Musina Local Municipality

Integrated Waste management plan : 2024 to 2029

Draft

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

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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
NEMWA	National Environment Management: Waste Act, 2008
NEM:WA	National Environmental Management: Waste Act, 2014
HCRW	Health Care Risk Waste
MEC	Member of Executive Council
SAWIC	South African Waste Information Centre
SAWIS	South African Waste Information System

List of Abbreviations / Acronyms	
MLM	Musina Local Municipality
BBBEE	Broad-Based Black Economic Empowerment BEE Black Economic Empowerment
CBD	Central Business District
CBO	Community Based Organisations
CCC	Clean City Campaign
CSIR	Council for Scientific and Industrial Research
DEA	Department of Environmental Affairs
DEAT	Department of Environment Affairs & Tourism
DEDET	Department of Economic Development, Environment and Tourism
DM	District Municipality
DMC	District Municipal Council
DoH	Department of Health
DTI	Department of Trade and Industry
DWAF	Department of Water Affairs & Forestry
DWS	Department of Water and Sanitation
ECA	Environment Conservation Act, Act 73 of 1989
EIP	Environmental Implementation Plan
EMI	Environmental Management Inspector
EO	Environmental Officer
EPWP	Extended Public Work Programme
FBRR	National Policy on Free Basic Refuse Removal
GPs	General Practitioners
HCRW	Health Care Risk Waste
HDPE	High Density Polyethylene
HR	Human Resource
IDP	Integrated Development Plan
IWMSA	Institute for Waste Management South Africa
PRO	Producer Responsibility Organisation
EPR	Extended Producer Responsibility
PIWMP	Provincial Integrated Waste Management Plan
WMO	Waste Management Officer

List of Abbreviations / Acronyms	
SME's	Small and Medium Enterprise's
WIS	Waste Information System
MRF	Material Recovery Facility
HHW	Household Hazardous Waste

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(Plan)	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	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

Word	Description
	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.
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, Act 59 of 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, Act 26 0f 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

Word	Description
	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.
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 Musina Local Municipality (MLM) represents a comprehensive strategy aimed at addressing the municipality's waste management challenges while aligning with broader provincial and national objectives. Initiated by the Department of Economic Development, Environment and Tourism (LEDET), this plan is part of a collaborative effort to support municipalities in formulating effective waste management strategies as mandated by national regulations.

Through meticulous Situational Analysis, crucial insights into MLM's waste landscape were obtained, considering demographic shifts, waste characteristics, and existing infrastructure. The IWMP outlines clear and measurable goals, ranging from improving waste services delivery to enhancing institutional capacity and compliance with waste regulations.

Stakeholder engagement has been integral throughout the development process, ensuring diverse perspectives are considered. Recommendations include promoting waste management awareness, enhancing facilities, and implementing waste reduction initiatives.

Monitoring, evaluation, and review mechanisms are vital for IWMP success, with annual assessments recommended to maintain relevance and stakeholder engagement. The IWMP serves as a roadmap towards a resilient waste management framework for MLM, fostering sustainability and positively impacting the local community and environmental landscape.

1. INTRODUCTION

LEDET is dedicated to providing support to seven municipalities in the development of their Local Municipal Integrated Waste Management plans. This initiative aligns with the requirements outlined in section 11 (4) of the National Waste Management Act 2008 (Act no. 59 of 2008). The objective is to assist these municipalities in establishing effective waste management strategies and plans that not only adhere to national regulations but also align with the National Waste Management Strategy. This collaborative effort aims to contribute to a more sustainable and environmentally responsible waste management system. Through this initiative, LEDET seeks to promote responsible waste management practices, ensuring that all plans and actions are in line with the National Waste Management Strategy and that municipalities are well-prepared to manage their waste in compliance with legislative requirements.

A public invitation to bid, titled "Appointment of professional service providers for the development of a municipal integrated waste management plan for seven (07) Municipalities in the Limpopo Province", with the Bid Reference number : EDET 291/2023 was advertised on all relevant platforms.

Musina Local Municipality is one of the municipalities selected to develop its Integrated Waste Management Plan (IWMP) through the current process facilitated by the appointed professional service provider, Mosa Green Consulting. This project is part of the initiative to support municipalities in formulating comprehensive waste management strategies as mandated by relevant regulations. Mosa Green Consulting will play a pivotal role in guiding and assisting Musina Local Municipality in crafting an effective IWMP that aligns with regulatory standards and promotes sustainable waste management practices within the region.

The aim of the Integrated Waste Management Plan (IWMP) for MUsina Local Municipality is to assess the current state of waste management and propose strategies for its improvement. Specifically, the objective is to outline a roadmap for waste management in the municipality over the next five years. In line with the National Waste Management Strategy of 2020 (NWMS), the primary goal is to integrate and optimize waste management practices to maximize efficiency while minimizing environmental impacts and financial costs. By doing so, the IWMP seeks to

enhance the quality of life for all residents of Musina and contribute to sustainable development in the region. This involves implementing measures to reduce waste generation, increase recycling and resource recovery, and ensure the proper disposal of residual waste. Additionally, public education and community engagement will play a crucial role in fostering a culture of responsible waste management practices. Overall, the IWMP aims to create a more sustainable and resilient waste management system that meets the needs of the population in Musina Local Municipality.

The NWMS also presents the waste management hierarchy which outlines the preferred methods for management of waste, as illustrated in figure 1 below,

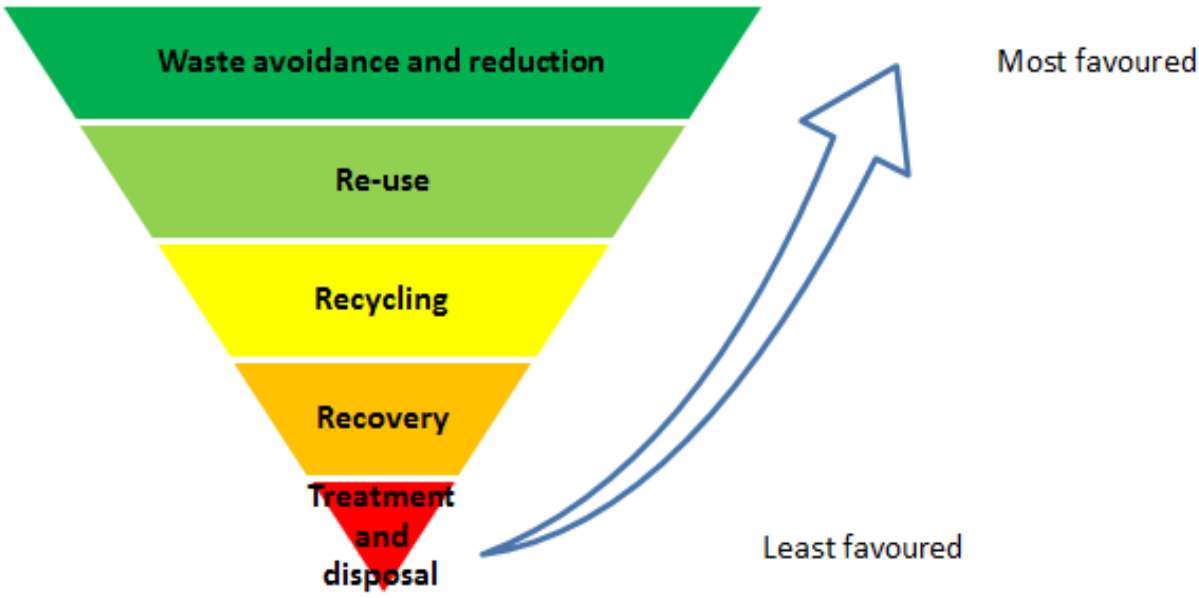

Figure 1: The Waste Hierarchy as per The National Waste Management Strategy , (DEA, 2011)

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). Figure 1, illustrates the adopted process which was used for integrated waste management planning.

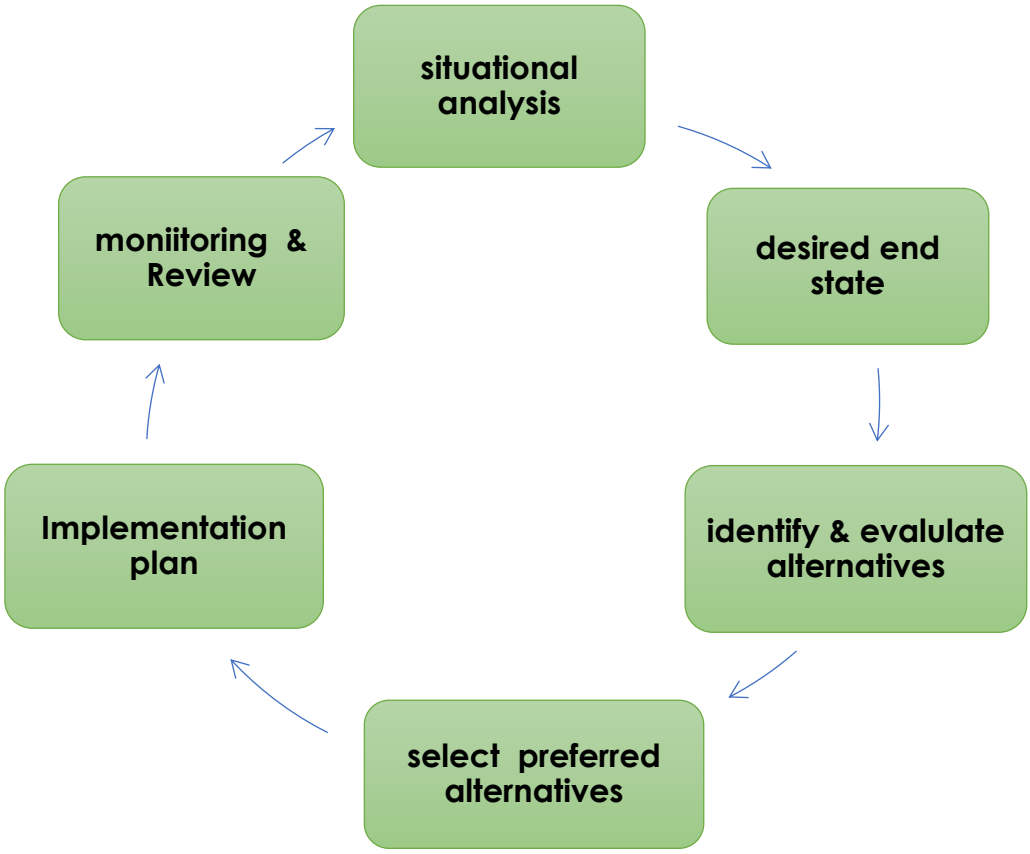

Figure 2: IWMP Planning Process

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

1.3. LEGISLATIVE REQUIREMENTS

The Republic of South Africa is committed to environmental protection through a comprehensive legislative framework. The nation adheres to various national acts, regulations, guidelines, and international conventions that play a crucial role in shaping the development of Integrated Waste Management Plans (IWMPs). The upcoming sections and tables offer a brief summary of critical South African legislation that oversees waste management.

The requirements of the National Environmental Management Waste Act (Act 59 of 2008, as amended) (refer to Table 3) and the Department of Environmental Affairs (DEA) Guideline for the Development of Integrated Waste Management Plans were used to guide the development of this IWMP.

Table 3: South African National Standards

National Act	Relevance
The Constitution of the Republic of South Africa (Act 108 of 1996)	The supreme law of the country and provides the legal foundation for every law developed. Everyone has a right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development and use.
The National Environmental Management Act (Act 107 of 1998) as amended (NEMA)	The framework Act dealing with environmental management in South Africa. It imposes a duty of care on every person who causes environmental degradation to put measures in place to stop, reduce or rectify the pollution as it occurs. The Environmental Impact Assessments (EIAs) that are required for the establishment and management of waste facilities are conducted under this legislation. The National Environmental Management Principles in S2 of the Act provide for the sound management of the environment, which includes waste aspects such as the polluter pays-, duty of care-, proximity-, regionalization- and cradle-to-grave principles. S24 of the Act makes provision for the application and enforcement of waste management licenses. The duty of care and the remediation of environmental damage are addressed in S28 of the Act. The principles enunciated in the NEMA need to inform waste management decision making and practices.

National Act	Relevance
The National Environmental Management Act: Waste Act (Act 59 of 2008) as amended (NEM:WA)	Regulates waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith. S11 of the NEW:WA, as amended, requires provincial departments, responsible for waste management to prepare IWMPs. S12 of the Act elaborates on the contents of IWMPs, while S13 provides the requirements for the implementation and reporting of IWMPs.
The National Environmental Management: Air Quality Act (Act 39 of 2004) as amended	Reforms the law regulating air quality in order to protect the environment by providing measures for the prevention of pollution and ecological degradation and for securing ecological sustainable development while promoting justifiable economic and social development; provides for national norms and standards regulating air quality monitoring, management and control of all spheres of government; for specific air quality measures; and for matters incidental thereto. This Act is furthermore relevant to the management of waste as it may impact on air quality and ultimately contribute to the mitigation of climate change. S15 of NEM: AQA requires the provincial department responsible for air quality management to prepare an Air Quality Management Plan. This plan is separate from the IWMP, but the MPIWMP does take mitigation and planning measures into account in the context of the impacts of waste on air quality.

