pillars, which are outlined in Table 21 below.

Table 21: Summary of 2020 NMWS goals

Strategic pillar	Outcome	Key intervention
Waste minimisation	45% of waste from diverted from landfill within 5 years; 55% within 10 years; and at least 70% within 15 years leading to Zero - Waste going to landfill.	• Prevent waste generation through cleaner production, industrial symbiosis and extended producer responsibility; • Prevent Food Waste; • Increase re -use, recycling and recovery rates; • Divert organic waste from landfill through composting and the recovery of energy; • Divert construction and demolition waste from landfill through beneficiation; and • Increase technical capacity and innovation for beneficiation of waste.
Effective and Sustainable Services	All South Africans live in clean communities with waste services that are well managed and financially sustainable.	• Separate waste at source; • Safe and environmentally sustainable disposal of hazardous household waste; • Cities Support Programme Implementation; and • Effective integrated waste management planning.
Compliance, Enforcement and Awareness	Mainstreaming of waste awareness and a culture of compliance resulting in zero tolerance of pollution, litter and illegal dumping	• Reduce Pollution, littering and illegal dumping; • Enhance capacity to monitor compliance and enforce the Waste Act and International Agreements; and • Ensure municipal landfill sites and waste management facilities comply with licensing requirements.

9.1.2 Alignment Of National And Provincial Goals

The NWMS is structured around a framework of eight goals, which are listed in Table 22 below with the alignment of the NWMS Goals with the Limpopo Provincial IWMP goals.

The 2020 NWMS and the Limpopo PIWMP (2020-2025), along with the status quo of waste management within the MLM were used to inform the MLM IWMP.

Table 22: The National Waste Management Strategies Aligned With The Limpopo Provincial IWMP Goals

NMWS Goals	Description	Targets	Provincial IWMP Goals
Goal 1:	Promote waste minimisation, re- use, recycling and recovery of waste.	• 25% of recyclables diverted from landfill sites for re-use, recycling or recovery. • All metropolitan municipalities, secondary cities and large towns have initiated separation at source programmes. • Achievement of waste reduction and recycling targets set in Industry WMPs for paper and packaging, pesticides, lighting and tyres industries.	Goals 1, 2 & 3
Goal 2:	Ensure the effective and efficient delivery of waste services	• 95% of urban households and 75% of rural households have access to adequate levels of waste collection services. • 80% of waste disposal sites have permits.	Goal 1
Goal 3	Grow the contribution of the waste sector to the green economy	• 69 000 new jobs created in the waste sector. • 2 600 additional SMEs and cooperatives participating in waste service delivery and recycling	Goal 5
Goal 4	Ensure that people are aware of the impact of waste on their health, well-being and the environment.	• 80% of municipalities running local awareness campaigns. • 80% of schools implementing waste awareness programmes.	Goal 7

NMWS Goals	Description	Targets	Provincial IWMP Goals
Goal 5	Achieve integrated waste management planning.	• All municipalities have integrated their IWMPs with their IDP's and have met the targets set in IWMPs. • All waste management facilities required to report to SAWIS have waste quantification systems that report information to WIS.	Goals 9 & 4
Goal 6	Ensure sound budgeting and financial management for waste services.	• All municipalities that provide waste services have conducted full-cost accounting for waste services and have implemented cost reflective tariffs.	Goal 1
Goal 7	Provide measures to remediate contaminated land.	• Assessment complete for 80% of sites reported to the contaminated land register. • Remediation plans approved for 50% of confirmed contaminated sites.	None
Goal 8	Establish effective compliance with and enforcement of the Waste Act.	• 50% increase in the number of successful enforcement actions against non- compliant activities. • 800 Environmental management inspectors appointed in the three spheres of government to enforce the Waste Act.	Goal 6

9.1.3 PROVINCIAL INTEGRATED WASTE MANAGEMENT PLAN FOR LIMPOPO PROVINCE: 2020 - 2025

In the year 2020, the Limpopo province formulated the Provincial Integrated Waste Management Plan (PIWMP) spanning the period from 2020 to 2025. The Implementation Plan of the Integrated Waste Management Plan (IWMP) delineates the objectives, indicators, and responsibilities of Local Municipalities (LM), District Municipalities (DM), and the Department. This document provides a detailed breakdown of their respective roles in attaining the goals outlined in the IWMP. Table 23 highlights the key focus areas and proposed actions, placing emphasis on the specific duties assigned to Local Municipalities in the realm of waste management. Furthermore, it is imperative for Local Municipalities to comprehend the roles and responsibilities of the province, particularly regarding initiatives that support waste management at the local level, such as offering training programs or specifying reporting requirements.

Table 23: Priority Areas & Proposed Implementation Of The Limpopo PIWMP

#	Activities	Indicators	Name of implementing state or organisation
Goal 1: Expansion of Waste Services and Cost Recovery			
1.1.	Expand waste collection services (Supply of refuse bags, bins, Contracts with transporters)	Collection route networks and frequency	DM & LM
1.2.	Develop a plan to establish a rural collection system (Improve infrastructure and transportation)	Rural refuse removal plan	DM & LM
1.3.	Identify hotspots and un-serviced areas and develop programme for clean-up and monitoring	New service points	LM
1.4.	Develop minimum service standards	Waste collection standards	DM, LM & LEDET
1.5.	Conduct survey on willingness to pay for services and develop a plan for cost recovery	Survey Report Cost & recovery plan	DM, LM & LEDET
Goal 2: Encourage waste minimization initiatives and promote recycling project			
2.1.	Reduce the number of dumpsites by 50%	List of closed dumpsites	DM, LM & LEDET
2.1.1.	Prioritize dumpsites to be closed and rehabilitated	Rehabilitated Sites	DM, LM & LEDET
2.2.	License all landfill sites	List of licensed landfills and transfer stations	DM, LM & LEDET
2.2.1.	Rehabilitate dumps and convert to fully licensed transfer stations and landfills		

#	Activities	Indicators	Name of implementing state or organisation
Goal 3: Establishment of licensed and well-managed waste disposal facilities			
3.1.	Encourage/train separation at source	Reduced waste volumes collected	DM, LM & LEDET
3.2.	Establish minimum recycling standards at source and transfer stations	Operational standards	LEDET & LM
3.3.	Develop recycling guidelines for all waste streams	Recycling Guidelines	LEDET & LM
3.4.	Establish 3 Pilot Project on recycling 3.4.1. Establish an Integrated Waste Exchange system (IWEX)	Recycling Pilot Project operational IWEX system operational	LEDET, DM, LM & Civil society
3.5.	Conduct survey of all recycling projects	Survey report, GIS and mapping	LEDET, DM, LM
Goal 4: Ensure safe and integrated hazardous waste management			
4.1.	Conduct Baseline Study on hazardous waste	Baseline Study report	LEDET & LM
4.1.1.	List hotspots and waste generators	List of waste sources mapped	LEDET & LM
4.2.	Develop hazardous waste cell	Hazardous waste disposal receptacle	LEDET, DM, DFFE & LM
4.3.	Encourage/train sorting at source	Hazardous domestic/ industrial waste sorted	LM, LEDET, & Industry,

#	Activities	Indicators	Name of implementing state or organisation
4.3.1.	Household hazardous waste sorting practiced	Hazardous domestic/ industrial waste sorted	LM, LEDET, & Industry,
4.4.	• Establish provincial health care waste management plan (including facilities like home-based care and hospices) • Increase number of operational incinerators, Decommission obsolete incinerators	• HCW Implementation Plan. • Licensed and compliant incinerators. • List of decommissioned incinerators.	LEDET /Dept of Health & LM
4.5.	Establish Pilot Project for agricultural waste recycling for compost development	Agricultural Waste Recycling Pilot Compost site established Compost market established	LEDET, Dept of Agriculture & LM
4.6.	Identify hazardous waste of concern and develop management plan	Hazardous waste stream management plan.	LEDET/Industry, Civil society, DFFE & LM
Goal 5: Strengthening institutional capacity for waste management			
5.1.	Increase number of waste management staff, align posts in all spheres of government	Increased number of waste management staff	DM, LM & LEDET
5.2.	Training/ skills transfer	Skilled staff	LEDET, DM, LMD PLG & LM
5.3.	Develop Waste Information System	Waste Database	DM, LM, LEDET, & DFFE
5.4.	Develop Green Procurement Policy and Cleaner Production Strategy	Green Procurement Policy Cleaner Production Strategy	LEDET, NCPC, DME, DFFE & LM

