

THE INTEGRATED WASTE MANAGEMENT PLAN (IWMP) FOR TSWELOPELE LOCAL MUNICIPALITY



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Integrated Waste Management Plan (IWMP) for the Tswelopele Local Municipality

Client:

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Acronyms and Abbreviations

| | |
|------|--|
| MF | Mayibuye Foundation NGO |
| EHP | Environmental Health Practitioner |
| GDP | Gross Domestic Product |
| LDM | Lejweleputswa Municipality |
| HD | High Density (plastic) |
| IDP | Integrated Development Plan |
| LED | Local Economic Development |
| LD | Low Density (plastic) |
| PPE | Poly Propylene Ethylene (plastic) |
| RDP | Reconstruction and Development Program South African |
| PET | Pulp and Paper Industries |
| TLM | Tswelopele Local Municipality |
| DWAF | Department of Water Affairs and Forestry |
| DEAT | Department of Environmental Affairs and Tourism |
| WIS | Waste Information System |

1. The Geographic Area

The Tswelopele Local Municipality (TLM) was established in December 2000. It is one of the five Category B municipalities that are a sub division of the Lejweleputswa Municipality Municipality. The other municipalities are Masilonyana, Tokologo, Nala and Matjhabeng. Tswelopele Local Municipality is situated in the central Free State about 100 km North West of Bloemfontein. It borders North West Province on the north, Thabo Mofutsanyane and North Free State on the north east and eastern sides, respectively. TM consists of Bultfontein, Phahameng, Hoopstad and Tikwana and their surrounding rural areas. The number of smallholdings in addition to number of farms found in the area are 2 168.

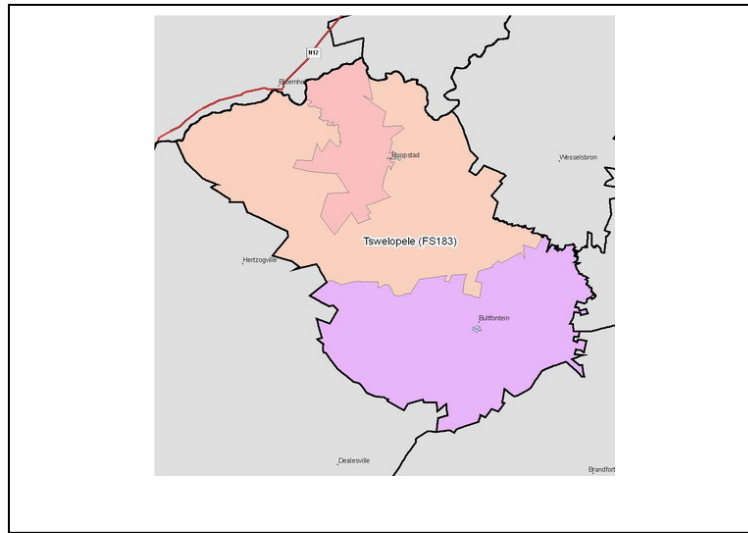


Figure 1: Geographic Area of Tswelopele Municipality
Source: Surveyor General Bloemfontein, 2001

TLM is administered in terms of Section 90 of the Municipal Systems Act as amended. Councilors, who are elected in terms of proportional presentation, represent local municipality and govern the Local Municipality. The Municipality's administrative model includes a core administration. This is headed by the Municipal Manager and heads of departments for Corporate Services, Financial Services, Community Services and Technical Services. The administrative structure has been created to manage and formulate policies and procedures and to co-ordinate various activities.

The TLM is made of 7 wards as demarcated by the Municipal Demarcation Board of South Africa. The wards are made of ward 1& 2 (composed of Phahameng), ward 3 (part of Phahameng, farms and Bultfontein), ward 4 (Tikwana township), ward 5 (Hoopstad and part of township), ward 6 (Hoopstad) and ward 7 (Farms). These wards are represented in Figure 2-9 below.