National Act	Relevance
The National Water Act (Act 36 of 1998) (NWA)	Controls pollution as it impacts upon surface and ground water in the country. The Act imposes a duty of care on polluters to restrict the amount of pollution contaminating water resources. It also deals with Water Use Licenses. These are needed for users who discharge water containing waste into a water resource, amongst others. The MPIWMP shall take cognizance of the requirements of the NWA to the extent that it relates to waste management. S20 – prescribe the control of emergency incidents that may pollute or have detrimental impact on a waste source S21 – lists "water uses" activities that necessitates an application for a Water Use License amongst: Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit; Disposing of waste in a manner which may detrimentally impact on a water resource; Disposing in any manner of water which contains waste from or which has been heated in any industrial or power generation process.
National Waste Management Strategy of the NEM: WA, 2008 (NWMS)	Item 6 (draft) Compulsory National Standards in terms of S9(1) and Measures to Conserve Water in terms of S 73(1)(j) A water services institution must take reasonable measures to prevent any substance other than uncontaminated storm water to enter – any storm water drain; or any watercourse, except in accordance with the provisions of the National Water Act, Act 36 of 1998. A water services institution must take reasonable measures to prevent storm water from entering its sewerage system.

National Act	Relevance
	Item 12 (draft) Compulsory National Standards: A water services institution must ensure that any major or visible leak in its water services system is repaired within 48 hours after the water services institution became aware thereof. A water services institution must have a consumer service to which leaks can be reported.
The Environment Conservation Act (Act 73 of 1989)	Provides for the effective protection and controlled utilization of the environment. This Act has been largely re-pealed by the NEMA, but certain provisions remain, such as the Regulations for the prohibition of the use, manufacturing, import and export of asbestos and asbestos-containing materials (GN 341 of 2001), which is applicable to the management of asbestos- or asbestos-containing waste material.
The Mineral and Petroleum Resources Development Act (Act 28 of 2002)	Given effect to the objects of Integrated Environmental Management mining applications are required to include an Environmental Management Plan (EMP), which covers waste management issues. Provides for the regulation and management of mining waste in the form of residue deposits and residue stockpiles. The management of residue deposits and residue stockpiles has been excluded from the MPIWMP, since the management of these mining-related wastes is the mandate of the Department of Mineral Resources (DMR).
The Explosives Act (Act 15 of 2003)	Provides for the regulation of explosives including the destruction thereof. This Act is relevant to the waste economy only in so far as the destruction/disposal of explosives is concerned.
National Health Act, 2003 (Act 63 of 1977)	Defines "municipal health services" to include water quality monitoring; food control; waste management; health surveillance of premises; surveillance and prevention of communicable diseases, excluding immunizations; vector control; environmental pollution control; disposal of the dead; and chemical safety, but excludes port health, malaria control and control of hazardous substances.

National Act	Relevance
	S20 (1) (a) states that "every local authority shall take all lawful, necessary and reasonably practicable measures to maintain its district at all times in a hygienic and clean condition." S20(1)(b) states that "every local authority shall take all lawful, necessary and reasonably practicable measures to prevent the occurrence within its district of any nuisance, unhygienic condition, offensive condition or any other condition dangerous to the health of any person." S32 of the Act requires that the municipal health services [including waste management must be effectively and equitably provided. Furthermore, national and provincial government must enter into a service level agreement as contemplated in S156 (4) of the Constitution, assigning the administration of the listed matters to the Municipality. The service level agreement must according to S32(3) provide for: • the services to be rendered by the Municipality; • the resources that the relevant member of the Executive Council must make available performance standards which must be used to monitor services rendered by the Municipality; and conditions under which the agreement may be terminated. This Act also pertains to health care waste management, which is referred to as Health Care Risk Waste (HCRW) in the Waste Act. The Act in relation to waste activities designates the municipal services by including waste management in terms of formulating regulations regarding medical and health care waste by the Minister responsible.

National Act	Relevance
	Note that careful consideration should be given in the MPIWMP with regards to HCRW because health care waste and hazardous waste are considered as a provincial responsibility. (it is undertaken by the Department of health)
The Disaster Management Act, (Act 57 of 2002)	provides a framework for the effective management and coordination of disaster response and recovery efforts in South Africa. It outlines the roles and responsibilities of various authorities, establishes the National Disaster Management Centre, and sets forth procedures for declaring a state of disaster. The Act aims to enhance the country's resilience and preparedness in dealing with disasters, whether natural or human-made, and facilitates a coordinated and efficient response to mitigate their impact on communities and infrastructure.
The National Health Act (Act 61 of 2003)	The National Health Act (Act 61 of 2003) is a pivotal piece of legislation in South Africa that governs various aspects of the country's health system. Enacted to promote and protect public health, the Act outlines principles and norms for healthcare services. It addresses matters such as patient rights, confidentiality of health information, and the establishment of the Office of Health Standards Compliance.
The Hazardous Substances Act (Act 15 of 1973)	The Hazardous Substances Act (Act 15 of 1973) in South Africa is legislation designed to regulate the control, use, and handling of substances with inherent hazards. Enacted to protect public health and the environment, the law empowers the government to oversee the import, manufacturing, sale, and disposal of hazardous substances. This includes the classification of such substances, setting permissible exposure limits, and the licensing of activities involving them. The Act aims to mitigate potential risks associated with hazardous substances, ensuring that their management adheres to strict safety standards.

National Act	Relevance
The Housing Act, No. 107 of 1997	S9(1) (a) (ii) states that "every Municipality must, as part of the Municipality's process of integrated development planning, take all reasonable and necessary steps to ensure that conditions not conducive to the health and safety of the inhabitants of its area are prevented or removed."
The Municipal Structures Act (Act 117 of 1998)	The Municipal Structures Act (Act 117 of 1998) sets the stage for effective waste management at the local level in South Africa by defining the structure and functions of municipalities. Within the framework of this Act, municipalities are empowered to develop and implement Integrated Waste Management Plans (IWMPs) in line with national legislation, such as the Waste Act of 2008. The Act establishes the authority and responsibilities of local government in waste management, emphasizing the importance of coordination, planning, and community involvement. This ensures that municipalities play a vital role in managing and mitigating the environmental impact of waste within their jurisdictions.
The Municipal Systems Act (Act 32 of 2000) as amended	Establishes the need for environmentally sustainable service delivery and the need for local IDPs. The Act defines the different levels of service provider and distinguishes between the service authority and the service provider. The Act states that municipal services have to be financially sustainable. It establishes the process through which municipalities should go in order to outsource service delivery functions, through the so-called S78 process.
The Municipal Finance Management Act (Act 56 of 2003)	Should be complied with should a Municipality decide to outsource service delivery functions. The object of this Act is to secure a sound and sustainable management of the fiscal and financial affairs of municipalities and municipal entities by establishing norms and standards and other requirements for- Ensuring transparency, accountability and appropriate lines of responsibility in the fiscal and financial affairs of municipalities;

National Act	Relevance
	• The management of their revenues, expenditures, assets and liabilities and the handling of the financial dealings. • Budgetary and financial planning processes and the coordination of those within the processes of organs of state in other spheres of government. • Borrowing; • The handling of financial problems in municipalities; • Supply chain management; and Other financial matters.
The Occupational Health and Safety Act (Act 85 of 1993)	Contains provisions that protect waste workers from harm during the waste management process. In particular there are regulations protecting workers and the public from exposure to asbestos, hazardous chemicals and lead. The act and its regulations are of particular importance to the management of the health and safety of workers responsible for the handling of waste. This Act could also be applicable to waste harvesters, if they are allowed by a Municipality to reclaim waste. All waste facilities and its employers are covered by this act defining safe working environment and conditions. This includes the responsible management of people salvaging from a waste facility.
The Public Finance Management Act (Act 29 of 1999) as amended	Regulates financial management in the national and provincial government to ensure that all revenue, expenditure, assets and liabilities of those government are managed efficiently and effectively, to provide for the responsibilities of persons entrusted with financial management in those government, and to provide for matters connected therewith. This Act is of importance to the financial aspects of waste management planning.

National Act	Relevance
The National Domestic Waste Collection Standards (Government Gazette No. 33935, 21 January 2011)	The National Domestic Waste Collection Standards, as outlined in Government Gazette No. 33935 on 21 January 2011, serve as a crucial set of guidelines in South Africa for the proper and standardized collection of domestic waste. These standards provide a framework for municipalities and waste management entities to ensure consistency and efficiency in the collection process, addressing aspects such as collection frequencies, container types, and segregation practices. By setting clear parameters, these standards contribute to effective waste management practices, promoting environmental sustainability and public health
The National Policy for the Provision of Basic Refuse Removal Services to Indigent Households (GN 34385, 22 June 2011)	The National Policy for the Provision of Basic Refuse Removal Services to Indigent Households, a stipulated in Government Notice 34385 on 22 June 2011, outlines a comprehensive framework in South Africa for ensuring that basic refuse removal services are provided to households facing financial hardships. The policy is designed to promote inclusivity and address socio-economic disparities by establishing criteria for identifying indigent households and defining the scope of essential refuse removal services that should be provided to them. It likely includes considerations such as the frequency of refuse collection, types of waste covered, and mechanisms for ensuring affordability for qualifying households. To gain a precise understanding of the policy's details, referring directly to the official government publication or relevant authorities in South Africa is recommended.

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 2021/2022.

(vii) General information was gathered as part of the investigative process obtained from the Musina Local Municipality IDP (2022/2023) and STATS 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.

2.3. GEOGRAPHIC AREA

Covering an extensive expanse of 10,347 square kilometres in the Vhembe District, Limpopo Province, South Africa, Musina is bordered by Zimbabwe to the north, Makhado and Musina to the south, Mozambique to the east, and the Capricorn District to the west (refer to Figure 2.1). Situated in close proximity to the Beit Bridge border post, Musina holds a pivotal role as a primary entry point into South Africa from the northern countries. The municipality's economic foundation is diverse, with key sectors including Agriculture, Forestry, and Fishing (35%), Mining (30%), Transport and Communication (15%), Manufacturing (11%), Finance and Business Services (9%), Wholesale & Retail Trade, Catering, and Accommodation (6%), Community, Social, Personal Services (6%), Government Services (5%), and Construction (5%).

Musina prides itself on a rich tapestry of tourist attractions, featuring renowned sites such as Mapungubwe National Park, designated as a World Heritage site, De Beers Game Farm, Musina Nature Reserve, Poppalin Ranch, Ratho Crocodile Farm, Beit Bridge, Limpopo River, Iron Ore Mine, Musina Old Copper Mine, De Beers Diamond Mine, Nwanedi-Luphephe, Aventura Tshipise, Kruger National Park Phafuri Gate, Tshipise-Sagole, Big Tree, Awelani Eco-Park, and a segment of Makuya Nature Reserve. Additionally, the region hosts numerous game farms, conservancies, national parks, nature reserves, and resorts that contribute to the area's allure. Ongoing endeavors in tourism and conservation play a significant role in the ongoing development of the region.