#	Activities	Indicators	Name of implementing state or organisation
5.5.	Establish Pilot Project for Cleaner Production and Clean Development Mechanism (Climate Change Mitigation)	Pilot project as a learning tool Trained Staff	LEDET, LM, NCPC, DMR, DM, DFFE & Industry
Goal 6: Develop waste regulations and by-laws and strengthening enforcement capacity			
6.1.	Develop by-laws for waste management in line with Waste Management Act, 2008	By-laws	DM, LM & LEDET
6.2.	Training of Environmental Management Inspectors	Number of trained staff for inspection, audits and enforcement	DM, LM, LEDET & Health sector
6.3.	Develop database of environmental cases	Database	LEDET, & LM
6.4.	Develop guideline and electronic data capture system for case management	Guideline, data capture system	LEDET & LM
6.5.	Implement Waste management System Education and awareness on the system	Data on waste generated, transported and disposed: WIS Information brochure	LEDET, Industry, Health sector & LM
6.5.1.	Develop information brochure on procedure		
Goal 7: Promote education and awareness on waste issues			
7.1.	Develop an education and awareness plan which includes all crosscutting issues	Education and awareness plan	LEDET, Civil society & LM
7.2.	Develop posters and awareness brochures	Education materials	DM, LM & LEDET

#	Activities	Indicators	Name of implementing state or organisation
7.3.	Establish Environmental Clubs and Forum	Environmental clubs in each municipality	DM, LM, LEDET,
Goal 8: Facilitate and guide regionalization of disposal facilities			
8.1.	Conduct Feasibility study of possible regional facility development	Feasibility study report, GIS and Mapping	DM, LM & LEDET
8.2.	Establish regional facility	Regional facility operational	DM, LM & LEDET, Construction company
Goal 9: Develop tools for risk assessment, monitoring and evaluation			
9.1.	Development of an Interdepartmental Committee for IWMP review and monitoring Develop monitoring programme	Interdepartmental Monitoring Committee Monitoring Programme	LEDET, SECTOR DEPT, Industry Civil society & LM
9.2.	Auditing of all waste programmes and projects (Recycling, training, transfer stations, landfills etc, waste minimization clubs)	Auditing Report	LEDET & LM
9.3.	Increase number of environmental Indicators included in the State of Environment Reporting	State of Environment Report Annual Report	DM, LM & LEDET

9.2 GOALS IDENTIFIED FOR MAKHADO LOCAL MUNICIPALITY

Alignment of Makhado Local Municipality Goals with National and Provincial Goals

The determination and identification the of MLM goals was guided by insights from the 2020 National Waste Management Strategy (NMWS), the Limpopo Provincial Integrated Waste Management Plan (PIWMP) covering the period 2020 to 2025, and the MLM situational analysis report completed.

Based on this integrated information, a total of eight goals were identified for the MLM, as detailed below. Additionally, Table 24 below provides a comprehensive overview, highlighting the alignment of MLM goals with both national and provincial objectives.

The goals identified for Makhado local Municipality are as follows:

Goal 1 : Waste collection provision services – Ensure the effective and efficient delivery of waste services

Goal 2 : Waste recycling - Increased waste minimisation and recycling

Goal 3: Waste management facilities - Ensure the effective management of landfill sites.

Goal 4 : Waste management information systems - Effective waste information management and reporting.

Goal 5: IWMP implementation and monitoring.

Goal 6: Waste education and awareness - Improved waste education and awareness.

Goal 7: Institutional functioning- Improve institutional functioning and capacity & Financial management - Provision of efficient and financially viable waste management services.

Goal 8: By-laws and enforcement of by-laws - Establish effective compliance with and enforcement of the Waste Act.

Table 24: Alignment Of MLM Goals With The National & Provincial Goals

MLM goal	2020 NMWS	Limpopo -PIWMP(2020-2025)
Goal 1 : Waste collection provision services – Ensure the effective and efficient delivery of waste services	**Goal 2:** Effective and Sustainable Waste Services - this would see all South Africans living in clean communities with waste services that are well-managed and financially sustainable.	• **Goal 1:** Expansion of Waste Services and Cost Recovery • **Goal 5:** Strengthening institutional capacity for waste management
Goal 2 : Waste recycling - Increased waste minimisation and recycling	**Goal 1:** Waste Minimization aims to prevent waste, with a target to divert 40% from landfills within five years through reuse, recycling, recovery, and alternative treatment: 25% waste reduction, controlled generation, and 20% reuse in the economic value chain. **Goal 3:** Waste Awareness and Compliance - the aim is to create a culture of compliance with zero tolerance for pollution, litter, and illegal dumping.	**Goal 2:** Encourage waste minimization initiatives and promote recycling project
Goal 3: Waste management facilities - Ensure Effective Management of Landfill Sites	**Goal 1:** Waste Minimization aims to prevent waste, with a target to divert 40% from landfills within five years through reuse, recycling, recovery, and	**Goal 3:** Establishment of licensed and well-managed waste disposal facilities

MLM goal	2020 NMWS	Limpopo -PIWMP(2020-2025)
	alternative treatment: 25% waste reduction, controlled generation, and 20% reuse in the economic value chain.	
Goal 4 : Waste management information systems - Effective waste information management and reporting	**Goal 2:** Effective and Sustainable Waste Services - this would see all South Africans living in clean communities with waste services that are well-managed and financially sustainable.	**Goal 5:** Strengthening institutional capacity for waste management
Goal 5: IWMP implementation and monitoring	**Goal 2:** Effective and Sustainable Waste Services - this would see all South Africans living in clean communities with waste services that are well-managed and financially sustainable. **Goal 3:** Waste Awareness and Compliance - the aim is to create a culture of compliance with zero tolerance for pollution, litter, and illegal dumping.	**Goal 9:** Develop tools for risk assessment, monitoring and evaluation
Goal 6: Waste education and awareness - Improved waste education and awareness,	**Goal 3**: Waste Awareness and Compliance - the aim is to create a	**Goal 7:** Promote education and awareness on waste issues

MLM goal	2020 NMWS	Limpopo -PIWMP(2020-2025)
	culture of compliance with zero tolerance for pollution, litter, and illegal dumping.	
Goal 7: Institutional functioning- Improve institutional functioning and capacity & Financial management - Provision of efficient and financially viable waste management services	**Goal 2**: Effective and Sustainable Waste Services - this would see all South Africans living in clean communities with waste services that are well-managed and financially sustainable.	**Goal 5:** Strengthening institutional capacity for waste management **Goal 1**: Expansion of Waste Services and Cost Recovery
Goal 8: By-laws and enforcement of by-laws - Establish effective compliance with and enforcement of the Waste Act.	**Goal 3**: Waste Awareness and Compliance - the aim is to create a culture of compliance with zero tolerance for pollution, litter, and illegal dumping.	**Goal 6:** Develop waste regulations and by-laws and strengthening enforcement capacity

9.3 OBJECTIVES AND ALTERNATIVES FOR MAKHADO LOCAL MUNICIPALITY

The primary objective of the Integrated Waste Management Plan (IWMP) is to tackle identified goals by offering multiple solutions. The preliminary actions and targets detailed in table 25 propose various alternatives to achieve these objectives. The following section will delve into alternative actions, emphasizing the significance of taking into account social, economic, and environmental impacts during decision-making.

In alignment with the aforementioned goals, specific objectives and corresponding alternatives have been pinpointed for the MLM. The selected alternatives, emphasized in this section, will be seamlessly incorporated into the implementation plan, ensuring a holistic and comprehensive approach.