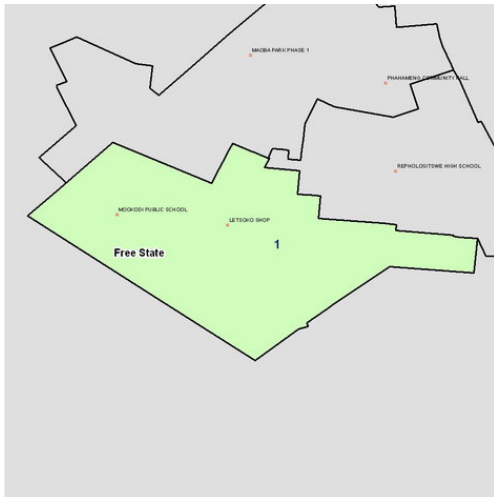


Figure 2: Geographical area of ward 1 within TLM Municipality

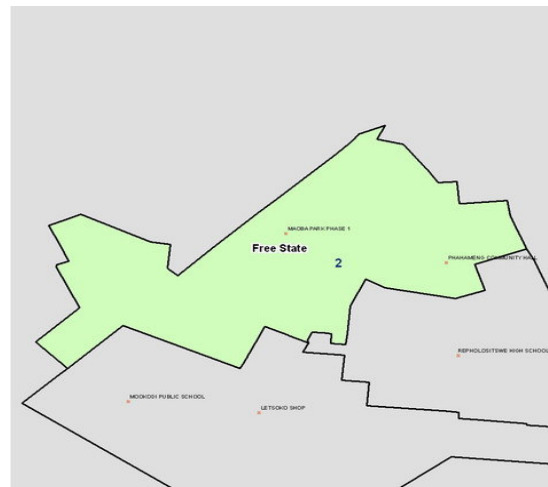


Figure 3: Geographical area of ward 2 within TLM Municipality



Figure 4: Geographical area of ward 3 within TLM Municipality

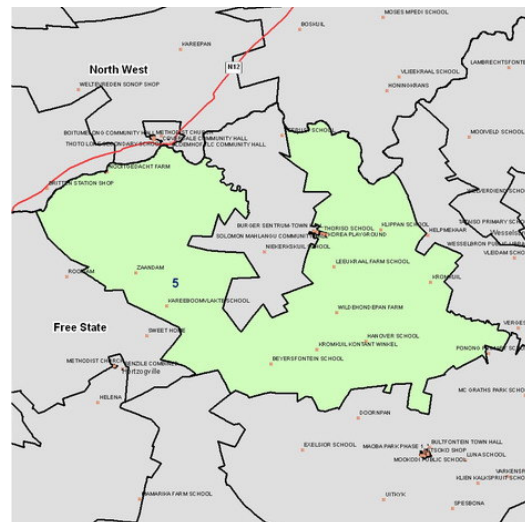


Figure 5: Geographical area of ward 5 within TLM Municipality

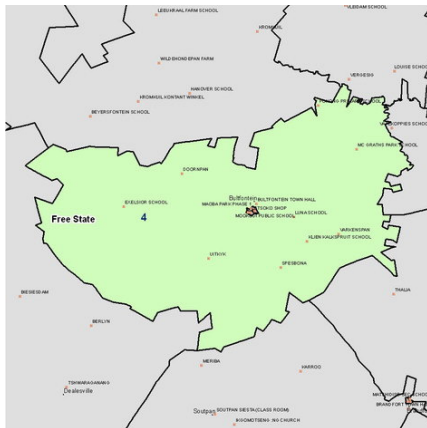


Figure 6: Geographical area of ward 4 within TLM Municipality

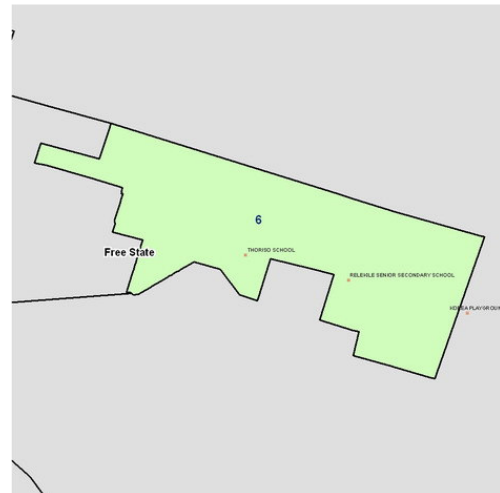


Figure 7: Geographical area of ward 6 within TLM Municipality

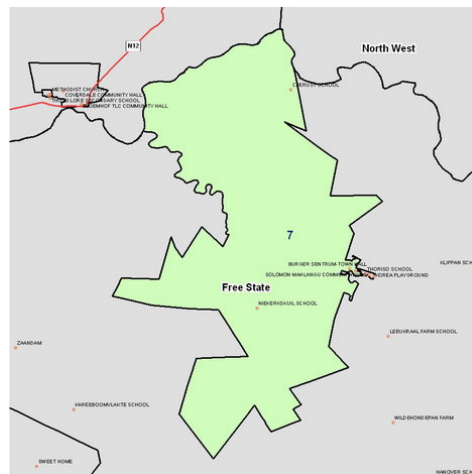


Figure 8: Geographical area of ward 7 within TLM Municipality

1. Administration and Land Use

In TM there are three different types of land ownership regimes. There is privately owned land, which is mainly used for commercial farming purposes. There is state owned land, which is used for both farming and residential purposes. Lastly, there is tribal land, which is mostly for residential purposes and some subsistence farming. The tenure patterns are still reflective of apartheid South Africa, with white people occupying the private land as owners, while the majority of blacks live under Local Authorities on its land whilst others depend on traditional authorities on state owned and tribal land.

Although agriculture seems to dominate most land use, most of the land that is under cultivation is used for commercial purposes. Farmers indicate that the scarcity of water is the reason why agriculture does not

contribute to the GDP of the TLM according to its potential.

At the moment a spatial development is fragmented with Hoopstad and Bultfontein being the well developed towns. The two towns have reasonably enclosed the commercial rural farmers. The overall spatial is fragmented owing to the Group Areas Act.

2.1 Economy

The economy of the TLM depends much on commercial agriculture, trade and government services. Agriculture is the most dominant economic contributor of about 52,09%. This contribution is both direct and indirect through spin-offs or multiplier effects within the other economic sectors, for instance, the increase in demand for housing and related infrastructure services for the farm workers. The highest level of industrial activity is within the Ward 1, 4 and Ward 5, accounting for 24.23% for ward 1 and 4 as well as 41.74% for the latter individuals within the agricultural community.

In turn, more agricultural activities can be noted in Ward 5, comparably less can be found in Ward 6 and 2. Besides the above major sector which is dominant throughout the municipality, there are major industries which include community/social/personal accounting for 1095, 3492 for private household, 255 for industry and 243 for financial/insurance/real estate.