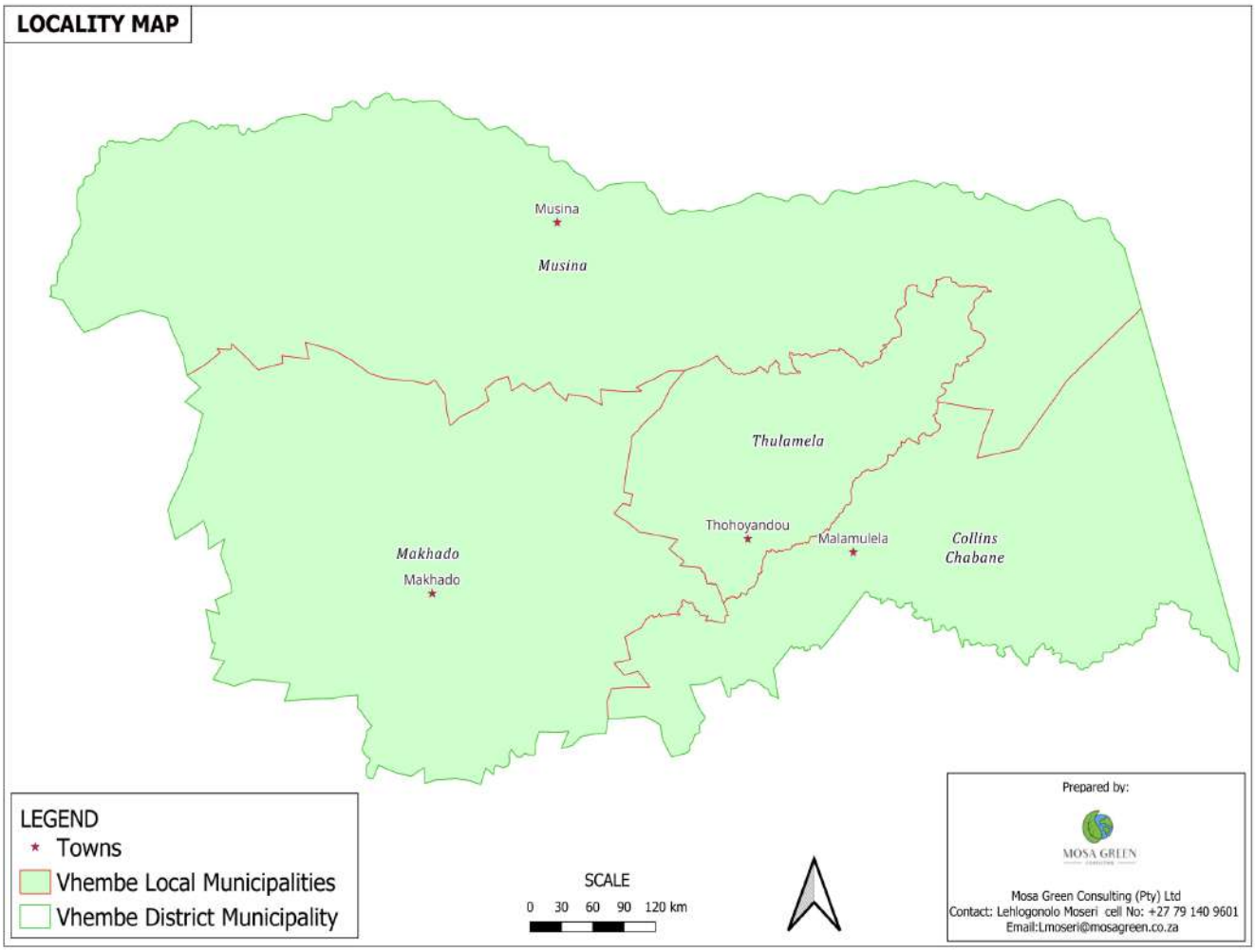

FIGURE 3: Vhembe District Municipality Locality Map

2.4. LOCALITY OF MUSINA LOCAL MUNICIPALITY

Musina encompasses a land area of approximately 10,347 km2 within the Vhembe District of the Limpopo Province in South Africa. It is the Positioned in close proximity to the Beit Bridge border post with Zimbabwe, it serves as a key entry point into South Africa from the north. The municipality shares borders with Zimbabwe to the north, Makhado and Musina to the south, Mozambique to the east, and the Capricorn District to the west (refer to Figure 2.1). The economic vitality of Musina is diversified, with major contributors including Agriculture, Forestry, and Fishing (35%), Mining (30%), Transport and Communication (15%), Manufacturing (11%), Finance and Business Services (9%), Wholesale & Retail Trade, Catering, and Accommodation (6%),

Community, Social, Personal Services (6%), Government Services (5%), and Construction (5%).

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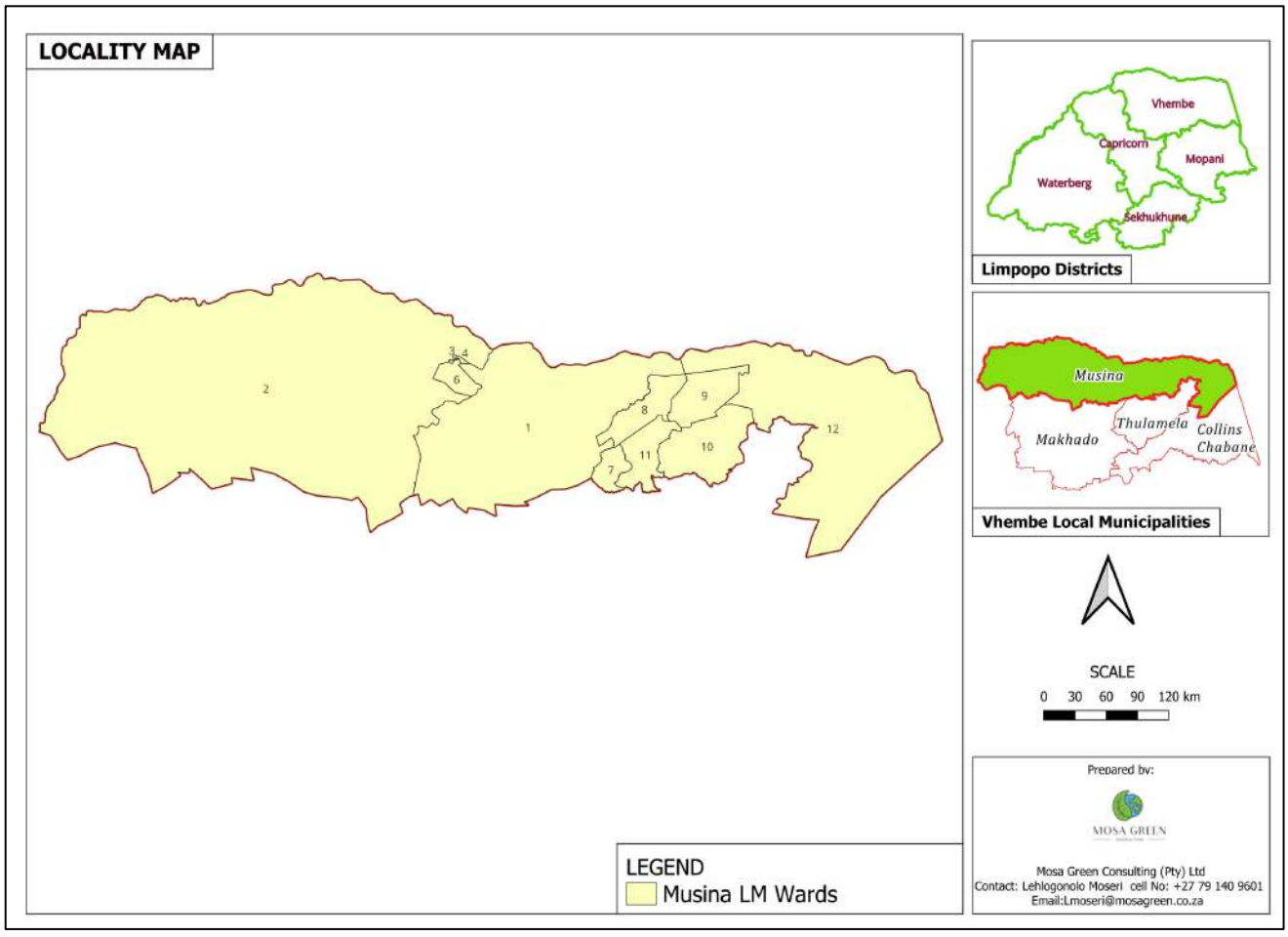


Figure 4: MLM locality map & wards

2.5. DEMOGRAPHICS AND POPULATION GROWTH

2.5.1. DEMOGRAPHIC – POPULATION AND PROFILE

The demographic landscape and developmental characteristics of Musina Local Municipality together offer a comprehensive depiction of its population. Demographics encompass a diverse set of statistical 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.

2.5.1.1. POPULATION SIZE AND DISTRIBUTION

Population data has been extracted from Statistics South Africa, relying on the records of the 2022 Census and the Musina Local Municipality Integrated Development Plan (IDP) for the year 2021/2022. According to the latest Statistics South Africa Census conducted in 2022, the Musina Local Municipality (MLM) has a total population of 130,899 individuals distributed across 45,934 households. This reflects a substantial 25% increase compared to the population figures recorded in the 2011 Stats SA census, which reported a population of 104,709 for the municipality. This notable surge in

population is attributed to the dissolution of the Mutale Local Municipality in 2016 and the subsequent integration of specific areas into the Musina Local Municipality. Presently, Musina Local Municipality comprises twelve wards and is represented by a complement of twenty-four councillors.

Table 3 below shows the total population, as well as the gender distribution, for both 2011 and 2022. The demographic data for Musina Local Municipality from 2011 to 2022 indicates a notable growth in the total population. In 2011, the population stood at 104,709, while it experienced a substantial increase to 130,899 by 2022. Examining gender distribution within the population, the data reveals a consistent pattern. In 2011, there were 51,183 males and 53,526 females, while in 2022, the male population increased to 68,221, and the female population reached 62,678. The higher male population in both years suggests potential demographic shifts or variations in gender-specific factors, which could be further explored for a deeper understanding. Analysing the gender ratios, it is evident that the male-to-female ratio has increased over the years, indicating a change in the demographic composition. The main factor including this shift is the dissolution of the Mutale Local municipality, with that being said , other actors could be due economic opportunities, social dynamics, or migration patterns that attract a higher number of males to the municipality.

Table 4: Total Population & Gender Distribution For 2022 & 2011 (STATS SA 2022)

Table 4 and figure 3 demonstrates The demographic breakdown by racial groups in the population reveals a predominantly Black African composition, accounting for a substantial 96.8% of the total. Coloured individuals make up a minimal 0.3%, while the Indian/Asian demographic comprises 0.6%. The White population represents 2.3%, and a negligible fraction falls under the "Other" category. This distribution underscores 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 5: Population Racial Distribution (Stats SA 2022)

Racial Group	Frequency	%
Black African	126 607	96,8%
Coloured	369	0,3%
Indian/Asian	736	0,6%
White	2 991	2,3%
Other	42	0,0%

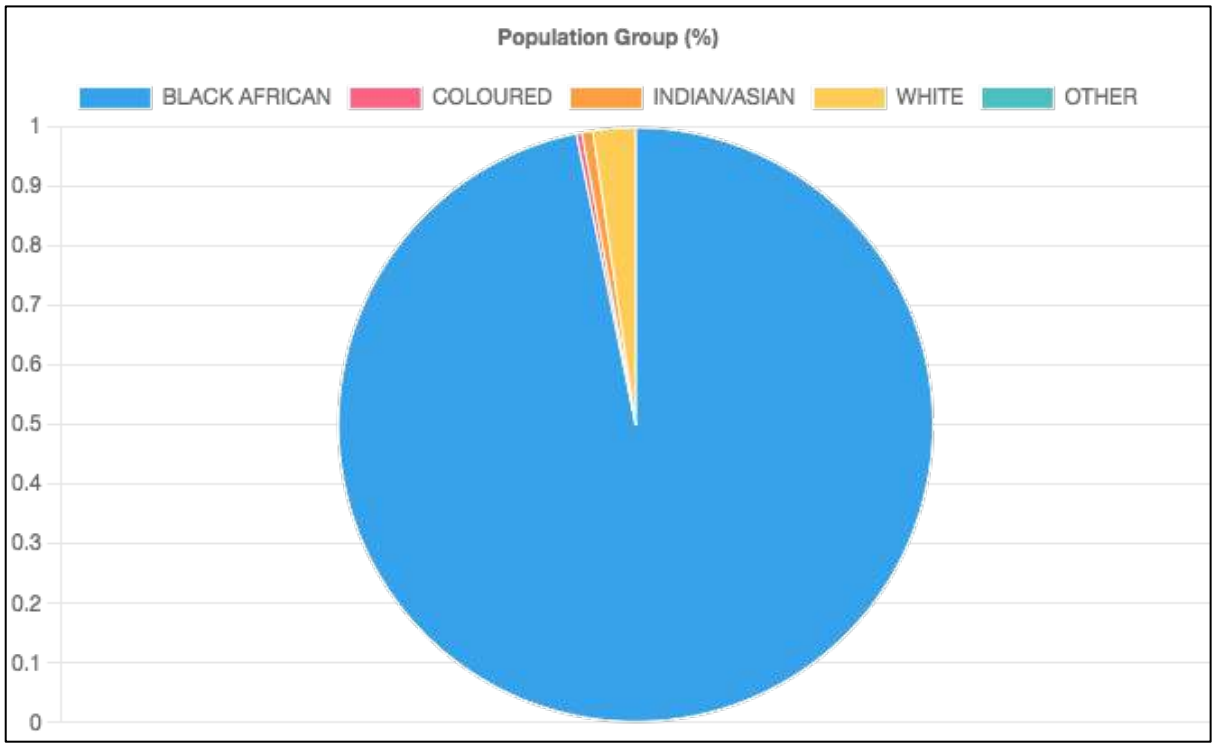


Figure 5: Chart of Race Population Distribution (STATS SA 2022)

2.5.1.2. HOUSE HOLDS AND LIVING CONDITIONS

Table 6: Number Of Households (STATS SA 2022)

Year	Number of Households
2022	45 934
2011	29 590

Table 5 above indicates the data on the number of households in Musina Local Municipality indicates a substantial increase from 29,590 households in 2011 to 45,934 households in 2022. This significant growth, representing a surge of about 55.1%. The main reason for the increase in population at that rate is that Mutale Local Municipality was disestablished and merged into Musina Local Municipality on 3 August 2016. This may be the main cause of the population increase in the Musina Local Municipality. This also suggests dynamic demographic changes, urbanization, or developmental initiatives within the municipality. 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 underscores 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.

The municipality will benefit ensuring propre planning for this increase in population and numbers. Regular updates and assessments will be crucial for informed decision making, and sustainable development within the municipality

Table 7: Formal Dwellings (STATS SA 2022)

Name	Frequency	%
Formal dwelling	41 728	90,8%
Traditional dwelling	1 280	2,8%
Informal dwelling	2 762	6,0%
Other	164	0,4%

Within the municipality, there are a total of 45,934 households. The distribution of dwelling types among these households reveals that 66.9% (29,262) reside in houses, 11.1% (4,856) live in flats and backyard dwellings, 9.1% (3,976) inhabit traditional houses, and 8.3% (3,644) call shacks their home, according to the Community Survey of 2016. The data presented in Table 6 illustrates the proportional representation of different dwelling types among households in the municipality.