Table 25: MLM Waste Management Objectives, Actions, targets And Alternatives

Objective	Actions and Targets	Alternative
Goal 1 : Waste collection provision services – Ensure the effective and efficient delivery of waste services		
1.1.Expand waste collection services (Supply of refuse bags, bins, Contracts with transporters.	• Develop programme to expand services to other areas within the municipality. • Development and adoption of a waste service level in line with National Domestic Waste Collection Standards (2019)	There's is no alternative for this objective
1.2.Provision of efficient and functional Waste management fleet and equipment- Ensure the effective and efficient delivery of waste services. The waste management fleet is sufficient to continue to provide a good waste collection service and there are backup vehicles available when required	• Develop and implement a waste management fleet replacement plan in order to ensure that vehicles are timeously replaced and operate efficiently. • Review level agreements with sub-contractors and establish waste service level agreement policy for the MLM and for sub- contractors.	There is no feasible alternative to this objective.
1.3.A kerbside collection service is provided to all future residential developments	Undertake a route planning exercise in order to ensure that the most economic collection route is followed by the waste collection fleet.	There is no feasible alternative to this objective.
	Waste specifications to be developed for all future municipal and private developments	The alternative to this objective would be to appoint a private service provider to service all new

Objective	Actions and Targets	Alternative
	(e.g. road widths and provision for drop-of centres)	housing developments. This is not deemed as a viable alternative as the MLM is responsible for the provision of refuse collection services to residents.
1.4. Increase and improve the collection of waste In rural areas,	• Undertake a route planning exercise in order to ensure that the rural collection route is followed by the waste collection fleet. • Develop buy-back centres in rural areas, (or areas that are a long distance from the landfill site)	There is already one transfer stations. There is already one transfer station. The next solution will be to establish additional transfer station to promote recycling.
Goal 2 : Waste recycling - Increased waste minimisation and recycling		
2.1. Increased diversion of waste from landfills.	Promote a greater participation of households in the separation at source programme and should raise awareness around what materials can be recycled in order to minimise contamination.	An alternative to this objective could be to install a MRF(Material Recovery Facility) to sort mixed domestic waste.
	Implement drop-off zones , for recyclables in public places	Drop -off facilities, or implement buy-back centres that are easy to reach for community.

Objective	Actions and Targets	Alternative
	Enable an environment for local recyclers to participate and grow in the Recycling / circular economy sector	There is no feasible alternative to this objective.
2.2. The Diversion Of Organic Waste From Landfill Is Increased	Awareness Programme For Household And School Composting Programmes.	The alternative is to develop a regional composting facility- (establish the feasibility)
Goal 3: Waste Management Facilities: Ensure Effective Management of Landfill Sites		
3.1.All waste facilities are operated in accordance with their licenses, and the required legislations.	• Ensure that landfill site comply with waste management license.	There's no alternative for this objective.
3.2.Decreased land-filled waste by 30% volume within 5 years through the 3R´s (waste reduction, re- use, recycling) and alternative treatment. This can be done through a comprehensive integration of waste reclaimers into the landfill	• Develop landfill site monitoring programme. • Encourage and roll-out a community empowerment programmes for the participation of local reclaimers in the landfill • Develop a data base for reclaimers at the landfill site and also look into best practice from other local municipalities regarding	There's no alternative option for this objective.

Objective	Actions and Targets	Alternative
	management of reclaimers at the landfill site. • Provide PPE for registered reclaimers. • Develop a checklist according to license conditions	
Goal 4: Waste management information systems - Effective waste information management and reporting		
4.1. Accurate waste information is reported on the SAWIS on a regular basis. MLM must be accurately aware of the type and quantity of waste generated in the municipality.	A weighbridge must be installed periodically serviced at the landfill for accurate waste quantities recording.	The municipality has a legal requirement in terms of the National Waste Information Regulations to report on the SAWIS.
4.2. Effective internal management of waste related data	All municipal waste facilities are registered and reporting on the SAWIS	The MLM is required in terms of the waste management by-laws, to report on the SAWIS.
Goal 5: IWMP implementation and monitoring		
5.1. Develop IWMP to include guidelines on implementation, recommendations, Key performance indicators and responsibilities	• Development of an IWMP by April 2025. • Endorsement of the IWMP by the MEC by April 2025.	There is no feasible alternative to this project.
5.2. Promote Integrated Waste Management Planning. (including sanitation)	• Stakeholder engagement	There is no feasible alternative to this objective.

Objective	Actions and Targets	Alternative
	• Identify waste types within the MLM that require dedicated waste management protocols (e.g. diapers, Cardboard, Plastic). • **Continuous improvement :** Foster a culture of continuous improvement by regularly reviewing and updating the Integrated Waste Management Plan based on evolving waste management trends, technologies, and community needs. • **Public- Private Partnerships** – Explore opportunities for public-private partnerships to enhance waste management services. Collaborate with private entities for waste collection, recycling, and other related activities, leveraging external expertise and resources.	
5.3. Establish a Local Municipal Environmental Forum and participate in the District Municipal Environmental Forum.	WMO to continue participating in the Local and District Environmental Forum: Waste Sub-Committee quarterly meetings.	There is no feasible alternative to this objective.
5.4. Elevate status of waste management in the IDP process.	Establish a waste management committee	There is no feasible alternative to this objective.

Objective	Actions and Targets	Alternative
5.5. Plans are in place to guide the development of waste management infrastructure which is required to meet national and provincial waste diversion targets	The MLM is to develop a waste infrastructure masterplan to guide the development of waste facilities over the next 10 – 15 years.	The waste management infrastructure plan can also form part of the Waste management services budget and planning
Goal 6: Waste education and awareness - Improved waste education and awareness		
6.1. Waste awareness campaigns are well planned and executed. Sufficient awareness materials are available for the waste awareness campaign	Develop an annual waste awareness calendar and maintain a record of all waste awareness activities undertaken	Use social media, radio, and local newspapers to spread awareness.
	Waste awareness campaigns are to be undertaken by trained and experienced personnel	
6.2. The public, business and industry are informed of what constitutes hazardous waste and how hazardous waste should be managed.	MLM to undertake hazardous waste awareness programmes.	No feasible alternative to this objective.

Objective	Actions and Targets	Alternative
6.3. Waste awareness campaigns are mainstreamed at schools and all learners and educated on good waste management practices	Waste awareness campaigns to be undertaken at all schools within MLM (e.g. school competitions vs puppet shows)	No feasible alternative to this objective.
Goal 7: Institutional functioning- Improve institutional functioning and capacity & Financial management – Budgeting and financing of waste management		
7.1. Institutional functioning- Improve institutional functioning and capacity		
7.1.1. The Solid Waste Management Department has sufficient well capacitated employees to allow for the waste management function to be actioned effectively and for the IWMP to be implemented	The MLM 's Solid Waste Management Department's organogram is to be reviewed to determine whether sufficient positions are listed to allow implementation of this IWMP. All key positions are to be filled	Refer to **Appendix B** for the Recommended waste department structure
	Dedicated employees for waste education and awareness must be appointed. Key performance indicators (KPIs) to be included in their formal job descriptions	An alternative to this project could be to add waste awareness campaigns to existing employees' duties
	Implementation of the IWMP to be added as KPIs to the Waste Manager or supervisors performance evaluation criteria.	No feasible alternative to this objective.

Objective	Actions and Targets	Alternative
	Training schedule developed with training needs for employees at different levels identified.	There is no feasible alternative to this project.
7.2: Financial management – Budgeting and financing of waste management		
7.2.1. Continuous Improvement financial sustainability of waste management in MLM	• Develop financial planning model for waste services to include all costs associated with the provision of waste services and align tariffs with costs.	• Develop and implement tariff models that is cost reflective. • Develop cost of supply study • Develop revenue enhancement study
7.2.2. Allocate more resources for waste management from existing budget and other sources of funding	• Identify funding sources for capital projects (e.g. Municipal Infrastructure Grant (MIG) and motivation of waste projects in IDP and other budgeting processes. • Engage with DFFE / LEDET concerning funding model FOR capital projects (e.g. Municipal Infrastructure Grant (MIG) and motivation of waste projects in IDP and other budgeting processes.	There is no feasible alternative to this objective.