2.2 Infrastructure and services

The Bultfontein and Hoopstad are well developed in terms of infrastructure and services whereas the Phahameng and Tikwane are lagging behind. Water and sanitation are critical in ensuring the health and well-being of people and are therefore defined as basic needs.

2.2.1 Water and Sanitation

Legislative Standards require that communities should have access to at least 20-30 liters per person per day of clean, safe water within 200m of all households. Using the standards that are set by the Water Services Act, 1997 to assess the level of TLM in water provision shows that 21.79% of the population of TLM is receiving water service that is below the basic RDP level. Within this context it is interesting to note that 19.68% of people at the TLM obtain water from a public tap and 0.78% through natural means (probably rivers and rainfall). 45.94% obtain water from an on-site tap and 0.98% from a borehole. Sanitation is mostly provided through the use of flushing although 81.36% of households have no formal system for sanitation and only 18.64% have access to a flush system.

The water source in the area is from the DWAf canals which come from Allemanskraal and Erfenies. The Department of Water Affairs has developed canals for the supply of Vet irrigation scheme and usage by the Bultfontein town. An integrated water use plan, addressing the long term sustainability of water resources and the use over the whole of the Sand – Vet river catchment has already been submitted.

2.2.2 Energy and Electricity

Power is obtained by various means. Only 66.48% of the people of TLM have access to full electricity supply, while the rest depend on other forms of energy like paraffin, gas and solar. This is a very major source of

concern as lack of access to electricity increases the chances of an unsustainable use of resources. The dominant source of lighting is electricity at 30.22% followed by candles at 30.22%, paraffin at 2.29% solar at 0.45% and gas at 0.14%.

There is a fair road network that links most areas in TLM with the major highways of South Africa. The quality of these roads is of a high standard design, however maintenance will have to be implemented frequently. The internal roads at Phahameng and Tikwana especially those associated with the newly developed low cost housing lack proper roads and have serious gullies and erosions. This in turn affects easy accessibility. And in general, the roads in the towns of Bultfontein and Hoopstad are in an acceptable state.