2.5.1.3. AVERAGE HOUSE HOLD INCOME

Table 8: Average Household Income (Community Survey 2016)

INCOME	Percentage (%)
R0 – R400	0,4%
R400 – R800	0,3%
R800 – R1,6K	3,2%
R1,6K – R3,2K	13%
R3,2K – R6,4K	32,9%
R6,4K – R12,8K	6,8%
R12,8K – R25,6K	11,9%
R25,6K – R51,2K	22,4%
R51,2K – R102,4K	7,2%
R102,4K – R204,8K	1,6%
R204,8K – R409,6K	0,3%
R409,6K – R819,2K	0%

The income distribution within the Musina Local Municipality (MLM) population, as presented in the table, reveals interesting insights. A small proportion of the population, totalling 4.9%, falls within the lower-income brackets (R0 – R3,200), suggesting that a limited segment faces financial constraints. In contrast, a significant majority, comprising 83.6%, falls within the middle-income brackets (R3,200 – R51,200), indicating a substantial portion of the population with moderate to relatively high incomes. The higher-income brackets (R51,200 and above) collectively represent 31.2% of the population, revealing a noteworthy but not dominant presence in these categories. Notably, the last two brackets (R409,6K – R819,2K and above) account for only 0.3%, suggesting either a scarcity of individuals with extremely high incomes or potential data limitations in these categories. This income distribution reflects the economic diversity within MLM, emphasizing a significant middle-class presence and providing valuable insights for municipal planning and resource allocation to address the varying needs of different income groups effectively. Understanding these income dynamics is pivotal for formulating targeted social programs and ensuring equitable development within the municipality.

2.5.1.4. AGE AND GENDER DISTRIBUTION

Referring to Table 8 provided below, a significant proportion (94.3%) of the population remains in the youthful bracket, falling within the 15-64-year age range. Conversely, the 65 and older category comprises a modest fraction, accounting for 4.2% of individuals (Census, 2022).

The prevailing pattern in age distribution necessitates that government departments and the Municipality allocate a substantial portion of the budget to Social Development Facilities. This allocation is crucial for addressing the requirements of the predominantly youthful population and ensuring that individuals in this age group acquire pertinent skills, fostering their development into responsible adults. Additionally, a pivotal aspect of the Municipality's developmental agenda, in collaboration with sector departments such as Education, Health, Public Works, Roads, and Transport, should include the creation of more job opportunities.

Table 9: Age Vs Gender Distribution (STATS SA 2022)

Age	0-19		20-39		40-59		60-85+	
Gender	Male	Female	Male	Female	Male	Female	Male	Female
Percent (%)	20,1	17,2	21,9	18,9	7,8	8,4	2,1	2,1

2.5.1.5. EDUCATION AND EMPLOYMENT STATUS

The educational level of the population in Musina Local Municipality is detailed in Table 9 and Figure 4 below, specifically highlighting the count of individuals with primary, secondary, and tertiary qualifications. This data is sourced from the STATS SA CENSUS 2022, providing insights into the educational profile of the community.

The educational data reveals a notable distribution across various levels, highlighting both strengths and areas for improvement within the community. A significant proportion of the population has attained only a "Some Secondary" education level, indicating a potential gap in secondary education completion rates. Moreover, the percentages of individuals with "No Schooling" and "Some Primary" or "Completed Primary" levels are areas that require attention to ensure a stronger foundation for academic growth. To address these challenges, a multifaceted approach is recommended. Initiatives should focus on improving access to primary education, encouraging the completion of secondary education, and facilitating pathways to higher education. This could involve community engagement programs, government advocacy for educational policies, and collaborations with external partners such as non-profit organizations and businesses. Additionally, efforts should be directed towards identifying and addressing any disparities in educational attainment, ensuring that all members of the community have equal opportunities for academic advancement. Establishing a robust monitoring and evaluation system will be crucial to tracking progress and refining strategies to meet evolving educational needs. Overall, a holistic approach that considers the entire educational continuum, from primary to higher education, is essential for fostering a well-educated and empowered community.

Table 10: Educational Levels Of Population (STATS SA 2022)

Name	Frequency	%
No Schooling	10 269	15,3%
Some Primary	4 025	6,0%
Completed Primary	2 977	4,4%
Some Secondary	25 372	37,9%
Grade 12/Std10	19 201	28,7%
Higher Education	4 743	7,1%
Other	372	0,6%

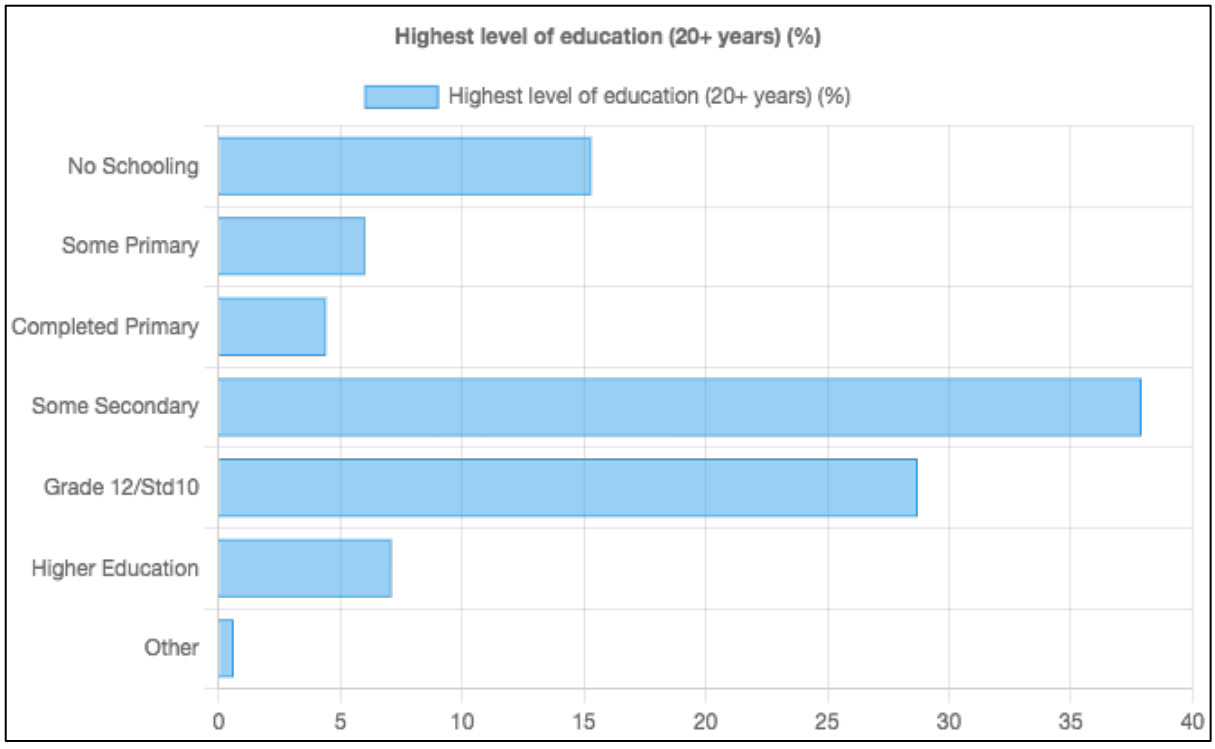


Figure 6: Graph Of The Highest Level Of Education Acquired (Census 2022)

2.5.1.6. ECONOMIC AND SOCIAL STATUS

Employment Status

The municipality has 43.5% (35001) people who are economically active i.e. employed, discouraged work-seeker account for 6.8% (8191), unemployed accounts for 14.6% (14876), whereas not economically active people accounts for 35.5% (40 327).

Tables 10 and 11 below shows the employment status, Unemployment is one of the key challenges facing MLM, which contributes to crime within the municipality. The unemployment rate stands at 29 % with the highest percentage amongst the youth aged between 15 to 19 years and declining with age (IDP 2021/2022).

Table 11: MLM Employment Status

Employment Status	Number
Employed	35001
Unemployed	14876
Discouraged Work Seeker	8191
Not Economically active	40327

Table 12: Monthly Income Status (IDP 2021/2022)

Monthly Income Status	Number
No Income	64174
R 1 - R 400	39623
R 401 - R 800	7981
R 801 - R 1 600	22191
R 1 601 - R 3 200	6019
R 3 201 - R 6 400	3600
R 6 401 - R 12 800	3429
R 12 801 - R 25 600	2086
R 25 601 - R 51 200	529
R 51 201 - R 102 400	143
R 102 401 - R 204 800	75
R 204 801 or more	69
Unspecified	7548
Not applicable	2761
Grand Total	**160229**

3. WASTE GENERATION AND CHARACTERISATION

3.1. WASTE CHARACTERISATION

Waste characterization 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 characterization 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 characterization 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).

3.1.1. 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 November 6th to 7th, 2023.
- Examination of Integrated Development Plan (IDP) and municipal records (**IDP 2021/2022).**
- 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 Musina Local Municipality (MLM) and disposed of at the Musina Landfill site.

3.1.2. 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

As there was no 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.

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 13: Mass Of Waste Types - Musina Town (From Various Extensions , Compactor)

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

Waste Category	Amount of waste (Kg)	%
Mixed Polystyrene	7,80	1,22
food waste	56,00	8,73
nonrecyclables)	250,00	38,97

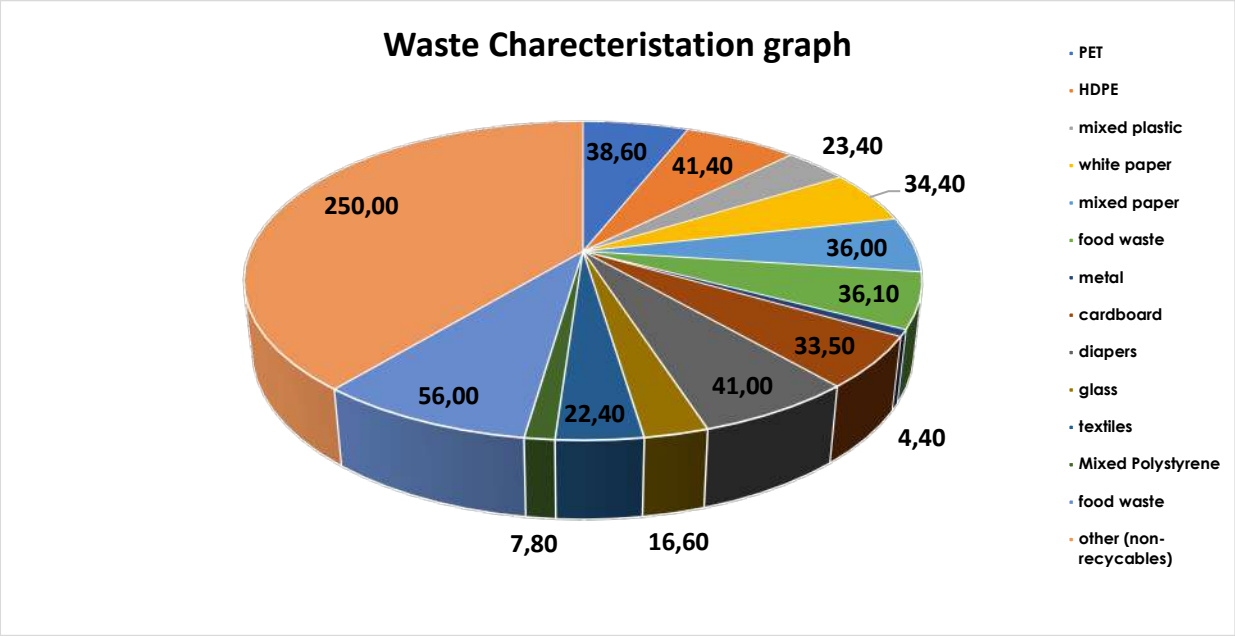


Figure 7: Waste Characterisation Chart - Musina Town (From Various Extensions, By Compactor)

Table 14: Mass Of Various Waste Types – Nancefield (Various Extensions)

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

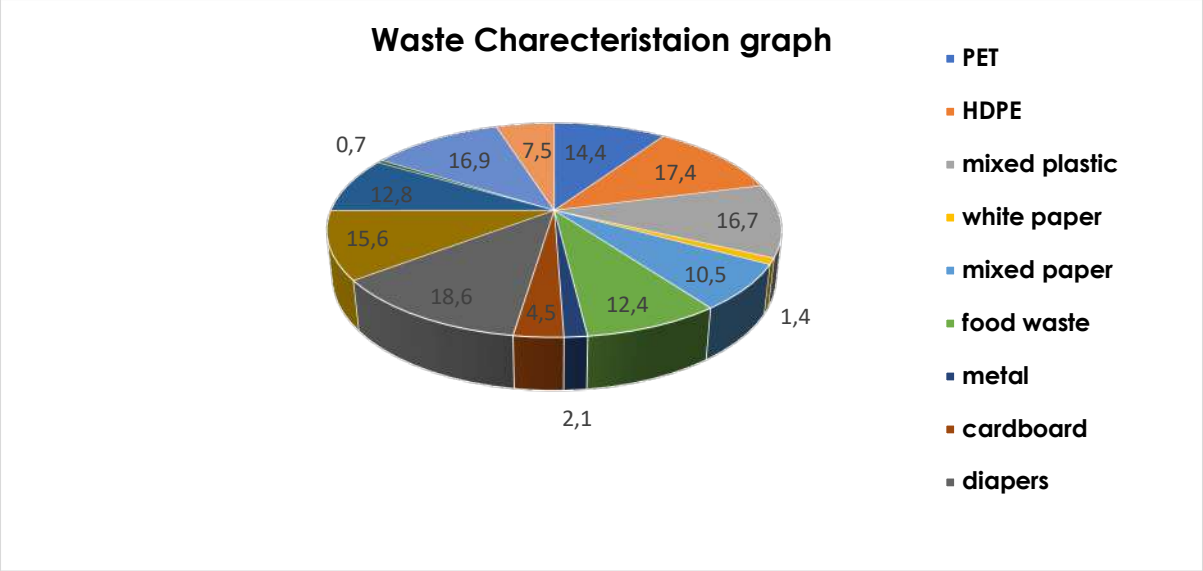


Figure 8: Waste Characterisation Chart - Nancefield (Various Extensions)