Objective	Actions and Targets	Alternative
7.2.3. Ensure there is adequate budget for new and maintenance of infrastructure for waste management	• The IWMP review must include review of waste services financial plan. • Engage with DFFE / LEDET concerning funding model. • Initiate and explore measures to increase the revenue stream • Ensure ongoing motivation of waste projects in IDP and other budgeting processes • Ensure ongoing annual review of waste services financial plan.	Development of financial plan for waste management.
Goal 8: By-laws and enforcement of by-laws - Establish effective compliance with and enforcement of the Waste Act.		
8.1Littering and illegal dumping is reduced and the by-laws related to waste management issues are enforced	Ensure that there is a provision for a fining schedule in the integrated waste management bylaws.	There is no viable alternate to this objective.
	Appoint a waste ranger to enforce the by-laws.	An alternative to this project would be to add the waste ranger function to existing employees functions. There is a risk that employees may not have capacity to undertake this role in addition to their existing roles. One

Objective	Actions and Targets	Alternative
		could also look to designate one of the current traffic peace officers to focus on waste, however this would reduce the capacity in the traffic department, which is not preferable.
	Undertake clean-up campaigns in areas where litter and illegal dumping is prevalent. These can be undertaken in association with local schools, environmental organisations or communities and used as waste awareness campaign	An alternative to this project would be for the MLM to undertake all clean-up campaigns in-house without engaging the communities. Clean up campaigns can be used to raise awareness so this is not deemed a suitable alternative.
8.2. The waste facility is operated in accordance with the license	Ensure that the landfill site is managed according to its license conditions	There is no alternative to this project
	All waste facilities to be audited internally and externally at the frequency specified in their waste management license or registration	There is no alternative to this project. Internal and external audits are required by the waste management licenses.

10. IMPLEMENTATION INSTRUMENTS

Implementation instruments, refer to the practical tools and mechanisms employed to execute and realize the strategic goals and objectives defined in the plan. These instruments encompass a range of elements such as partnerships with relevant entities, formulation of legislative frameworks, development of economic measures, and establishment of a financial plan. Each of these instruments plays a pivotal role in translating the IWMP from a conceptual framework into tangible actions on the ground. The collaborative involvement of stakeholders ensures that these instruments are tailored to the specific needs and dynamics of the municipality, thereby facilitating effective and sustainable waste management practices.

The implementation instruments encompass several key components vital for the successful execution of the Integrated Waste Management Plan (IWMP). These include:

1. **Partnerships:** Involves collaborations and alliances with external entities, organizations, or community stakeholders to enhance the collective effectiveness of waste management initiatives.
2. **Legislative Instruments:** Involves the development and enforcement of by-laws and regulations to establish a legal framework for waste management practices, ensuring compliance and accountability.
3. **Funding Mechanisms:** Entails the identification and establishment of financial resources and mechanisms to support the implementation of the IWMP. This includes budget allocations, grants, and other financial instruments.
4. **Implementation Plan:** Comprises a detailed and comprehensive roadmap outlining specific actions, responsibilities, and timelines for achieving the goals and objectives set forth in the IWMP. It serves as a guiding document for the step-by-step execution of the waste management plan.

These implementation instruments collectively form an integrated strategy for addressing waste management challenges, ensuring a systematic and coordinated approach to achieve the desired outcomes outlined in the IWMP. They play a crucial role in facilitating effective waste management practices and promoting sustainable solutions within the community.

10.1 PARTNERSHIPS

Establishing partnerships is recognized as a crucial mechanism for delivering the necessary services and facilities integral to the Municipal Integrated Waste Management Plan (MLM IWMP). The expenses and requisites associated with a sustainable waste management system are substantial, necessitating contributions and engagement from diverse stakeholders. Therefore, it becomes imperative for municipalities to foster collaborations with various stakeholders, aiming to sustain and advocate for sound waste management practices among all community members. A spectrum of partnerships, encompassing Public-Public Partnership, Public-Private Partnership, and Public-Community Partnership, can be forged to achieve these objectives. Descriptions of these partnerships are detailed below.

10.1.1. public-public partnerships

Public-Public Partnerships (PUP) refer to collaborations and alliances formed between public entities, such as government agencies, local authorities, or public institutions. In the context of waste management, this type of partnership involves cooperation between different public bodies at various levels, such as municipal, regional, or national, to collectively address and manage waste-related challenges. Public-Public Partnerships aim to leverage shared resources, knowledge, and expertise to enhance the efficiency and effectiveness of waste management practices and initiatives. These partnerships often contribute to the development of comprehensive and coordinated strategies for waste reduction, recycling, and disposal, ensuring a unified approach to address community needs and environmental concerns.
Collaboration and support can be sought through established connections with public institutions. Instances of such existing relationships include:

- LEDET - compliance and enforcement with environmental legislation and EIA regulations, licensing of landfills and other waste activities, quarterly Environmental Forum (EQM)
- DWS – compliance with water legislation and regulations including sewage treatment facilities, cemeteries, catchment management etc.
- Department of Public Works – Extended Public Work Programme (EPWP).

- DFFE- oversees IWMP development by establishing waste management policies to ensure compliance, monitoring and approving municipal and provincial IWMPs, and managing waste data via SAWIS.
- Waste Bureau - One of its functions is to support and advice on the development and implementation of Industry Waste Management Plans.
- Cooperative Governance and Traditional Affairs- The Cooperative Governance and Traditional Affairs (Municipal Infrastructure Grant) funds municipalities to enhance service delivery, particularly in infrastructure development. For waste management, the grant can be used to purchase essential fleet vehicles, such as waste collection trucks and equipment, to improve municipal waste services.
- National Treasury- allocates funds to ensure proper resource distribution.
- Vhembe Biosphere Reserve- Provide funding support for emerging companies with community- and environmentally beneficial projects.

Additional prospects for collaboration and knowledge-sharing could involve partnering with other municipalities in Limpopo that have operational waste management departments.

10.1.2 Public-Private Partnerships

A Public-Private Partnership (PPP) is a collaborative arrangement between a public-sector institution or organization and a private company or party. In this partnership, the private entity assumes the financial risks associated with the project, covering capital costs, facility design and construction, as well as operational expenses. While the public entity typically retains ownership of the land, the fixed assets are funded and sponsored by the private entity, eventually transitioning into state property. This arrangement allows for shared responsibilities and resources, leveraging the strengths of both sectors to achieve project success.

Few existing public-private partnerships are currently in place that are pertinent to waste management in MLM. Recognized partners include:

- Private Waste management and Recycling companies

Establishing partnerships with the private sector is crucial for the effective implementation, especially in waste minimization, reuse, and recycling initiatives. Numerous commercial entities in Limpopo are involved in the recycling or reclamation of various types of waste.

The following solutions must be implemented to ensure to strengthen effective private partnerships:

- Continuous roll-out and implementations of public interventions such as operation Phakisa, the DFFE's Recycling Enterprise Support Programme, and the Waste Bureau these programmes must also have a monitoring and evaluation element to ensure progress and growth of the organisations supported
- PRO's and EPR schemes - PROs and EPR schemes play vital roles in supporting the public sector in waste management by shifting the responsibility for waste from municipalities to producers and manufacturers. PROs and EPR schemes alleviate the financial and operational burdens on the public sector by shifting responsibility to producers. By promoting sustainable practices, investing in infrastructure, and encouraging waste reduction, these initiatives contribute significantly to effective waste management.

  Examples of PRO's that must participate include:

  - The glass recycling company
  - SAPPI
  - Polyco
  - Consol
  - PETCO
- Local recyclers need enhanced empowerment to ensure the establishment and maintenance of effective systems.
- **Other recycling organisations include:**
  - National Recycling Forum
  - Glass recycling association of South Africa

- Paper recycling Association of South Africa
- National Oil Recycling Association of South Africa
- Rose Foundation

10.1.3 Public-Community (NGO/CBO) Partnerships

This collaboration involves community members receiving the service actively participating in the partnership with the public entity providing the service. A common illustration in waste management is the involvement of community-based contractors in recycling programs. This includes tasks such as collecting recyclables separated at the source.

Opportunities for collaboration regarding community-based waste management programs are potential with the following organizations:

- **South African Local Government Association (SALGA):**
  - SALGA offers support across various disciplines, including waste management. MLM can actively engage with SALGA to participate in and derive benefits from their extensive programs.
- **Clean City Campaign (CCC):**
  - CCC encompasses the Recycling Forum and brings together key stakeholders, including councillors, private companies, and NGOs. MLM has the opportunity to collaborate and contribute to this platform, fostering a collective approach to waste management.
- **Institute for Waste Management South Africa (IWMSA):**
  - MLM can explore collaboration with IWMSA by engaging in various training programs. Joining interest groups within IWMSA, such as Collection and Transport, Landfill and Waste Treatment, and Waste Minimization and Recycling, offers MLM opportunities to stay informed and contribute to industry advancements.
- **Environmental Assessment Practitioners Association of South Africa (EAPASA)**
  - (EAPASA) is a body established to regulate and promote the practice of environmental assessment in South Africa. EAPASA offers various training programs and resources to ensure that environmental practitioners operate in compliance with national regulations. MLM can explore collaboration with

EAPASA to ensure that its employees operate in compliance with national regulations.