2.2.3 Dwellings

The major part of housing types is formal dwellings (50.08%), informal dwelling (23.98%) and traditional types of dwellings exist at the farms on a scale of 17.47%. Informal dwellings occur in townships due to social security opportunities.

2.2 Development Issues

The TM has the potential for huge development owing to the assistance by the national and provincial governments through the Project Consolidate. Despite this project no resource has been deployed in a form of human (expertise) or financial capacity. The developmental project earmarked for the period of 2006 to 2011 have been budgeted to an estimated tune of R115 million.

The existing towns serve as economic base and the potential to support long term sustainable development. The majority of these settlements serve as a dormitory as most people work elsewhere and commute on a daily basis to places of employment outside the settlements (mines, farms, etc.), and form part of the migrant labour system.

The fact that settlements/towns were not, allowed developing naturally at nodes of economic or social activities, resulted in the establishment of enormous amount settlement with little or no economic base, and with no position in hierarchy or any functional order whatsoever. The present situation renders "the provision of all social and physical infrastructures very costly and inefficient.

The National Spatial Development Framework calls for the integrated development of growth points to improve access the jobs, shopping and various services. It is expected that this will lead to population shifts out of rural areas that are isolated from opportunities and services.

2.3 Current Population, Distribution and Growth Estimates

According to the 2001 Statistics the population growth rate between 1996 and 2001 growth level was very low, thus consider significant in terms of planning, and is expected to remain low in the light of HIV / AIDS related deaths. There are +/-56 981 households in the TLM. Based on the above figures there are approximately 5.3 people per household which is fairly high, but indicative of the rural composition and undiversified nature of the area. In terms of racial division, the African population dominates by far with 98% of the Population. The female

percentage is marginally higher than the male as displayed in Table 1.

Table 1: Inhabitants per Local Municipality and gender

| Municipality | Male | Female | Total |
|--------------|--------|--------|--------|
| Ward 1 | 3 074 | 3 833 | 6 907 |
| Ward 2 | 4 695 | 4 743 | 9 438 |
| Ward 3 | 3 072 | 2 651 | 5 723 |
| Ward 4 | 4 695 | 4 743 | 9 438 |
| Ward 5 | 6 313 | 6150 | 12 463 |
| Ward 6 | 3 462 | 3 860 | 7 322 |
| Ward 7 | 2 690 | 2 940 | 5 630 |
| Total | 28 001 | 28 920 | 56 921 |

The TLM is mainly urban, with 74.18% of the total population residing in the formal dwelling type which could be regarded as urban areas and 4.14% as rural. The informal settlements for dwelling account for 4.14% of the dwelling types and are mostly associated with the formal or established townships.

Table 2 : Distribution of the population

| Settlement Type | Wards | | | | | | | Total (%) |
|-----------------|--------|--------|--------|--------|--------|--------|--------|-----------|
| | Ward 1 | Ward 2 | Ward 3 | Ward 4 | Ward 5 | Ward 6 | Ward 7 | |
| Formal | 75.45 | 65.01 | 82.55 | 75.45 | 87.08 | 49.52 | 84.22 | 74.18 |
| Informal | 18.64 | 34.67 | 15.36 | 18.64 | 4.80 | 45.67 | 12.86 | 21.52 |
| Traditional | 5.66 | 0.16 | 2.08 | 5.66 | 8.00 | 4.49 | 2.91 | 4.14 |
| Other | 0.26 | 0.16 | 0.00 | 0.26 | 0.12 | 0.32 | 0.00 | 0.16 |

(i) Ward 1

The population for Ward 1 was calculated based on the base population statistics for the Free State of 2001 for the years through 2025. Beyond 2007 an annual growth rate of 2.4% is assumed.

Table 3 :Population per year

| Year | Population |
|------|------------|
| 2001 | 9 438 |
| 2004 | 9 896 |
| 2010 | 11 410 |
| 2015 | 12 846 |
| 2025 | 16 285 |

(ii) Ward 2

As there is no specific population growth rate available, the general growth rate for the Free State Province of 2.4% per annum given by the Department of Statistics is applied.