Table 15: Mass Of Various Waste Types - Musina Town (Skip Truck)

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
Alu cans	0	0,00
cardboard	23,6	15,98
diapers	12,2	8,26
glass	21,6	14,62
textiles	0	0,00
Mixed Polystyrene	0,9	0,61
food waste	22,6	15,30
other (non-recyclables)	12,6	8,53

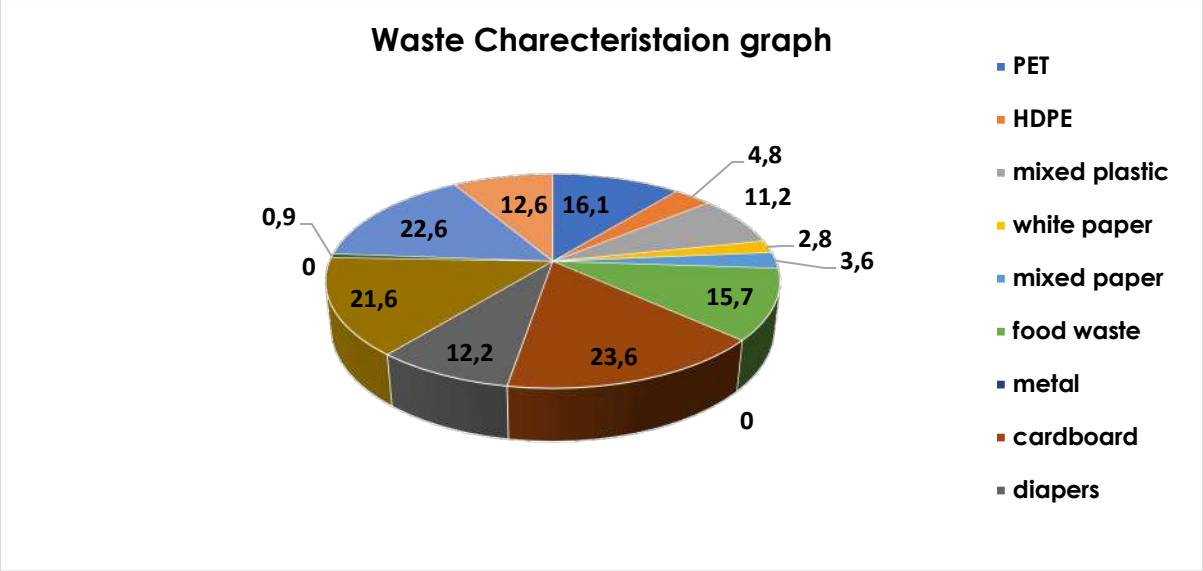


Figure 9: Waste Characterisation Chart- Musina Town (Skip Truck)

3.1.3. 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;

Waste characterisation study, data collection (sampling at the Musina Landfill site)	
	

Waste characterisation study, data collection (sampling at the Musina Landfill site)

Waste characterisation study, data collection (sampling at the Musina Landfill site)	
	
	

Waste characterisation study, data collection (sampling at the Musina Landfill site)	
	

Figure 10: Waste Sorting At Musina Landfill, For Waste Characterisation Study And Data Collection

3.2. WASTE GENERATION

3.2.1. 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 and not the Minimum Requirements for Waste Disposal. 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 130 899 persons was used (MLM IDP, 2021/2022) to calculate the waste tonnages presented in the table below.

Table 16: 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 12, 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.

3.3. ESTIMATING FUTURE WASTE GENERATION RATES AND QUANTITIES

3.3.1. 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)

- Plans to transform Musina Municipality into a city;
- 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

Table 17: 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 2.13 suggests that the future domestic waste in MLM is projected to be approximately 21,954.23 tons, 1,707.37 tons, and 169.27 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.

3.4. WASTE RECYCLING, TREATMENT AND DISPOSAL

3.4.1. 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, five (05) 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

3.4.2. 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 176 currently operating within the Musina 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. The total amount of waste recyclers is five (05)

3.4.3. TREATMENT AND DISPOSAL

Table 18: Musina Landfill Profile

Location	Portion of the land situated North of Harper Road on Rem of the Farm Messina No.4-MT ,
Site classification	Class B
License type/use	Permit : 12/4/10/8-B/8V/4
Date issued	14 December 2016
Estimated remaining life and anticipated closure date	The landfill has at least 13 years, anticipated closure will be in 2036
Estimated size of facility	6 Hectares
Access control and signage	There is adequate access control. Signage, gate and a fence present
Surrounding land use	Formal settlements , outside/ away from the buffer zone
Facilities	Hired sanitary facilities, and office
Plant used on site	Compactor, Tipper, Truck, TLB, Water tanker and excavator
Description of waste management	Public are directed to drop off area. Waste is chipped in working area. However, during the site visit the chipper was in for repairs.
Waste accepted on site	General waste (domestic Waste)
Use of cover material	Waste is not compacted regularly, and no daily cover is applied.
Storm water management & drainage system	Not present
Recycling	Waste is separated at the landfill site , mainly by informal citizens
Informal reclaimers present?	Yes
Operating hours	Monday – Saturday: 08h00 – 17h00 Public Holidays: 08h00 – 13h00
Estimated cost for closure	There is currently n estimated costs for closure
Challenges	• There is no weighbridge • Large amounts of waste, due to plant breakdowns • Given that the waste body is beyond the licensed footprint, the remaining airspace of the site is a concern; • The facility must have a space for garden for food waste, to enable other activities such as composting • 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 lack of formal south Africans as waste pickers is of concern as thee are incentives and

	government programmes, which the informal citizens forfeit. • There is no dedicated are to put the separated waste streams by the informal waste pickers, this poses a serios housekeeping concern around the perimeter of the landfill

The Musina landfill site, with a remaining lifespan of approximately 13 years out of its licensed 20-year term, is actively addressing infrastructural needs. Despite the absence of a weighbridge, plans for improvement were incorporated into the budget for the 2018/2019 financial year. This budget allocation encompasses not only the installation of a weighbridge but also the establishment of a site office, provision of ablution facilities, and drilling of boreholes, with implementation scheduled to begin in July 2018. The landfill site, which is securely enclosed and monitored by vigilant security personnel around the clock, is on a trajectory to enhance its operational capabilities.

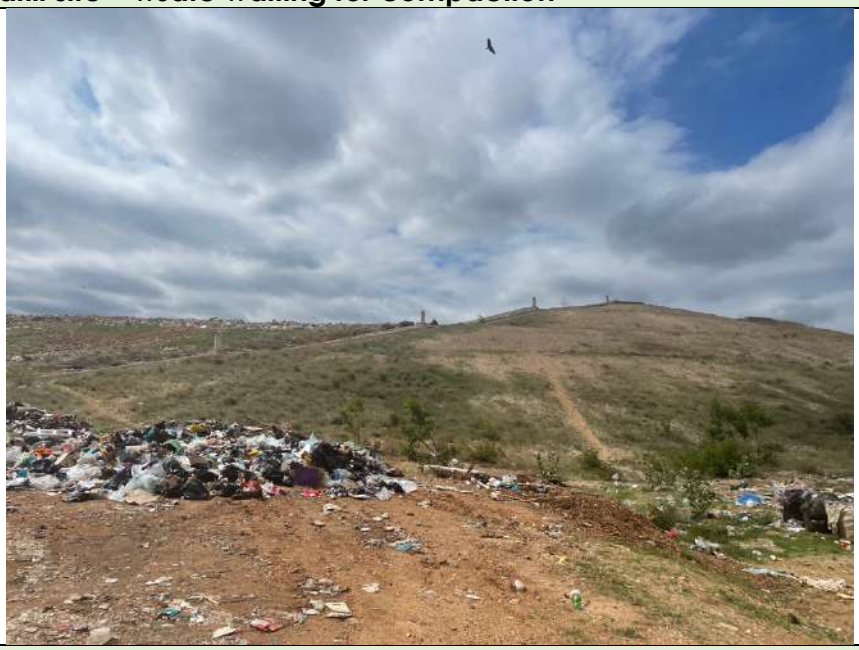
In addition to the aforementioned improvements, it's noteworthy that there are currently no site offices in place. Acknowledging this, the municipality has been utilizing mobile ablution facilities onsite, ensuring that essential sanitary amenities are available for staff and workers. This dynamic approach to infrastructure development aligns with the Municipality's commitment to creating a well-equipped and efficient landfill facility. The planned installation of a weighbridge, site office, ablution facilities, and boreholes reflects a comprehensive strategy to upgrade the landfill site's infrastructure, promoting better waste management practices and environmental responsibility.

Musina Land Fill site – landfill signage

Musina landfill- entrance way- poor general house keeping

Musina landfill site

Musina landfill site – wsate waiting for compaction



Musina landfill site- waste within the landfil premises (in need of beetr waste storage infratructure)

Figure 11: Musina Landfill Images

3.4.4. ILLEGAL DUMPING

Musina Local Municipality has identified atleast 26 illegal dumping sites within its jurisdiction. These sites are located across different wards, including areas like N1 opposite China Mall Wholesale, stormwater areas behind Skoon Plaas Stadium, Phase 3 behind Diza Spring Pub, next to Spiriluna, behind Munyai's Church Extension 14, and many others. 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.

3.5. STATUS OF WASTE COLLECTION SERVICES

3.5.1. WASTE COLLECTION STATUS

According to CENSUS 2022, The Musina Local Municipality comprises of 45,934 households. As outlined in the Musina Local Municipality Integrated Development Plan (IDP) for the period 2021-2022, 15,350 urban households benefit from weekly refuse removal services. Additionally, 5,708 households in areas such as Madimbo, Malale, Domboni, Tshikhudini, Tanda, Masisi, Bennde Mutale, Nkontswi, and Mutele B have access to weekly refuse removal. The municipality collects and estimates an annual waste amount of 27,715.86 tons. Notably, public institutions, government buildings, and commercial properties receive daily waste collection services.

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.

3.5.2. WASTE COLLECTION TRANSPORT /FLEET

Ensuring efficient waste service delivery within the Municipality depends significantly on the meticulous selection and proper maintenance of vehicles in the waste management department. Presently, the MLM waste management department has a fleet comprising 11 vehicles, one trailer, and 48 bins. This fleet includes 3 compactor trucks, 6 tractors, 1 skip truck, 1 non-compactor truck, 1 trailer, 42 skip bins, and 1 UCCT bin, as outlined in detail in Table 22 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 & equipments, 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 19: MLM Waste Management Fleet Information

#	Vehicle Type	Quantity	Operational status
1.	compactor trucks	3	2 operational and 1 on breakdown
2.	Tractors	6	1 operational and 5 on breakdown
3.	Skip truck	1	Operational
4.	Non compactor truck	1	Operational
5.	Skip bins	42	Operational
6.	UCCT bins (4m^3)	6	Operational
7.	Trailer	1	Operational

3.6. 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 20: MLM Budget Allocation For Waste Management Services (IDP)

Activity	2021/2022	2022/2023
Solid waste removal: operational costs	R 8 289 147,80	R 5 996 615,79
Admin, Human resources & capacity building	R 559 811,56	R 129 389,31
Total	**R 8 848 959,36**	**R 6 126 005,10**

The allocation of budget details presented on table 19, unmistakably underscore the municipality's challenge of operating within a constrained financial framework. This is predominantly attributed to a significant portion of the population being indigent. As a result, the municipality relies heavily on grants to meet its financial requirements. The most recent figures pertaining to the revenue generated by the municipality have not been disclosed in the Integrated Development Plans (IDPs) or through municipal personnel.

Provision of free basic services

The Municipality implemented a Free Basic Services Policy in 2003, which remains in operation and undergoes annual reviews to accommodate any emerging developments. According to this Policy indigents registered receive a Free Basic Refuse removal service that is 100% subsidised on collection of refuse. The service entails a waste collection service at least once per week or the removal of a bulk refuse container placed within an area. Households earning a joint income of not more than R 3 560 per month (proof of pay slips/copy of recent bond statements required), qualifies for free basic services in terms of the policy.

3.6.1. 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).

3.7. 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 offers a visual representation of the organizational structure, or organogram, for waste management services within MLM. This structure encompasses both refuse removal and landfill management. Table 20 supplements this visual representation by detailing 27 vacant positions within waste management services at MLM. These positions include one Superintendent, four environmental officers, twenty general workers, and two drivers. The organogram functions as a comprehensive overview, delineating the hierarchy and roles within the waste management department. 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.