10.2 LEGISLATIVE INSTRUMENTS: DEVELOPMENT AND ENFORCEMENT OF BY-LAW

The development and execution of Integrated Waste Management Plans (IWMPs) hinge on the enactment of appropriate municipal legislation. Municipalities possess the authority to institute by-laws, which serve to complement national and provincial regulatory frameworks. The enforcement of these by-laws is vital and can be carried out through municipal channels, such as Peace Officers, or through other designated authorities within the municipality, including Ward Counsellors.

It is strongly recommended that MLM undertakes the revision of existing by-laws (as outlined in Provincial Gazette No.2858 of 20 October 2017) and actively implements and enforces relevant provisions to address the following issues in waste management:

- Domestic waste, littering, and illegal dumping.
- Landfill site reclaimers who are residents.
- Disposal of medical waste generated by private medical institutions, such as General Practitioners (GPs) and private clinics.
- Management of industrial waste.
- Handling of commercial waste, with a specific focus on the disposal of used oils, old vehicle body parts, chassis, etc.

10.3 FUNDING MECHANISMS

The successful implementation of the MLM Integrated Waste Management Plan (IWMP) is contingent upon having adequate funds available to execute the plan. Considering the strategies identified in the gap and analysis chapter, funding will likely be essential for the following priority projects recommended:

1. **Waste Management Training and Awareness Programme for Officials and Councillors:**
   - Funding is needed to facilitate comprehensive training programs for municipal officials and councillors to enhance their understanding and proficiency in waste management practices.

2. **Waste Management Awareness Programme for the Public:**
   - Financial support is required for developing and executing public awareness campaigns to educate and engage the community in effective waste management practices.
3. **Waste Management Awareness Initiatives for Informal Settlements and Ward Councillors:**
   - Funding is necessary to implement targeted awareness initiatives tailored to informal settlements, involving collaboration with ward councillors to ensure effective communication and engagement.
4. **Schools Waste Awareness Programmes:**
   - Financial resources are needed to establish waste awareness programs in schools, fostering a culture of responsible waste management among students.
5. **Capacitating Officials for the Implementation of By-Laws:**
   - Capacitating officials through training programs on the implementation of revised by-laws requires funding support to ensure effective enforcement and compliance.

Securing funds for these priority projects will be instrumental in advancing the MLM IWMP, promoting sustainable waste management practices, and fostering community participation and compliance.

10.3.1 FUNDING INSTRUMENTS

The Municipality will need to explore various funding sources for the proposed goals and targets within the Integrated Waste Management Plan. Funding mechanisms can be sourced from both internal and external avenues, encompassing operational budgets, government departments, private sector collaboration, and international funders/donors.

Potential donor/ capital funding sources for the Municipality include:

- **Municipal Infrastructure Grant (MIG):**
  - A funding source aimed at supporting municipal infrastructure projects.
- **Department of Environment, Forestry and Fisheries (DEFF):**
  - Offers various programs and partnerships related to environmental initiatives.

- **Department of Public Works (DPW):**
  - Extended Public Works Programme (EPWP) provides funding for labour-intensive construction methods.
- **Department of Trade and Industry (DTI):**
  - Various programs and schemes that can contribute to waste management goals.
- **Industrial Development Corporation (IDC):**
  - Green Energy Fund from IDC can be explored for environmentally focused projects.
- **Royal Danish Embassy (DANIDA):**
  - Represents a potential international donor source.
- **World Bank:**
  - An international financial institution that may offer support for waste management initiatives.
- **United Nations Development Programme:**
  - UNDP can be a valuable source for funding projects aligned with sustainable development goals.
- **DBSA- Development bank of Southern Africa**
  - DBSA can be a valuable source for funding projects aligned with sustainable development goals and the green economy
- **CSIR- Council for Scientific and Industrial Research**
  - The CSIR can play a role as a source for funding projects aligned with sustainable development goals and the green economy through directed and multidisciplinary research and innovation to accelerate socio-economic prosperity around South Africa.

10.3.2 FINANCIAL MANAGEMENT

To ensure the successful implementation of the MLM Integrated Waste Management Plan (IWMP), a comprehensive financial plan needs to be formulated. This financial plan should be intricately linked to the individual elements of the IWMP, identifying the specific components that require implementation and financing. The following steps are crucial in developing the financial plan:

1. **Identification of Project Elements:**
    - Clearly delineate the different elements and initiatives outlined in the IWMP that require implementation. These may include waste management training programs, public awareness campaigns, infrastructure development, and other targeted projects.
2. **Review and Evaluation of Implementation Models:**
    - Explore various models or alternatives for implementing each project element. Evaluate the feasibility, efficiency, and effectiveness of different approaches to determine the most suitable implementation model.
3. **Establishment of Finance Sources:**
    - Identify and establish diverse sources of financing. This may involve a combination of internal funding from operational budgets, collaboration with government departments, partnerships with the private sector, and seeking support from international funders or donors.
4. **Confirmation of Financing Terms and Conditions:**
    - Confirm the terms and conditions associated with the identified financing sources. This includes understanding the repayment terms, interest rates (if applicable), and any specific conditions attached to the financial support.
5. **Pro-forma Financial Analysis:**
    - Conduct a pro-forma financial analysis to quantify the economic impact of the project. This involves estimating the costs associated with each project element, projecting revenues or savings, and assessing the overall financial feasibility of the IWMP.

By following these steps, the Municipality can develop a robust financial plan that aligns with the specific requirements of the IWMP. This plan will not only guide the implementation process but also provide a clear understanding of the economic implications and benefits associated with the waste management initiatives.

11. IMPLEMENTATION PLAN

The Integrated Waste Management Plan (IWMP) for Makhado Local Municipality serves as a comprehensive framework to assess the current waste management landscape and implement strategies for improvement. Over the next five years, this plan aims to align with the National Waste Management Strategy of 2020 (NWMS), focusing on optimizing and integrating waste management practices. By doing so, the IWMP seeks to enhance efficiency, minimize environmental impacts and financial costs, and contribute to sustainable development in the region.

Central to this effort is improving the quality of life for Makhado residents through key strategies such as reducing waste generation, promoting recycling and resource recovery, and ensuring the proper disposal of residual waste. Public education and community involvement play a crucial role in fostering responsible waste management practices. Ultimately, the IWMP strives to establish a resilient and sustainable waste management system tailored to the needs of Makhado's population.

Key goals identified for Makhado Local Municipality's waste management programme include:

The primary objective of the Integrated Waste Management Plan (IWMP) is to tackle identified goals by offering multiple solutions. The preliminary actions and targets detailed in the table propose various alternatives to achieve these objectives. The following section will delve into alternative actions, emphasizing the significance of taking into account social, economic, and environmental impacts during decision-making.

In alignment with the aforementioned goals, specific objectives and corresponding timeframes and resources required have been pinpointed for the MLM. The selected goals & targets emphasized in this section, will be seamlessly incorporated into the implementation plan, ensuring a holistic and comprehensive approach.

The goals identified for Makhado local Municipality are as follows:

- **Goal 1:** Waste collection provision services – Ensure the effective and efficient delivery of waste services
- **Goal 2:** Waste recycling - Increased waste minimisation and recycling
- **Goal 3:** Waste management facilities - Ensure Effective Management of Landfill Sites

- **Goal 4:** Waste management information systems - Effective waste information management and reporting
- **Goal 5:** IWMP implementation and monitoring
- **Goal 6:** Waste education and awareness - Improved waste education and awareness,
- **Goal 7:** Institutional functioning; Human & Financial Resources Management- Improve institutional functioning and capacity
- **Goal 8:** By-laws and enforcement of by-laws - Establish effective compliance with and enforcement of the Waste Act.