Table 4 Population per year

| Year | Population |
|------|------------|
| 2001 | 7 243 |
| 2004 | 8 350 |
| 2010 | 9 401 |
| 2015 | 11 918 |
| 2025 | 7 243 |

(iii) Ward 3

According to the 2001 Census, the estimated population of Ward 3 is 32 188. The Department of Statistics South Africa uses a figure of about 2.4% per annum as a general basis for calculating population growth (based on Census 2007). Based on this assumption, the following population growth in Ward 3 can be projected:

Table 5 : Population per year

| Year | Population |
|------|------------|
| 2001 | 5 280 |
| 2004 | 6 087 |
| 2010 | 6 853 |
| 2015 | 8 688 |
| 2025 | 5 280 |

(iv) Ward 4

The current population in Ward 4 is estimated to be 185 517 people. Population growth rates were derived from the latest Development Bank of Southern Africa (DBSA) growth rates for their population estimates based on low and high HIV/Aids impact scenario's. For the average growth rates a middle HIV/Aids impact was assumed. For growth rates after 2010 the general rates for Free State given by the Department of Statistics South Africa were assumed.

Table 6 : Population per year

| Year | Population | Growth rate% |
|------|------------|--------------|
| 2001 | 9896 | 2,5 |
| 2004 | 11410 | 2,5 |
| 2010 | 12846 | 2,3 |
| 2015 | 16285 | 2 |
| 2025 | 9896 | 2 |

(v) Ward 5

The population statistics vary greatly depending on the information source used. The only growth rate of the population which has been found is an estimate at the provincial level of 2.4% per annum. It is unknown to what extent this figure considers the impact of HIV. According to this assumption the population would growth until 2010 up to 12846 and up to 9896 in the year 2025.

Table 7 : Population per year

| Year | Population |
|------|------------|
| 2001 | 13 070 |
| 2004 | 15 069 |
| 2010 | 16 966 |
| 2015 | 21 508 |
| 2025 | 13 070 |

(vi) Ward 6

The population statistics vary greatly depending on the information source used. The only growth rate of the population which has been found is an estimate at the provincial level of 2.4% per annum. It is unknown to what extent this figure considers the impact of HIV. According to this assumption the population would grow until 2010 up to 9 966 and up to 14 419 in the year 2025.

Table 8 : Population per year

| Year | Population |
|------|------------|
| 2001 | 7 678 |

| | |
|------|--------|
| 2004 | 8 852 |
| 2010 | 9 966 |
| 2015 | 12 634 |
| 2025 | 14 419 |

(vii) Ward 7

The population statistics vary greatly depending on the information source used. The only growth rate of the population which has been found is an estimate at the provincial level of 2.4% per annum. It is unknown to what extent this figure considers the impact of HIV. According to this assumption the population would grow until 2010 up to 6 806 and up to 9 714 in the year 2025.

Table 9 : Population per year

| Year | Population |
|------|------------|
| 2001 | 5 630 |
| 2004 | 5 903 |
| 2010 | 6 806 |
| 2015 | 7 663 |
| 2025 | 9 714 |

Summary**Table 10 Summary of population and growth in TLM**

| Year | Population | | | | | | |
|------|------------|--------|--------|--------|--------|--------|--------|
| | Ward 1 | Ward 2 | Ward 3 | Ward 4 | Ward 5 | Ward 6 | Ward 7 |
| 2001 | 9438 | 7 243 | 5 280 | 9896 | 13 070 | 7 678 | 5 630 |
| 2004 | 9896 | 8 350 | 6 087 | 11410 | 15 069 | 8 852 | 5 903 |
| 2010 | 11410 | 9 401 | 6 853 | 12846 | 16 966 | 9 966 | 6 806 |
| 2015 | 12846 | 11 918 | 8 688 | 16285 | 21 508 | 12 634 | 7 663 |
| 2025 | 16285 | 7 243 | 5 280 | 9896 | 13 070 | 14 419 | 9 714 |

The above population growth rate is based on population growth rate of Free State of 2.4% determined by Statistics SA, 2007.

2.4 Income, Education and Age

The 2001 Census reveals that only 30.06% of the total population of TLM is employed, with Ward 2 and Ward 6 unemployment rate scoring above the municipality average. The economy of TLM needs to create 62 jobs per year in order to reduce the unemployment rate by 1% per year. Unemployment is a very serious issue for the TLM; currently it stands at 38.69% far more than the national 27%.

Given the nature of the rural economy, where economically active people migrate to cities, the majority of the population (38.69%) of TLM is youthful aged below 19. 38% is economically active group i.e. between 20 and 59 years while 6% are older than 60 years. Women constitute the majority of the population (55.2%).