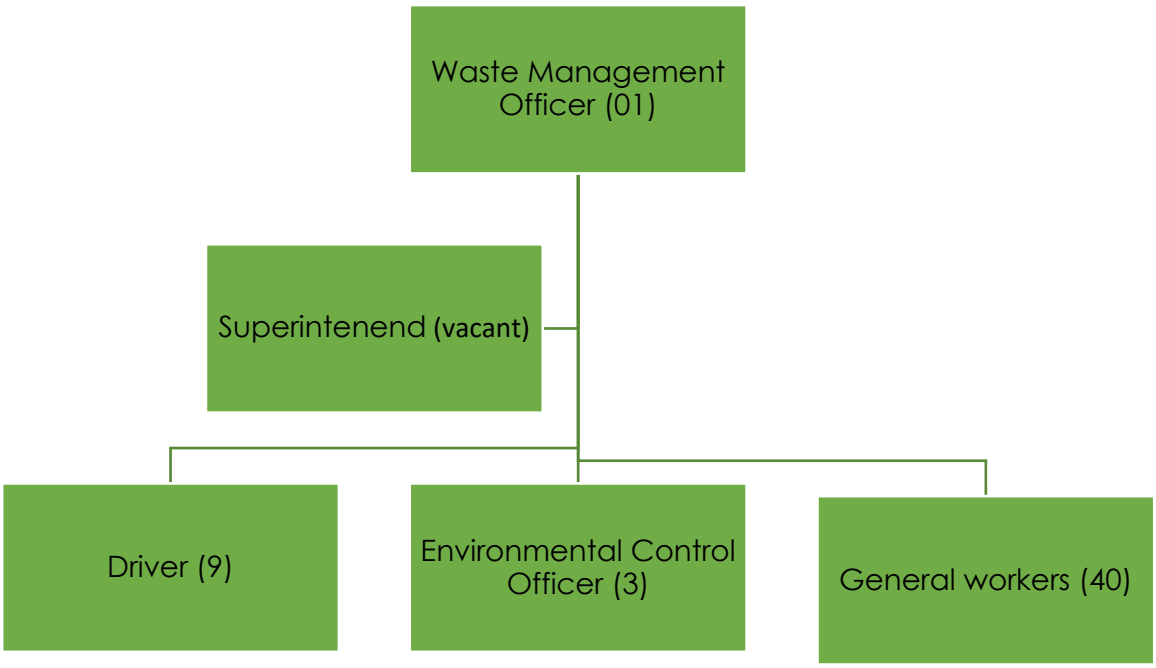


Figure 12: MLM Waste Management Organogram

TABLE 21: Vacant Position In The MLM Waste Management Department

Position	Number of Vacant positions
Superintendent Environmental Management	01
Environmental Officer	04
General Assistant workers	20
Drivers	02

3.8. ROLES AND RESPONSIBILITIES OF A WASTE MANAGEMENT OFFICER

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:

1. Developing and Implementing Waste Management Plans: Creating comprehensive waste management plans that outline strategies for waste reduction, recycling, and proper disposal. This may involve collaborating with other departments, local authorities, and waste disposal facilities.
2. Compliance Monitoring: Ensuring that waste management activities comply with local, state, and federal regulations. This includes staying informed about changes in legislation related to waste management and adjusting strategies accordingly.
3. Educating and Training: Conducting awareness programs and training sessions for employees and the community on proper waste disposal practices, recycling initiatives, and the importance of reducing waste.
4. Waste Audits: Conducting waste audits to analyze the types and quantities of waste generated by an organization. This information can be used to identify opportunities for waste reduction and recycling.
5. Coordination with Waste Disposal Facilities: Collaborating with waste disposal facilities, recycling centers, and other waste management service providers to ensure the proper and environmentally friendly disposal of different types of waste.
6. Monitoring Waste Collection Systems: Overseeing waste collection processes to ensure efficiency and effectiveness. This may involve working with waste collection contractors or managing in-house waste collection teams.
7. Data Collection and Reporting: Collecting data on waste generation, recycling rates, and other relevant metrics. This information is used to evaluate the success of waste management programs and to prepare reports for internal and external stakeholders.
8. Research and Innovation: Keeping abreast of new technologies and best practices in waste management. Identifying and implementing innovative solutions for waste reduction and recycling.
9. Emergency Response Planning: Developing and implementing plans for handling hazardous waste and responding to environmental emergencies, such as spills or accidents involving hazardous materials.
10. Community Engagement: Engaging with the local community to promote sustainable waste management practices. This may involve organizing

community clean-up events, participating in public forums, and addressing concerns related to waste management.

Overall, the Waste Management Officer plays a critical role in promoting environmentally responsible and sustainable waste management practices within an organization or community.

4. GAPS AND NEEDS ANALYSIS

4.1. 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.

4.2. 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
13. Development challenges

Table 22: Waste Management Gaps And Needs Identified At Musina 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.	**Waste management practices** • There is Inadequate municipal services and basic infrastructure within the MLM. • There is generally a lack of information on waste streams. • The vast majority of waste generated is unaccounted for within the MLM. • Waste collection is limited and does not reach other areas within MLM such as. Folovhodwe, Gumela, Lutshindwi, Masea, Mabvete, Tshiungani, Gumbu, Rangani, Mapakoni and etc. • MLM is unable to collect waste in villages due to unsurfaced roads	• The MLM is providing average household waste management collection service to some of the households • Not 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

Legislated requirement/ best practice	Gaps	Needs
	and long distance from the villages to the landfill site. • Illegal dumping is prominent in the areas of Nancefield , extension 8 & 9, Bergview & Beitbridge boarder gate. • The Municipality has three compactor trucks of which two are functional, six tractors with five non-functional and a tipper truck and skip truck. • MLM has skip bins placed for waste disposal purposes, however there is illegal dumping along the skip bins and burning of waste within the skip bins , in Nancefiled extension 8 & 9, and around the city center • Lack of Vehicle Maintenance Plan, the Municipality has several non-functional vehicles which	must be improvement in order to decrease illegal dumping's • The municipality need to invest in proper waste management fleet to ensure efficient waste management collection services • 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

Legislated requirement/ best practice	Gaps	Needs
	could also be because of unskilled labour and poor maintenance. • MLM by-laws are not fully enforcement. • Councillors' involvement in waste management is limited only to cleaning campaigns.	
2. Waste recycling		
• 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,	• 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 five privately owned recycling companies i.e.	• 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. ⇒ Provision of easily accessible recycling drop- off facilities for households which

Legislated requirement/ best practice	Gaps	Needs
and 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.	Messina Herwinning; Rehoboth Recycling; China Mall Recycling, Khakhathi's Recycling Plant &Thomas Ragau's Recycling Plant • 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. • Informal recycling is undertaken at the Musina landfill site and is carried out by informal recyclers / reclaimers that are not documented.	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 there gatherings etc • MLM must ensure that a weighbridge is in place to ensure accurate measurement of the waste that the landfill receives, • MLM needs to put a programme for the implementation and

Legislated requirement/ best practice	Gaps	Needs
	• MLM is not fully aware of the amount of waste that is recycled within the Municipality. • Currently there is no weigh bridge at the Musina Landfill site • MLM do not have waste infrastructures such as Buy Back Centre and Transfer Station. • There is a great deal of recyclable material that goes into the landfill site (e.g. Plastic, glass, Plastic cardboard, etc.). • There is limited recycling, considering the amount of recyclable material observed during waste characterisation	management of a buy-back centre, this may also ensure more participation of reclaimers in the municipality • For the villages, or locations that are not receiving waste collection services, a transfer station must be put I place, this will ensure that waste is placed in a centralised location, encouraging recycling and efficient collection system
5. Organic waste management		

Legislated requirement/ best practice	Gaps	Needs
• 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. • There is no organic waste diversion plan MLM	• 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 • By-laws to be amended to ensure contractors and garden service companies only dispose of chipped organic waste at Old Place as a space saving measure. • An organic waste diversion plan needs to be developed for the MLM landfill
6. Waste Management facilities		
Musina Landfill Site	• The waste records generated at this facility are due to mass estimates, as there is no	• A weighbridge needs to be installed at the landfill, this will ensure accurate data capturing

Legislated requirement/ best practice	Gaps	Needs
	weighbridge – they are not adequately accurate. • Informal reclaimers live outside of this facility. • There is no adequate facilities at the landfill site, e.g.- working space office, sanitation services (the landfill currently uses hired toilets). • There is no presence of local reclaimers at the landfill – 100 % of the reclaimers are not documented • There is no facility available for garden and organic waste at the facility • The insufficient quantity of machinery at the facility results in a backlog of waste outside the landfill due to delayed and inefficient waste compaction.	• 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.

Legislated requirement/ best practice	Gaps	Needs
7. **Waste management fleet and Equipment**		
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. • Long repair times. • Some of the MLM fleet are open trucks and tractors which are not closed,	• MLM must review their fleet and allocate and plan for replacement to meet the required standards
8. Waste management information system		
8.1. IWMP development, implementation & monitoring		
• The Waste Act requires that the IWMP is submitted to DEA&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	• 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).

Legislated requirement/ best practice	Gaps	Needs
	solutions to waste problem in the MLM.	
8.2. 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 industrial waste is generated from these records. • There are gaps in the data for commercial waste.	• Collect information on business / commercial waste collection using tagging system of bins.
9. 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.	• No records of the number of awareness events. • The MLM does not undertake follow up surveys to determine the effectiveness of waste awareness 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

Legislated requirement/ best practice	Gaps	Needs
	• Widespread littering within the municipality and the MLM does not have the capacity to manage the situation. • Lack of public awareness concerning good waste management practises. • Capacity building and training on waste minimization and recycling does not exist. • Awareness campaigns were done by youth jobs in waste/clean- up campaigns,	fluent in the prevalent languages within the municipality (Tsonga and Tshivenda).
10. 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. • Littering and illegal dumping occurs in open areas across the MLM.	• The MLM needs to update the by-laws and they should be aligned with the Waste Act and GRDM waste management by-laws.

Legislated requirement/ best practice	Gaps	Needs
publishes the Waste Management By-Laws	• Skip sites become illegal dumping sites. • By-laws not in line with GRDM by-laws • MLM needs to move toward legal compliance in terms of landfill site operations. • There are numerous items of legislation and government policy that govern waste management in South Africa and to which MLM needs to comply and align with Powers and functions • The powers allocated to MLM in terms of the Constitution need to be adhered to. • The MLM by-laws only cover refuse removal and there is a need to align them to the objectives and goal once the	• 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. • Consider mini drop-off/ transfer station facilities in areas where there's no landfill or efficient / regular collection services

Legislated requirement/ best practice	Gaps	Needs
	IWMP has been finalised and adopted.	
11. Institutional functional and financial management		
• 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. • No tariffs are charged for the disposal of waste at landfill by contractors / private companies. • Lack of effective communication within MLM and communication hierarchies are unclear. • MLM financial & capacity resources are limited. • Lack of coordination efforts on waste matters between the Province, District and MLM.	• The MLM need to review the organogram and prioritise portions which need to be filled. • The staff need to be skilled on waste awareness services and stakeholder engagement with regards to waste management and circular economy initiatives • The MLM need undertaking a full cost accounting exercise, with a focus on budget vs revenue of waste management services • MLM must ensure that cost reflective tariffs are implemented.
12. Financial management		

Legislated requirement/ best practice	Gaps	Needs
	• It is understood that the revenue generated by this service is not sufficient to cover the cost of the service incurred by the municipality. • Aging infrastructure and the cost of maintaining landfill sites are very high including the free refuse removal offered to all registered indigents. • None payment of services by household is also a challenge (IDP). • MLM waste management falls under Waste management, Parks and Recreation department.	
13. Development challenges		

Legislated requirement/ best practice	Gaps	Needs
	• Elevated levels of unemployment and poverty persist. • Numerous informal settlement developments are prevalent. • A significant influx of undocumented foreign nationals is observed. • Expansion of waste management programs is necessary. • Anticipated substantial population growth and increased urban migration are expected. • The national government, through the Department of Trade and Industry (DTI), has designated Musina Local Municipality as a Special Economic Zone.	• **Expand Waste Management Programs:** ⇒ Increase outreach and education on waste separation at the source. ⇒ Implement community-based recycling initiatives to reduce overall waste. • **Special Economic Zone (SEZ) Development:** ⇒ Collaborate with the Department of Trade and Industry (DTI) to leverage SEZ status for sustainable economic growth. ⇒ Integrate waste management considerations into SEZ development plans. • **Address Unemployment and Poverty:**

Legislated requirement/ best practice	Gaps	Needs
	• Ambitious plans are underway to transform Musina into a city by 2030.	⇒ Community awareness on circular economy opportunities and initiatives to create jobs • **City Transformation Planning:** ⇒ Engage in collaborative urban planning efforts to accommodate population growth. ⇒ Prioritize infrastructure development to support the transition to a city by 2030.

5. 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) 2020-2025which 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).