After undergoing a thorough process, the implementation plan for the Integrated Waste Management Plan (IWMP) has been drafted. This plan will be subjected to further stakeholder engagements and input to ensure its alignment with the needs and expectations of the stakeholders.

Table below is a high-level summary of the proposed implementation actions:

Table 26:Draft implementation plan for Makhado local municipality

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
Goal 1: Waste collection provision services – Ensure the effective and efficient delivery of waste services						
Objective 1.1: Expand waste collection services (Supply of refuse bags, bins, Contracts with transporters.)						
1.1.1.	Develop programme to expand services to other areas within the municipality.	Implement collection routes and frequency, and allocate budget.	Revised collection schedule which improves efficiency	MLM	1 – 3 years	OPEX
1.1.2.	Create a sustainable culture in the handling, transportation and disposal of waste	9140 households are targeted in the following areas: Makhado, Dzanani, Tshikota, Waterval, Braambos Airforce Base	Provide kerbside refuse collection to all formal households	MLM	1-5 years	OPEX
			Review of the refuse collection schedule	MLM	0-1 year	OPEX
			Outsourcing refuse collection in certain areas of Makhado Local Municipality or Public partnership agreement	MLM	1-5 years	R8 mil.
			Procurement of refuse collection vehicles	MLM	1-5 years	R10 mil

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
			Provide adequate waste storage facilities for domestic waste by rolling out of 240L wheelie bins to households	MLM	1-5 years	R7,5 mil
Objective 1.2: Provision of efficient and functional Waste management fleet and equipment- Ensure the effective and efficient delivery of waste services. The waste management fleet is sufficient to continue to provide a good waste collection service and there are backup vehicles available when required						
1.2.1.	Develop and implement a waste management fleet replacement plan in order to ensure that vehicles are timeously replaced and operate efficiently.	A fleet replacement policy which considers age, kilometres, and maintenance, repair and fuel costs.	A fleet replacement plan	MLM	1- 3 years	OPEX
1.2.2.	Review level agreements with sub-contractors and establish waste service	Updated service level agreements	Updated service level agreement	MLM	On- going	OPEX

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
	level agreement policy for the MLM and for sub-contractors.					
Objective 1.3: increase and improve the collection of waste In rural areas						
1.3.1.	Undertake a route planning exercise in order to ensure that the most economic collection route is followed by the waste collection fleet.	Implement collection routes and frequency, and allocate budget	Collection route plan	MLM	1 – 3 years	R500 K
1.3.2.	Develop buy-back centres or transfer stations in rural areas, (or areas that are a long distance from the landfill site)	• Operational transfer centre • Operational Buy-back centre,	Construction of buy-back centres and Transfer stations	MLM	1-3 years	R3,5 mil
Goal 2: Waste recycling - Increased waste minimisation and recycling						
Objective 2.1: Increased diversion of waste from landfills.						

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
2.1.1.	Promote a greater participation of households in the separation at source programme and should raise awareness around what materials can be recycled in order to minimise contamination.	• At least 50% of the residential & business must have a waste management plan, with a specific focus on separation at source	Separation at sources master plan	MLM, Vhembe District Municipality and LEDET	1-3 years	R1,5 mil
2.1.2.	Implement drop-off zones, for recyclables in public places	Have a minimum of 1 drop off zone, in public spaces.	Drop -off zone database	MLM	0-1 years	R1 mil
2.1.3	Enable an environment for local recyclers to participate and grow in the Recycling / circular economy sector	• Increase in number of local recyclers • Decrease in number of wastes sent to landfill	A revised list of registered local recyclers, all the landfills & transfer station under MLM	MLM, Vhembe District Municipality, LEDET	0-1 years	OPEX
Objective 2.2: Increased diversion of organic waste from landfills						

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
2.2.1	Increase the diversion of organic waste from the landfill	Develop an organic waste plan and align it with National organic waste compositing strategy.	An organic waste composting plan	MLM & LEDET	1-3 years	OPEX
2.2.2.	Awareness Programme For Household And School Composting Programmes.	Education & awareness plan , that includes organic waste recycling	Education & awareness plan , that includes organic waste recycling	MLM	1-3 years	OPEX
Objective 2.3: Create a sustainable recycling and reuse culture within the municipality including developing infrastructure for recycling						
2.3.1	Promote recycling and recovery of waste	To achieve 15% of recyclables by 2026 and 30% of recyclables by 2030	Establishment of material recovery facilities and drop off centres	MLM	2-5 years	R2,5 mil
			Develop and implement a strategy that will introduce the separation at source	MLM	1-5 years	R350 K
			Implement the Waste to energy project at the	MLM	3-5 years	

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
			Makhado landfill site through PPP			
			Enhance and coordinate all recycling activities including- Formalization of recycling within Makhado	MLM	1-5 years	OPEX
			Establish and implement an organic waste materials policy	MLM	1-5 years	OPEX
			Formulate and implement a waste minimization/ recycling policy	MLM	1-5 years	OPEX
			Outsourcing of waste reclamation at the landfill site	MLM	1-5 years	OPEX
			Construction of Buy-back centres (MRFs) in Makhado	MLM	1-5 years	R2 mil
			Appointment of 1 x official to lead and promote	MLM	1-5 years	

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
			recycling and waste minimisation programmes.			
			Conduct feasibility study and Construction of 1 x compost plant	MLM	1-5 years	R2,5 mil
Goal 3: Waste Management Facilities: Ensure Effective Management of Landfill Sites						
Objective 3.1.: All waste facilities are operated in accordance with their licenses, and the required legislations						
3.1.1.	Ensure the Makhado landfill is managed in accordance with the license conditions.	•A landfill monitoring programme •Internal & external landfill audit are undertaken	Provision of internal and external audit reports	MLM	1-3 years	R2 mil
3.1.2	Construct fencing around the landfill, to manage access control	Fencing around the landfill, and sufficient access control	Fenced landfill site	MLM	1-3 years	R 1 mil.
Objective 3.2.: Ensure the safe and proper disposal of waste						
3.2.1	Effective management and operation of the landfill site	Landfill compliance	Provision of adequate space for the safe disposal of waste through the following:	MLM	1-5 years	R15 mil

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
			• Construction completion for a Mega Cell at Makhado Landfill Site • Investigation of suitable land for establishment of Luvuvhu region waste transfer station and Waterval region waste transfer station • Appointment of external service providers for the operation and management of the landfill site/ alternatively, purchase of landfill plant and equipment			

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
			to operate landfills in-house • Acquisition of landfill equipment for inhouse operation • Appointment and training of staff to operate the landfill equipment/machinery • Installation of weighbridges in Makhado landfill site and Dzanani transfer station			
3.2.2	Effective management of illegal dumping in rural areas	All rural areas	Investigate and develop a strategy for the appropriate waste disposal facilities in rural areas	MLM	1-5 years	OPEX

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
3.2.3	Effective management of waste in public gathering and public open spaces	All public gathering and public open spaces	Develop and implement a strategy for the control and management of waste in public gathering and public areas	MLM	1-5 years	OPEX
3.2.4	Effective management and control of street cleansing	All centralised and decentralised business areas	Develop and implement a strategy for adequate and reliable street cleansing service that will cover all central and decentralised business areas. Install street litter bins along main routes, hiking spots, and CBD	MLM	1-5 years	OPEX
3.2.5	Ensure compliance of municipal landfills	All landfills	Appoint service providers for the operation of landfills/ alternatively, procure equipment for operation of landfills in-house.	MLM	1-5 years	R30 mil

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
Objective 3.3.: Decreased land-fill waste by 30% volume within 5 years through the 3R´s (waste reduction, re- use, recycling) and alternative treatment						
3.3.1.	Implementation of a separation at source programme in households	• Separation at source programme plan/ document • Awareness campaigns	Separation at source plan	MLM	1-3 years	R2,5 mil
Goal 4: Waste management information systems - Effective waste information management and reporting						
Objective 4.1 Effective internal management of waste related data						
4.1.1.	All municipal landfill sites are registered and reported on the SAWIS	Available SAWIS data	Updated SAWIS data	MLM	1 – 5 years	OPEX
4.1.2.	Ensure that the waste information system feeds into the government WIS (waste information system) and meets the requirements	Available SAWIs data	Updated SAWIS data	MLM	1 year	OPEX