(i) Ward 1

Table 11 : Annual household income and income group

| Annual household Income | Percent of the Households | Income group ² |
|-------------------------|---------------------------|---------------------------|
| None | 62.42 | Informal & very low |
| R1 - R6,400 | 36.28 | Informal & very low |
| R6,401 – R25,600 | 1.02 | Low |
| R25,601– R102,400 | 0.10 | Middle |
| R102,401.00 – R04,800 | 0.13 | High |
| Over R 204,801 | 0.06 | Very High |
| Unspecified | - | - |

According to the table above 37% of the households belong to the very low to low income group excluding the unspecified. Almost 16.2% of the populations are youth people aged 15-34 years. This implies the need for investment in educational, sports and recreational facilities.

The municipality has a high proportion of people with no education (app.26%). A total of 31.95% are illiterate.

(ii) Ward 2

Table 12: Annual household income and income group

| Annual household Income | Percent of the households | Income group ³ |
|-------------------------|---------------------------|---------------------------|
| None | 80.01 | Informal & very low |
| R1 - R6,400 | 19.59 | Informal & very low |
| R6,401 – R25,600 | 0.22 | Low |
| R25,601– R102,400 | 0.04 | Middle |
| R102,401.00 – R204,800 | 0.04 | High |
| Over R 204,801 | 0 | Very High |
| Unspecified | - | - |

As shown in the table above around 99.6% of the population belongs to a very low income group and 0.22% to a low income 'group. That indicates that the vast majority of the population falls under a very low income group meaning that most of the families have less than R 6 400 income per year. To summarize, about 99.83% of the population can be categorized into a "very low" income group and for the remaining 0.18% belong to "middle" and "higher" income group.

The number of illiteracy people is estimated to be 35.2% of the municipal population. Approximately 26% of the population has no schooling at all. 37% have an education ranging from primary to secondary school, whilst 12.2% have matriculated. Just a wonder 5% have attended institutions after matriculation. TLM consists of 40% children and youth aged 0 to 14 years. 35.2% of the population are aged 15 to 35 and 20% equals those aged 35 to 64. Only 6% of the population is over the age of 65 years.

(iii) Ward 3

Table 13: Annual household income and income group

| Annual household income | Percent of the households | Income group |
|-------------------------|---------------------------|---------------------|
| None | 77.07 | Informal & very low |
| R1 - R6,400 | 22.63 | Informal & very low |
| R6,401 – R25,600 | 0.24 | Low |
| R25,601– R102,400 | 0.06 | Middle |
| R102,401.00 – R204,800 | 0.00 | High |
| Over R 204,801 | 0,00 | Very High |
| Unspecified | 0.00 | - |

Since 1996 the number of households with no income has increased. The major part of the households belong to the very low income group. Concerning the age distribution, the largest portion of the community falls within the age bracket of 15- 34 years. In this area, there are insufficient schools and classrooms and in addition, facilities are inaccessible. 33% of the people are in educational institutions whilst 62% are not attending any classes or courses. The low level of education provision and quality leads to migration in order to be near better schools.

(iv) Ward 4

Table 14: Annual household income and income group

| Annual household Income | Percent of the Households | Income group |
|-------------------------|---------------------------|---------------------|
| None | 62.42 | Informal & very low |
| R1 - R6,400 | 36.28 | Informal & very low |
| R6,401 – R25,600 | 1.02 | Low |
| R25,601– R102,400 | 0.10 | Middle |
| R102,401.00 – R204,800 | 0.13 | High |
| Over R 204,801 | .06 | Very High |
| Unspecified | - | |

For the purpose of income classification into different ranges of income groups the data had to be adjusted at the expense of accuracy. As shown in the table above more than 99.72% of the population belongs to a very low to low income group, 0.1% to a middle income group and only 0.19% to higher groups. The majority of the population 95.96% earn less than R 3 200 per month. A large percentage of the population (19.79%) is unemployed of which 18.44% are female.