Table 4 below presents a desired end state derived from the identified Integrated Waste Management Plan (IWMP) issues and observations. This encompasses the identification of priorities and strategic goals that the Musina Local Municipality (MLM) aims to achieve regarding IWMP. The strategic goals are informed by pertinent waste legislations and policies, guided by the waste management hierarchy. It is important to highlight that the National Waste Management Strategy (NWMS) outlines a set of goals that municipalities must accomplish within a five-year period to effectively implement the Waste Act.

Establishing specific target dates within a quantifiable timeframe is essential for achieving municipal strategic goals and targets within the five-year period following the approval of the Integrated Waste Management Plan (IWMP). The target dates for each strategic goal can be categorized into three overarching timeframes as follows:

- Immediate 1 year
- Short Term: 2 to 3 years
- Medium Term: 3 to 5 years
- Long Term: 5 to10 years

These goals aim to address the gaps and needs of the communities and more importantly respond to the requirements of the Waste Act as well as the eight Goals of the NWMS and the Provincial goals. Further to this, other general strategic objectives to augment the above objective were considered. Such objectives included but were not limited to:

- Waste awareness campaigns, training, and capacity building of municipal officials and councillors responsible for waste management;
- Defining institutional requirements and organisational structures at various levels of waste management;
- Compliance monitoring and enforcement; and
- Defining the relevant policy and legislative framework for achieving the goals and objectives set. This will include national, provincial and local government policies and legislation.

Table 23: Goals And Objectives Terminology As Per DEA & DP Guide For Waste Management Planning

Term	Description	Example
Goal	Long term desired result which can be accomplished through various projects. Goals are not necessarily measurable but instead present a long term desired end state for the municipality. The goals will be aligned to the NWMS and the WCIWMP.	Increased waste diversion from landfill
Objective	Measurable outputs which, once completed, will contribute to the accomplishment of a goal.	An increase of diversion of recyclable waste from landfill by 5% to 10%.

Term	Description	Example
	Objectives will have deadlines to drive their implementation.	
Policy (target)	Smaller projects which when combined will fulfil the requirement of an objective. As with the objectives, the policies will also have deadlines for implementation.	Expand the two bag system to new areas
		Develop two buy back centres in low income areas
		Place drop-off facilities for recyclables at all existing municipal waste management facilities.

5.1. ALIGNMENT WITH NATIONAL AND PROVINCIAL GOALS

5.1.1 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 (DEFF). 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.

5.1.2. Alignment Of National And Provincial Goals

The NWMS is structured around a framework of eight goals, which are listed in Table 4 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 24: 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 requitements

Table 25: 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

NMWS Goals	Description	Targets	Provincial IWMP Goals
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
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

NMWS Goals	Description	Targets	Provincial IWMP Goals
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

5.1.3. 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 6 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 26: 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 & DEDET
1.5.	Conduct survey on willingness to pay for services and develop a plan for cost recovery	Survey Report Cost & recovery plan	DM, LM & DEDET
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 & DEDET
2.1.1.	Prioritize dumpsites to be closed and rehabilitated	Rehabilitated Sites	DM, LM & DEDET
2.2.	License all landfill sites	List of licensed landfills and transfer stations	DM, LM & DEDET
2.2.1.	Rehabilitate dumps and convert to fully licensed transfer stations and landfills		
Goal 3: Establishment of licensed and well-managed waste disposal facilities			

#	Activities	Indicators	Name of implementing state or organisation
3.1.	Encourage/train separation at source	Reduced waste volumes collected	DM, LM & DEDET
3.2.	Establish minimum recycling standards at source and transfer stations	Operational standards	DEDET & LM
3.3.	Develop recycling guidelines for all waste streams	Recycling Guidelines	DEDET & 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	DEDET, DM, LM & Civil society
3.5.	Conduct survey of all recycling projects	Survey report, GIS and mapping	DEDET, DM, LM
Goal 4: Ensure safe and integrated hazardous waste management			
4.1.	Conduct Baseline Study on hazardous waste	Baseline Study report	DEDET & LM
4.1.1.	List hotspots and waste generators	List of waste sources mapped	DEDET & LM
4.2.	Develop hazardous waste cell	Hazardous waste disposal receptacle	DEDET, DM, & LM , DFFE
4.3.	Encourage/train sorting at source	Hazardous domestic/ industrial waste sorted	LM, DEDET, & Industry,
4.3.1.	Household hazardous waste sorting practiced	Hazardous domestic/ industrial waste sorted	LM, DEDET, & Industry,

#	Activities	Indicators	Name of implementing state or organisation
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.	DEDET /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	DEDET, Dept of Agriculture & LM
4.6.	Identify hazardous waste of concern and develop management plan	Hazardous waste stream management plan.	DEDET/Industry, Civil society, LM & DFFE
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 & DEDET
5.2.	Training/ skills transfer	Skilled staff	DEDET, DM, LMD PLG & LM
5.3.	Develop Waste Information System	Waste Database	DM, LM, DEDET, & DEAT
5.4.	Develop Green Procurement Policy and Cleaner Production Strategy	Green Procurement Policy Cleaner Production Strategy	DEDET, NCPC, DME, DEAT & 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	DEDET, LM, NCPC, DMR, DM, DEA & 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 & DEDET
6.2.	Training of Environmental Management Inspectors	Number of trained staff for inspection, audits and enforcement	DM, LM, DEDET & Health sector
6.3.	Develop database of environmental cases	Database	DEDET, & LM
6.4.	Develop guideline and electronic data capture system for case management	Guideline, data capture system	DEDET & LM
6.5.	Implement Waste management System Education and awareness on the system	Data on waste generated, transported and disposed: WIS Information brochure	DEDET, 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	DEDET, Civil society & LM
7.2.	Develop posters and awareness brochures	Education materials	DM, LM & DEDET

#	Activities	Indicators	Name of implementing state or organisation
7.3.	Establish Environmental Clubs and Forum	Environmental clubs in each municipality	DM, LM, DEDET,
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 & DEDET
8.2.	Establish regional facility	Regional facility operational	DM, LM & DEDET, 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	DEDET, 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	DEDET & LM
9.3.	Increase number of environmental Indicators included in the State of Environment Reporting	State of Environment Report Annual Report	DM, LM & DEDET

5.2. GOALS IDENTIFIED FOR MUSINA LOCAL MUNICIPALITY

Alignment of Musina 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 nine goals were identified for the MLM, as detailed below. Additionally, Table 7 below provides a comprehensive overview, highlighting the alignment of MLM goals with both national and provincial objectives.

The goals identified for Musina 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- Improve institutional functioning and capacity

Goal 8: Financial management - Provision of efficient and financially viable waste management services

Goal 9: By-laws and enforcement of by-laws - Establish effective compliance with and enforcement of the Waste Act.

Table 27: 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:** Ensure the effective and efficient delivery of waste services	• **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 2:** Promote waste minimisation, re-use, recycling and recovery of waste	**Goal 2:** Encourage waste minimization initiatives and promote recycling project
Goal 3: Waste management facilities - Ensure Effective Management of Landfill Sites	**Goal 2:** Promote waste minimisation, re-use, recycling and recovery of waste	**Goal 3:** Establishment of licensed and well-managed waste disposal facilities
Goal 4 : Waste management information systems - Effective waste information management and reporting	**Goal 5:** Achieve integrated waste management planning	**Goal 5:** Strengthening institutional capacity for waste management
Goal 5: IWMP implementation and monitoring	**Goal 5:** Achieve integrated waste management planning	**Goal 9:** Develop tools for risk assessment, monitoring and evaluation
Goal 6: Waste education and awareness - Improved waste education and awareness,	• **Goal 3:** Grow the contribution of the waste sector to the green economy • **Goal 4:** Ensure that people are aware of the impact of waste on their	**Goal 7:** Promote education and awareness on waste issues

MLM goal	2020 NMWS	Limpopo -PIWMP(2020-2025)
	health, well-being and the environment	
Goal 7: Institutional functioning- Improve institutional functioning and capacity	None	**Goal 5:** Strengthening institutional capacity for waste management
Goal 8: Financial management - Provision of efficient and financially viable waste management services	**Goal 6:** Ensure sound budgeting and financial management for waste services	**Goal 1**: Expansion of Waste Services and Cost Recovery
Goal 9: By-laws and enforcement of by-laws - Establish effective compliance with and enforcement of the Waste Act.	**Goal 8:** Establish effective compliance with and enforcement of the Waste Act	**Goal 6:** Develop waste regulations and by-laws and strengthening enforcement capacity

5.3. OBJECTIVES AND ALTERNATIVES FOR MUSINA 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 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 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 28: MLM Waste Management Objectives, Actions, targets And Alternatives

Objective	Actions and Targets	Comment on 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 project.
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 project that would ensure that

Objective	Actions and Targets	Comment on Alternative
		the most economic collection route is followed.
	Waste specifications to be developed for all future municipal and private developments (e.g. road widths and provision for drop-of centres)	The alternative to this project would be to appoint a private service provider to service all new housing developments. This is not deemed as a viable alternative as the KLM is responsible for the provision of refuse collection services to residents.
1.4.Include the collection of waste In rural areas,	• Undertake a route planning exercise in order to ensure that the most economic collection route is followed by the waste collection fleet. • Develop transfer stations in rural areas, (or areas that are a long distance from the landfill site)	putting up infrastructures such as transfer station or a buy-back centre.
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	An alternative to this project could be to install a dirty MRF to sort mixed domestic waste. This is

Objective	Actions and Targets	Comment on Alternative
	can be recycled in order to minimise contamination.	not deemed as a suitable alternative as the cost of recyclables decreases with contamination and separation at source programmes aid in raising the public's awareness of recycling.
	Implement drop-off zones , for recyclables in public places	Drop -off facilities, or implement buy-back centres that are easy to reach for community
	Enable an environment for local recyclers to participate and grow in the Recycling / circular economy sector	There is no feasible alternative to this project.
2.2. The Diversion Of Organic Waste From Landfill Is Increased	Awareness Programme For Household And School Composting Programmes.	• Drop-off facilities for food waste could be added to transfer stations and drop-off centres, however as food waste decomposes quickly, these bins would need to be emptied regularly and at present there are no municipal

Objective	Actions and Targets	Comment on Alternative
		composting facilities for food waste. This is therefore not deemed as a viable alternative. • 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 the Musina landfill is manage in accordance with the license conditions	There's no alternative for this objective
	The landfill must 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.
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	• Develop landfill site monitoring programme. • Encourage and roll-out a community empowerment programmes for the participation of local reclaimers in the landfill	There's no alternative option for this.

Objective	Actions and Targets	Comment on Alternative
through a comprehensive integration of waste reclaimers int the landfill	• Develop a data base for reclaimers at the landfill site and also look into best practice from other local municipalities regarding 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 is aware of the type and quantity of waste generated in the municipality.	A weighbridge must be installed at the landfill for accurate waste quantities	There are no feasible alternatives to this project. 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	There are no feasible alternatives to this project. The MLM is required in terms of the waste management by-laws, to report on the SAWIS.

Objective	Actions and Targets	Comment on Alternative
4.3. Effective internal management of waste related data		
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 2024. • Endorsement of the IWMP by the MEC by April 2024	There is no feasible alternative to this project.
5.2. Promote Integrated Waste Management Planning. (including sanitation)	• Stakeholder engagement • 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	There is no feasible alternative to this project.

Objective	Actions and Targets	Comment on Alternative
	collection, recycling, and other related activities, leveraging external expertise and resources.	
5.5. 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 project.
5.6. Elevate status of waste management in the IDP process.	Establish a waste management committee	There is no feasible alternative to this project.
5.7. 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	Develop an annual waste awareness calendar and maintain a record of all waste awareness activities undertaken	There is no feasible alternative to this project.

Objective	Actions and Targets	Comment on Alternative
awareness materials are available for the waste awareness campaign	Waste awareness campaigns are to be undertaken by trained and experienced personnel	There is no feasible alternative to this project. In order for waste awareness campaigns to be undertaken successfully, they need to be undertaken by personnel with experience in waste management.
6.2. The public, business and industry are informed of what constitutes hazardous waste and how hazardous waste should be managed	MLM to support with hazardous waste awareness programmes with business and industry. These programmes should focus on the hazardous cell at the regional landfill site and inform business and industry of registration requirements	The alternative to this project would be for the MLM to undertake their own hazardous waste awareness programme. As the MLM is the custodian of the landfill site, it is recommended that the MLM lead awareness programmes with support from the local municipality.
	MLM to undertake hazardous waste awareness programmes with the public with a focus on HHW	There is no viable alternative to this project. Alternatives methods for undertaking awareness campaigns (e.g. open days vs

Objective	Actions and Targets	Comment on Alternative
		community meetings) could be considered.
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 KLM	There is no viable alternative to this project. Alternatives methods for undertaking awareness campaigns (e.g. school competitions vs puppet shows) could be considered.
Goal 7: Institutional functioning- Improve institutional functioning and capacity		
7.1. 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	The alternative to this project would be to outsource functions covered by vacant positions. This is not deemed as a suitable alternative as the MLM should focus on building expertise internally and the cost to outsource will likely be higher than to appoint an employee.
	Dedicated employees for waste education and awareness to be appointed. Key	An alternative to this project could be to add waste awareness campaigns to existing employees'

Objective	Actions and Targets	Comment on Alternative
	performance indicators (KPIs) to be included in their formal job descriptions	duties, however there is a risk that the employees may not have time available to adequately perform the additional role.
	Implementation of the IWMP to be added as KPIs to the Waste Manager or supervisors performance evaluation criteria.	An alternative could be to not have any KPIs relating to IWMP implementation but this risks failure to implement the IWMP.
	Training schedule developed with training needs for employees at different levels identified.	There is no feasible alternative to this project.
Goal 8: Financial management – Budgeting and financing of waste management		
8.1. Improve 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.	There is no feasible alternative to this project that would ensure that the most economic collection route is followed.
8.2. 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.	There is no feasible alternative to this project.