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
	of the National waste management strategy					
Goal 5: IWMP implementation and monitoring						
Objective 5.1 Develop IWMP to include guidelines on implementation, recommendations, Key performance indicators and responsibilities						
5.1.1.	Development of an IWMP by April 2025, Endorsement of the IWMP by the MEC by 30th April 2025	Finalised and approved by the council then endorsed by the MEC	An endorsed IWMP	MLM & LEDET	0-1 years	Budget by LEDET
5.1.2	Undertake annual performance reviews of this IWMP, and send reports to LEDET.	Implementation and monitoring of waste management projects.	Implementation and Monitoring Plan	MLM	1-5 years	OPEX
Objective 5.2. Promote Integrated Waste Management Planning						
5.2.1	• Identify waste types within the MLM that require dedicated waste management	An endorsed IWMP by April 2025	hazardous waste management database	MLM	1 – 3 years	OPEX

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
	protocols (e.g. diapers, Hazardous waste). • **Continuous improvement:** Foster a culture of continuous improvement by regularly reviewing and updating the Integrated Waste Management Plan based on evolving waste management trends, technologies, and community needs • **Public- Private Partnerships** – Explore					

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
	opportunities for public-private partnerships to enhance waste management services. Collaborate with private entities for waste collection, recycling, and other related activities, leveraging external expertise and resources					
Objective 5.3. Establish a Local Municipal Environmental Forum and participate in the District Municipal Environmental Forum.						
5.3.1.	WMO to continue participating in the Local and District Environmental Forum:	Attendance of district or regional Waste management meetings	Waste committee proof of attendance & minutes	MLM	0-1 years	OPEX

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
	Waste Sub-Committee quarterly meetings.					
5.3.2.	Establish environmental community clean-up clubs in the municipality	Active Environmental club in the municipality	Awareness plan/ schedule	MLM	0-1 years	OPEX
Objective 5.4. Plans are in place to guide the development of waste management infrastructure which is required to meet national and provincial waste diversion targets						
5.4.1	The MLM is to develop a waste infrastructure masterplan to guide the development of waste facilities over the next 10 – 15 years	Waste Infrastructure Master Plan	Waste Infrastructure Master Plan	MLM	5 -10 years	OPEX
Goal 6: Waste education and awareness – Improved waste education and awareness						
6.1	Enhance public participation to ensure that the community takes ownership of the environment through cleaning campaigns	All Wards	Develop and implement a clean-up programme for all wards	MLM	Continuous	OPEX
			Develop and implement an awareness and education strategy.		Continuous	OPEX

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
	and greening programmes		Create education and awareness among communities on best waste management practices			
			Design/source educational material on waste management		1-5 years	OPEX
			Establish an education and awareness unit within the department		1-5 years	OPEX
			Implement the Adopt-a-Spot policy to encourage and support enviro groups		Continuous	OPEX
			Introduce ward-based cleaning competitions and encourage participants		1-5 years	OPEX
			Establish platform (e.g. hotline) and complaint		1-2 years	OPEX

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
			form on municipal website for reporting of any waste related matter and ensuring efficient client and customer relations			
Goal 7: Institutional functioning; Human & Financial Resources Management						
Objective 7.1. The Waste Management Department has sufficient well capacitated employees to allow for the waste management function to be actioned effectively and for the IWMP to be implemented						
7.1.1.	The MLM 's Waste Management Department's organogram is to be reviewed to determine whether sufficient positions are listed to allow implementation of this IWMP. All key positions are to be filled	Reviewed organogram, with sufficient personnel	Organogram with completed positions	MLM	1-5 years	OPEX
7.1.2.	Implementation of the IWMP to be added as	Training schedule developed with training needs for	Skilled employees	MLM	1-5 years	OPEX

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
	Key performance indicators (KPIs) of the WMOs performance evaluation criteria.	employees at different levels identified.				
7.1.3	Implementation of the IWMP to be added as KPIs to the Waste Manager or supervisors' performance evaluation criteria.	Waste Management Officer – KPI has IWMP implementation	Updated KPI's	MLM	1-5 years	OPEX
Objective 7.2.: Continuous Improvement financial sustainability of waste management in MLM						
7.2.1.	• Allocate more resources for waste management from existing budget and other sources of funding. • Identify funding sources for capital projects (e.g.	• To have a budget that address all the equipment required by 2025/2026 • A database of all funders in place, with relevant proposals	Relevant Budgets & proposals	MLM	1-3 years	OPEX

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
	Municipal Infrastructure Grant (MIG) and motivation of waste projects in IDP and other budgeting processes. • Engage with DFFE / LEDET concerning funding model. Capital projects (e.g. Municipal Infrastructure Grant (MIG) and motivation of waste projects in IDP and other budgeting processes.					
7.2.2	Improve revenue collection from all waste	All Commercial refuse collection areas	Collect data on the commercial refuse	MLM	0-1 year	OPEX

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
	management revenue streams		collection services operating within Makhado Install alternative waste storage and collection facilities in identified business centres - static compactors for commercial businesses waste			
		All Landfill site and households	Implement cost reflective and volumetric tariffs		1-2 years	
		All residential properties	Adjusting refuse collection tariffs to residential properties which accommodate more than 1 household		1-5 years	
		Revenue enhancement	Adjusting the tariffs for Mass containers hiring		1-5 years	

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
		Revenue enhancement and legal compliance	Outsourcing waste reclamation at all Landfill site		1-5 years	
		Revenue enhancement	Ensure revenue enhancement through issuing of Waste transportation and disposal permits		1-5 years	
Goal 8: Compliance and Enforcement						
Objective 8.1.: Review and develop appropriate waste management by- laws based on proposed new goals & objectives						
8.1.1.	Develop appropriate and enforceable waste management by-laws that will protect the environment and enhance the municipality's waste management practices.	Approved Waste by-laws	Reviewed and Gazetted Waste by-laws	MLM	1 year	OPEX

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
	• Approve, publish, and implement the by-laws.					
8.1.2.	Ensure that sufficient, dedicated staff are in place to enforce the by-laws	Appoint dedicated staff to enforce the by-laws	A dedicated team for the enforcement of by-laws	MLM	1 – 3 years	R2 500 000
8.1.3	Systematically monitor and enforce compliance with regulations, authorization conditions and bylaws	All landfills	Conduct internal landfill audits/checklist monthly and quarterly in all landfill sites and transfer station.		Continuous	OPEX
			Implement a proper and effective waste information system,		Continuous	
			Implement an effective waste permitting system to all commercial waste transporters		Continuous	
			Conduct Biannually water sampling monitoring at all landfill sites		Continuous	OPEX

No.	Action / objective	Target	Key performance indicator	Responsible department	Timeframe	Budget
			Establish the landfill committees in all landfill site		0-1 year	OPEX
		All compliance officers	Appointment of waste management officers as peace officers for the enforcement of the by-laws		0-1 year	OPEX
			EMI capacity expanded to enforce the Waste Act		1-5 years	OPEX
		All commercial waste transporters and landfill users	Issuing of Waste disposal permit and waste transportation permit in terms of the municipal solid waste by laws		Continuous	OPEX

12. REPORTING ON IMPLEMENTATION, MONITORING AND REVIEW

Section 13 (3) of Waste Act notes the requirement in Section 46 of the Municipal Systems Act (32 of 2000) for municipalities to compile annual performance reports. Section 13 also specifically requires that progress reports must consider implementation of the IWMP including:

- The extent to which the plan has been implemented during the period;
- The waste management initiatives that have been undertaken during the reporting period;
- The delivery of waste management services and measures taken to secure the efficient delivery of waste management services, if applicable;
- The level of compliance with the plan and any applicable waste management standards;
- The measures taken to secure compliance with waste management standards;
- The waste management monitoring activities;
- The actual budget expended on implementing the plan;
- The measures that have been taken to make any necessary amendments to the plan; These annual reviews should culminate in a formal review report which should be made available to the provincial authorities.

A full review of the IWMP should be undertaken in 2029, however intermediate reviews may also be required if the status quo of waste management changes significantly before 2029.