Approximately 35.5% of the population is younger than 15 years, 59.69% between 15 and 65 years and 49% older than 65 years. The majority is thus in the economic active age groups. Table 15 below shows the annual household income and income group

(v) Ward 5

Table 15 : Annual household income and income group

| Annual household Income | Percent of the households | Income group |
|-------------------------|---------------------------|---------------------|
| None | 63.17 | Informal & very low |
| R1 - R6,400 | 36.11 | Informal & very low |
| R6,401 – R25,600 | 0.39 | Low |
| R25,601– R102,400 | 0.17 | Middle |
| R102,401.00 – R204,800 | 0.12 | High |
| Over R 204,801 | 0.05 | Very High |
| Unspecified | - | |

At least 36%% of the households have less than R 4 000.00 income per year and 63% of them have no annual income.

The age distribution is fairly normal as 22.8% of the population is aged between 5-14 years, 38% between 15-35 years 23% and 35-64 years.

(vi) Ward 6

Table 16 : Annual household income and income group

| Annual household Income | Percent of the Households | Income group |
|-------------------------|---------------------------|---------------------|
| None | 81.48 | Informal & very low |
| R1 - R6,400 | 18.36 | Informal & very low |
| R6,401 – R25,600 | 0.16 | Low |
| R25,601– R102,400 | 0.00 | Middle |
| R102,401.00 – R204,800 | 0.00 | High |
| Over R 204,801 | 0.00 | Very High |
| Unspecified | - | - |

At least 18.3% of the households have less than R6.400 income per year and 81.2% of them have no annual income.

The age distribution is fairly normal as 36% of the population is aged between 0-14 years, 38% between 15-34 years and 22% between 35-64 years.

(vii) Ward 7

Table 17 : Annual household income and income group

| Annual household Income | Percent of the Households | Income group |
|-------------------------|---------------------------|---------------------|
| None | 63.84 | Informal & very low |
| R1 - R6,400 | 35.15 | Informal & very low |
| R6,401 – R25,600 | 0.96 | Low |
| R25,601– R102,400 | 0.05 | Middle |
| R102,401.00 – R204,800 | 0.00 | High |
| Over R 204,801 | 0.00 | Very High |
| Unspecified | - | - |

At least 35% of the households have less than R6.400 income per year and 63% of them have no annual income.

The age distribution is fairly normal as 32% of the population is aged between 0-14 years, 35% between 15-34 years and 26% between 35-64 years.

Summary

Table 18 : Summary income situation in TLM

| Household Income (p/a) | Percent of the households | | | | | | | Income group |
|------------------------|---------------------------|--------|--------|--------|--------|--------|--------|---------------------|
| | Ward 1 | Ward 2 | Ward 3 | Ward 4 | Ward 5 | Ward 6 | Ward 7 | |
| None | 62% | 80% | 77% | 36.39 | 63% | 81-2% | 63% | Informal & very low |
| R1 - R6,400 | | 15.7 | 14,5 | 36.28 | 36.11 | 16.1 | 29.8 | Informal & very low |
| R6,401 - R25,600 | 170 | 33.8 | 34,2 | 1.02 | 0.39 | 55.9 | 19.7 | Low |
| R25,601 - R102,400 | 10,8 | 9.9 | 8,46 | 0.10 | 0.17 | 23.2 | 6.7 | Middle |
| R102,401 - R240,800 | 0,3.1 | 1.5 | 1,20 | 0.13 | 0.12 | 1.5 | 0.6 | High |
| Over R 240,801 | 0,211 | 0.6 | 0,03 | 0.06 | 0.05 | 3.3 | 0.4 | Very High |

There is no national legislation focusing specifically on waste management. A Waste Management Bill is being prepared by the national Department of Environmental Affairs and Tourism but it has not been submitted to Parliament. In the absence of such legislation, a variety of national Acts and policy documents must be analysed to understand the responsibilities of Local and District Municipalities for waste management and how required initiatives should fit into the broader national strategy for sustainable development.

In general, national government is responsible for setting policy and minimum standards. Provincial Government may adopt regulations that are stricter than the national standards and is responsible for monitoring and ensuring that local municipality adopt waste management strategic plans and implement them. Local Government may adopt and enforce local by-laws that augment National and Provincial requirements and must act within the policy framework established by national government.

In addition, national policy identifies waste management as a cross cutting issue that must be taken into consideration when economic and social development decisions are made. Moreover other national cross cutting issues such as Broad-Based Black Economic Empowerment, the National Spatial Development Perspective and encouragement of labour intensive solutions are all issues that must be incorporated into waste management strategic planning.