Objective	Actions and Targets	Comment on Alternative
	• Engage with DEA / LEDET concerning funding model. capital projects (e.g. Municipal Infrastructure Grant (MIG) and motivation of waste projects in IDP and other budgeting processes.	
8.3. 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 DEA / 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.	There is no viable alternate to this project. It is required by legislation to ensure sufficient budget for waste management infrastructure
Goal 9: By-laws and enforcement of by-laws - Establish effective compliance with and enforcement of the Waste Act.		

Objective	Actions and Targets	Comment on Alternative
9.1. Littering 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 project.
	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 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	An alternative to this project would be for the MLM to undertake all clean-up campaigns in-house without

Objective	Actions and Targets	Comment on Alternative
	communities and used as waste awareness campaign	engaging the communities. Clean up campaigns can be used to raise awareness so this is not deemed a suitable alternative.
9.2. 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.

6. 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.

6.1. PARTNERSHIPS

Establishing partnerships is recognized as a crucial mechanism for delivering the necessary services and facilities integral to the Municipal Integrated Waste Management Plan (Muina 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.

6.1.1. 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 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.
- DEA – Extended Public Work Programme (EPWP).
- DEA- Chemicals and Waste Management.
- Waste Bureau - One of its functions is to support and advice on the development and implementation of Industry Waste Management Plans.

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

6.1.2. 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 This 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:**
    - PETCO
    - The glass recycling company
    - SAPPI
    - Polyco
    - Consol
- 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

6.1.3. 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.

6.2. 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.

6.3. 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.

7. IMPLEMENTATION PLAN

The following section contains an implementation plan. The implementation plan outlines the following per project:

- Goal and objective
- Action requires
- Inidicator / target
- Project priority;
- Timeframes;
- Anticipated budget;

Waste Management Officer

The successful execution of the IWMP will heavily depend on the municipality to formally designating a competent, well-equipped, and suitably qualified Waste Management Officer (WMO), and a supporting team. As previously mentioned in this document, according to the Waste Act, it is obligatory for Local Municipalities (LMs) to designate a WMO, and it is a key priority for the municipality to comply with this requirement. The responsibilities and duties of a WMO are also outlined within the report.

Moreover, it is believed that a sufficiently skilled WMO could effectively address many of the identified issues and tasks without the need to resort to outsourcing to external service providers or consultants.

The proposed implementation plan is outlined in Table 33

Table 29: implementation plan

No.	Action	Indicator/target	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.	1 – 3 years	R 3 000 000,00
1.1.2.	Development and adoption of a waste service level in line with National Domestic Waste Collection Standards (2019)	Develop service level standards	1- 3 years	Nil – to be undertaken internally
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.	Procure sufficient waste management fleet	The waste management fleet is sufficient to continue to provide a good waste collection service and there are backup vehicles available when required	1 year	R 20 000 000,000
1.2.2.	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.	1- 3 years	Nil – to be undertaken internally

No.	Action	Indicator/target	Timeframe	Budget
1.2.3. .	Review level agreements with sub- contractors and establish waste service level agreement policy for the MLM and for sub- contractors.	Updated service level agreements	1 – 3 years	Nil – to be undertaken internally
Objective 1.3.: A kerbside collection service is provided to all future residential developments				
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.	Documented, and optimised collection route – that is most economic	1 – 3 years	Nil – to be undertaken internally
1.3.2.	Waste specifications to be developed for all future municipal and private developments (e.g. road widths and provision for drop-of centres)	Waste specification included in all frameworks and future developments (forms part of all recommendation for municipal reports)	3-5 years	Nil – to be undertaken internally
Objective 1.4: increase and improve the collection of waste In rural areas,				
1.4.1.	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	1 – 3 years	Nil
1.4.2.	Develop buy-back centres or transfer centres in rural areas, (or areas that are a long distance from the landfill site)	• Operational transfer centre • Operational Buy-back centre ,	1-3 years	N/A
Goal 2 : Waste recycling - Increased waste minimisation and recycling				

No.	Action	Indicator/target	Timeframe	Budget
Objective 2.1: . Increased diversion of waste from landfills.				
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.	Reduced waste sent to landfill	1-3 years	R 200 000,00
2.1.2.	Implement drop-off zones , for recyclables in public places	Decreased numbers of illegal dumping sites	1-3 years	R 500 000,00
i.	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 waste sent to landfill	1-3 years	N/A
Objective 2.2 : The Diversion Of Organic Waste From Landfill Is Increased				
2.2.1.	Awareness Programme For Household And School Composting Programmes.	Education & awareness plan	1-3 years	Nil – to be undertaken internally
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 Musina landfill is managed in accordance with the license conditions.	• A landfill monitoring programme	1 – 3 years	R 150 000,00

No.	Action	Indicator/target	Timeframe	Budget
		• Internal & external landfill audit are undertaken		
3.1.2.	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 in 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 management of reclaimers at the landfill site. • Provide PPE for registered reclaimers. Develop a checklist according to license conditions	1 – 3 years	Nil- can be done through EPR schemes

No.	Action	Indicator/target	Timeframe	Budget
Objective 3.2.: Decreased land-fill waste by 30% volume within 5 years through the 3R´s (waste reduction, re- use, recycling) and alternative treatment				
3.2.1.	Implementation of a separation at source programme in households	• Separation at source programme plan/ document • Awareness campaigns	1-3 years	Nil- can be done through EPR schemes
3.2.2	Develop a comprehensive integration of waste reclaimers int the landfill	• A data-base of reclaimers in the landfill • Waste reclaimers support programme (provision of PPE, and other equipment's)	1 – 3 years	Nil- can be done through EPR schemes
Goal 4: Waste management information systems - Effective waste information management and reporting				
Objective 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.				
4.1.1.	A weighbridge must be installed at the landfill for accurate waste quantities	Working weighbridge	3-5 years	R 500 000,00
Objective 4.2.: Effective internal management of waste related data				
4.2.1.	All municipal waste facilities are registered and reporting on the SAWIS	Available SAWIS data	1 – 3 years	Nil – to be done internally

No.	Action	Indicator/target	Timeframe	Budget
4.2.2.	Ensure that the waste information system feeds into the government WIS (waste information system) and meets the requirements of the National waste management strategy	Available SAWIs data	1 year	Nil – to be done internally
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 2024 Endorsement of the IWMP by the MEC by April 2024	An endorsed IWMP by April 2024	1 – 3 years	Nil – IWMP plan / budget by LEDET
Objective 5.2.: Promote Integrated Waste Management Planning.				
5.2.1	• 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	• An endorsed IWMP by April 2024 (NB: The IWMP contains the information)	1 – 3 years	Nil – IWMP plan / budget by LEDET

No.	Action	Indicator/target	Timeframe	Budget
	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: Waste Sub-Committee quarterly meetings.	Attendance of district or regional Waste management meetings	On-going	Nil
5.3.2.	Establish environmental community clean-up clubs in the municipality	Active Environmental club in the municipality	1-3 years	Nil
Objective 5.4: Elevate status of waste management in the IDP process.				
5.4.1	Establish a waste management committee	Waste management committee	1 – 3 years	Nil – to be done internally
Objective 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				
5.7.1	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	5 -10 years	N/A
Goal 6: Waste education and awareness - Improved waste education and awareness				

No.	Action	Indicator/target	Timeframe	Budget
6.1.1.	Develop an annual waste awareness calendar and maintain a record of all waste awareness activities undertaken	Annual waste awareness calendar	. 1-3 years	Nil – to be done internally
6.1.2.	• Waste awareness campaigns are to be undertaken by trained and experienced personnel. • 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	Trained/ skilled municipal personnel	1-3 years	Nil – to be done internally
Objective 6.2: The public, business and industry are informed of what constitutes hazardous waste and how hazardous waste should be managed				
6.2.1.	Conduct research on the status and quantity of medical and hazardous commercial and domestic waste produced Develop a database of all producers of medical and hazardous waste	Documented data -base and implemented monitoring plan	1 – 3 years	Nil – to be done internally

No.	Action	Indicator/target	Timeframe	Budget
6.2.2.	MLM to undertake hazardous waste awareness programmes with the public with a focus on HHW	Promote appropriate disposal of medical, commercial and industrial waste and ensure adequate management by the respective waste generators and service providers	1 – 3 years	Nil – to be done internally
Goal 7: Institutional functioning- Improve institutional functioning and capacity				
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	. 1-3 years	N/A
7.1.2.	Appoint Dedicated employees for waste education and awareness to be appointed. Key performance indicators (KPIs) to be included in their formal job descriptions	Training schedule developed with training needs for employees at different levels identified.	1-3years	N/A
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	1-3 years	N/A
Goal 8: Financial management – Budgeting and financing of waste management				
Objective 8.1.: Continuous Improvement financial sustainability of waste management in MLM				

No.	Action	Indicator/target	Timeframe	Budget
8.1.1.	Develop financial planning model for waste services to include all costs associated with the provision of waste services and align tariffs with costs.	IDP outlines a comprehensive and efficient waste services budget to enable effective implementaon of IWMP	1-3 years	Nil – to be done internally
8.1.2.	• 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 DEA / LEDET concerning funding model. Capital projects (e.g. Municipal Infrastructure Grant (MIG) and motivation of waste projects in IDP and other budgeting processes.	• To have a budget that address all the equipment required by 2024/2025 , 2025/2026 • To have. New waste collection fleet • A database of all funders in place, with relevant proposal	1-3 years	R 25 0000 000,000 (minimum)
8.1.3.	Ensure there is adequate budget for new and maintenance of infrastructure for waste. The	• Annual review of tariff structure and debt collection strategy	1-3 years	Nil – to be done internally

No.	Action	Indicator/target	Timeframe	Budget
	IWMP must include review of waste services financial plan. • 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. Management			
8.1.4.	Ensure that the "free basic service" for qualifying indigents is implemented	Implemented indigent free basic service for qualifying indigents	1-3 years	TBC
Goal 9: By-laws and enforcement of by-laws – Establish effective compliance with and enforcement of the Waste Act.				
Objective 9.1.: Littering and illegal dumping is reduced and the by-laws related to waste management issues are enforced				
9.1.1.	• Ensure that there is a provision for a fining schedule in the integrated waste management bylaws. • Ensure that by-laws are comprehensive • Ensure by-laws are in line with the NWMA	100% introduction and enforcement of by laws.	1 year	Nil – to be done internally

No.	Action	Indicator/target	Timeframe	Budget
9.1.2.	Ensure that sufficient, dedicated staff are in place to enforce the by-laws	Appoint a waste ranger to enforce the by-laws	1 – 3 years	TBC

8. 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.

9. CONCLUSION

In conclusion, the Integrated Waste Management Plan (IWMP) for Musina 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 goals identified for Musina 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- Improve institutional functioning and capacity

Goal 8: Financial management - Provision of efficient and financially viable waste management services

Goal 9: By-laws and enforcement of by-laws - Establish effective compliance with and enforcement of the Waste Act.

The alignment of these goals with provincial and national waste management strategies underscores the municipality's dedication to integrated and coordinated efforts. The identified goals encompass various facets of waste management,

including service delivery, education, institutional capacity building, and regulatory compliance.

Stakeholder engagement throughout the development process has been integral, ensuring that diverse perspectives are considered and integrated. This inclusive approach fosters ownership and support for the IWMP, enhancing its effectiveness and sustainability.

To address existing gaps and improve rudimentary waste management practices, various implementation instruments have been explored, including partnerships, legislative measures, funding mechanisms, and the development of an implementation plan. Recommendations include promoting waste management awareness and training programs, enhancing waste management facilities, addressing illegal dumping sites, updating waste management tariffs, and encouraging waste reduction, reuse, and recycling initiatives.

Monitoring, evaluation, and review are vital for the success of the IWMP. Establishing a robust monitoring framework to prioritize IWMP goals and ensure adequate resource allocation is crucial. This dynamic document requires ongoing review, with annual assessments recommended to maintain relevance and stakeholder engagement. The next review in 2025 is essential to prevent the IWMP from becoming obsolete and to uphold stakeholder confidence and utilization.

In essence, the IWMP serves as a strategic roadmap toward a resilient waste management framework for MLM. Through collaboration, stakeholder engagement, and adherence to regulatory frameworks, MLM aims to realize its vision of sustainable waste management practices that positively impact both the local community and the broader environmental landscape.

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ANNEXURE A: LIST OF RECYCLING COMPANIES AT MLM

#	Name of recycler	Type of recyclables	Operational status
1.	Messina recycling	Paper Box Glass Cans	Active
2.	Rehoboth recycling	Paper Box Glass Cans	Active
3.	Neo scrap metal	Ferrous and non-ferrous metals	Active
4.	Manyol general construction	Paper Box Glass Cans	Active
5.	Vha venda steel	Ferrous and non-ferrous metals	Active