13. CONCLUSION

In conclusion, the Integrated Waste Management Plan (IWMP) for Makhado Local Municipality (MLM) embodies a comprehensive strategy aimed at tackling the municipality's waste management challenges while aligning with broader provincial and national objectives. Through meticulous Situational Analysis, critical insights into MLM's waste landscape were gleaned, encompassing demographic shifts, waste characteristics, and existing infrastructure.

The identified goals for MLM include:

1. Ensure the effective and efficient delivery of waste services.
2. Increase waste minimization and recycling efforts.
3. Ensure effective management of landfill sites.
4. Establish effective waste information management and reporting systems.
5. Implement and monitor the IWMP.
6. Improve waste education and awareness within the community.
7. Enhance institutional functioning and capacity.
8. Provide efficient and financially viable waste management services.
9. Establish effective compliance with and enforcement of waste regulations through by-laws.

The alignment of these objectives with provincial and national waste management strategies highlights the municipality's commitment to an integrated and coordinated waste management approach. These goals encompass critical aspects such as service delivery, public education, institutional capacity development, and regulatory compliance.

Stakeholder engagement has been a cornerstone throughout the development process, ensuring diverse perspectives are incorporated. This inclusive approach fosters a sense of ownership and broad support for the Integrated Waste Management Plan (IWMP), enhancing both its effectiveness and long-term sustainability.

To bridge existing gaps and elevate waste management practices, a range of implementation mechanisms have been explored, including strategic partnerships, legislative interventions, financial frameworks, and the formulation of a structured

implementation plan. Key recommendations focus on raising awareness through education and training programs, improving waste management infrastructure, addressing illegal dumping, updating waste tariffs, and promoting waste reduction, reuse, and recycling initiatives.

Robust monitoring, evaluation, and review processes are essential to the IWMP's success. A structured monitoring framework will help prioritize objectives and ensure efficient resource allocation. Given the evolving nature of waste management, the IWMP requires continuous assessment, with annual reviews recommended to maintain its relevance and stakeholder engagement. The next scheduled review in 2025 will be critical in preventing obsolescence and sustaining stakeholder confidence.

Ultimately, the IWMP serves as a strategic roadmap for building a resilient and sustainable waste management system within the municipality. Through collaboration, stakeholder participation, and adherence to regulatory standards, the municipality aims to achieve its vision of an efficient, environmentally responsible waste management framework that benefits both the community and the broader ecosystem.

REFERENCE LIST

1. Department of Economic Development, Environment and Tourism, Provincial Integrated Waste Management Plan for Limpopo Province: 2020 - 2025
2. Department of Economic Development, Environment and Tourism, 2019.Limpopo Municipal Waste Services Report.
3. Department of Environmental Affairs and Tourism, 2000. Starter Document for Integrated Waste Management Planning in South Africa, Guideline Document, Pretoria: Government Printers.
4. Department of Environmental Affairs and Tourism, 2006. The National State of the Environment Report South Africa.
5. Department of Environmental Affairs, 2011. National Domestic Waste Collection Standards (GG No. 33935 GN. No. 21). Pretoria: Government Printers.
6. Department of Environmental Affairs, 2011. National Waste Management Strategy. Pretoria: Government Printers.
7. Department of Environmental Affairs, 2018. South African State of Waste Report.

Department of Environmental Affairs, 2019. National Waste Management Strategy. Pretoria: Government Printers.

8. Department of Environmental Affairs, 2019. The South African Waste Information Centre, http://sawic.environment.gov.za .
9. Department of Health, 2020. Health Facilities in Limpopo Province, http://www.doh.limpopo.gov.za/?q=node/25
10. Department of Water Affairs and Forestry, 1998. Minimum Requirements for Waste Disposal by Landfill.
11. Makhado Municipality (2024) Draft IDP Review 2024. Available at: https://www.makhado.gov.za/sstaff/pages/sites/makhado/documents/idp/DRAFT%20IDP%20REVIEW%20%202024%20MARCH%20-%20Copy.pdf
12. Republic of South Africa, 1998. National Water Act, No. 36 of 1998.

Republic of South Africa, 2000. Local Government: Municipal Systems Act (Act No. 32 of 2000).

13. Republic of South Africa, 2012. Government Gazette No. 35583 No. 625 National Waste Information Regulations.
14. Republic of South Africa, 2013 Government Gazette No. 36784 No. 635 National Norms and Standards for the Assessment of Waste for Landfill Disposal.

15. Republic of South Africa, 2013 Government Gazette No. 36784 No. 636 National Norms and Standards for the Assessment of Waste for Landfill Disposal.
16. Republic of South Africa. 1998, Government Gazette No 19519 Volume 401, National Environmental Management Act (Act 107 of 1998). 27 November 1998 No 154 .

APPENDICES

APPENDIX A: LIST OF WASTE RECYCLING COMPANIES

#	Name of recycler	Type of recyclables	Operational status
1.	Trash Converters	Paper Box Glass Cans	Active
2.	Waste Aside	Paper Box Glass Cans	Active
3.	LTT Handelaar	Paper Box Glass Cans	Active

APPENDIX B :RECOMMENDED WASTE DEPARTMENT STRUCTURE

No	Positions	No. Positions	No. Positions Filled	No. Vacant	Additional Positions Proposed
1.	Director Community Services	1	1		
2.	Manager Waste Management (PL3)	1	1		
3.	Air Quality Officer				1
4.	Environmental Officer				1
5.	**Technician: Waste Collection and Disposal (PL04)**	1	1		
	Landfill Manager				1
	Supervisor: Landfill Site (Disposal) (PL8)				1
	Weighbridge Operator (PL10)	1		1	
	Weighbridge Operator Assistant (PL11)				1
	Landfill Compactor Operator (PL10)	1	1		
	Truck Drivers				2
	Landfill Attendant (PL11)	1	1		
	Service Workers (PL15)	5	1		4

No	Positions	No. Positions	No. Positions Filled	No. Vacant	Additional Positions Proposed
6.	**Senior Waste Management Officer (Collection)**				1
	Supervisor: Cleansing and Refuse Collection (Makhado Region) (PL8)	1	1		
	Compactor Truck Drivers (PL10)	6	3		3
	Skip Loader Truck Drivers (PL10)				4
	Team Leader (PL10)				1
	Caretaker (PL10)				1
	Service Workers: Street Cleaning (PL15)	33	17	1	15
	Service Workers: CBD (PL15)	18	13	1	4
	Service Workers: Refuse Removal (PL15)	21	9	6	6
	Supervisor: Refuse Cleansing and Collection (Luvuvhu Region) (PL8)	1		1	
	Compactor Truck Drivers (PL10)	2		1	1
	Skip Loader Truck Drivers (PL10)				2

No	Positions	No. Positions	No. Positions Filled	No. Vacant	Additional Positions Proposed
	Team Leader (PL10)	1		1	
	Caretaker (PL10)	1		1	
	Tractor Driver (PL14)	2		1	1
	Service Workers: Refuse Removal (PL15)	21	4	17	
	Supervisor: Refuse Cleansing and Collection (Dzanani Region) (PL8)	1	1		
	Compactor Truck Drivers (PL10)	3	1		2
	Skip Loader Truck Drivers (PL10)	2			2
	Team Leader (PL10)	1		1	
	Caretaker (PL10)	1		1	
	Tractor Driver (PL14)	2	1		1
	Service Workers: Refuse Removal (PL15)	19	10	7	2
	Supervisor: Refuse Cleansing and Collection (Waterval Region) (PL8)	1		1	
	Compactor Truck Drivers (PL10)	2	1		1
	Skip Loader Truck Drivers (PL10)	2			2

No	Positions	No. Positions	No. Positions Filled	No. Vacant	Additional Positions Proposed
	Team Leader (PL10)	1		1	
	Caretaker (PL10)	1		1	
	Tractor Driver (PL14)	2	1		1
	Service Workers: Refuse Removal (PL15)	18	14	2	2
7.	**Superintendent Solid Waste Management (PL6)**	1			1
	Solid Waste Management Compliance and Enforcement Officer	2			2
	Waste Education and Awareness Officer	2			2
	Environmental Education Officer	1			1
	EPWP Officer: Environment and Culture	1			1
	EPWP Data Capturer (PL8)	1			1
8.	**Transfer Station**				
	Foremen				1
	EPWP Recycling				20
	Service Workers: Refuse Removal (PL15)				5