The following sections focus on the specific responsibilities of local government for waste including crosscutting issues.

2.6 National Legislation

(i) The Constitution

The Constitution of the Republic of South Africa in Section 24 compels Government to pass reasonable legislation to protect the environment and prevent pollution and guarantees everyone an environment that is not harmful to their health; Schedules 4 and 5 mandate municipality with the responsibility for refuse removal, refuse dumps, solid waste disposal and cleansing.

(ii) The Municipal Structures Act (No. 117 of 1998)

States that local government is responsible for refuse removal and solid waste disposal.

(iii) Municipal Systems Act (No. 32 of 2000)

Requires all municipalities to undertake Integrated Strategic Planning processes and produce an Integrated Strategic Plan. These plans must include a sub plan for Integrated Waste Management.

Municipal Finance Management Act requires municipalities to shift their budgeting processes from an administrative approach that in the past focused on rules not outcomes to a performance-based system focused on outputs, outcomes and measurable objectives, to enable municipalities to maximize their capacity for service delivery.

(iv) National Policy

The White Paper on Integrated Pollution and Waste Management (March 2000) promotes adoption of the principle of the "waste hierarchy" focusing on reducing the volumes of waste that must be disposed of.

Department of Water Affairs Minimum Requirements for Waste Disposal by Landfill (MR) (Second Edition 1998) promotes the following principles: Waste Hierarchy, Duty of Care, Polluter pays and Precautionary approach.

The MR was published by the DWAF in 1994. The second edition was published in 1998. The document sets forth the waste classification system. The two classes of waste identified are general and hazardous. The MR forms part of the DWAF waste management series that establishes a reference framework of standards for waste management in South Africa. It also facilitates the enforcement of the landfill permitting system provided for in terms of Section 20(1) of the Environment Conservation Act, 1989 (Act 73 of 1989).

The Polokwane Declaration (2001) adopted the vision of a waste free generation and reduction by 50% and 25% respectively by 2012. The National Waste Management Strategy sets forth a specific list of responsibilities for municipal government including: Compile general and hazardous waste management plans; Promote and implement initiatives for waste minimization; Waste collection for general waste; with regional government, plan and manage landfill sites; data collection for the national Waste Information System.

(v) District and Local Municipality

Legislation and policy do not clearly demarcate responsibilities between District and Local Municipalities.

- The Municipal Structures Act states that the Municipality Municipality is responsible for solid waste disposal

sites insofar as it relates to: determination of a waste disposal strategy; regulation of waste disposal and establishment, operation and control of waste disposal sites, bulk waste transfer facilities and waste disposal facilities for more than one local municipality in the municipality.

- The Municipal Structures Act assigns to Local Municipality: municipal planning; municipal health services; refuse removal and solid waste disposal.

However these terms are not clearly defined. District Municipality and Local Municipality are required to work together to maximise, effective delivery of services and to engage in consultations to ensure effective division of responsibilities and areas of cooperation within the parameters set forth in legislation and national policy

(vi) Crosscutting issues

The White Paper on Local Government (1998) mandates local government to adopt a developmental character and to transform operations from administrative driven to strategic planning led. Municipal integrated Development Plans, Provincial Growth and Development Strategies and the National Spatial Development Perspective must be harmonised (President Mbeki- State of the Nation address 2004). The Broad-Based Black Economic Empowerment Act (No. 53 of 2003) mandates municipal government to promote empowerment within its own structures and processes and to use its purchasing power to promote empowerment within its supply chain.

Skills Development, The South African Qualifications Authority and its Standards Generating Body for waste management in cooperation with the Local Government SETA are developing training standards for workers in the waste' industry and making funding available for learnerships and waste training in general. The White Paper on Municipal Service Partnerships (April 2010) promotes use of partnerships including Public Private Partnerships to mobilise human and capital resources to expand delivery of municipal services including waste management.

(vii) International Obligations

It should also be noted that South Africa is a party to both the Stockholm and Basel Conventions dealing with hazardous wastes. Of particular relevance is the burning of waste that might include plastic with chlorine content (PVCs) because this can lead to the production of dioxins. PVC plastic can be found in health care waste and in a portion of household plastic. Dioxins are persistent organic pollutants (POPs) that are particularly carcinogenic and can build up within the food chain. Thus the burning of waste at low temperatures as it occurs in TM at health care facilities and in backyards has been eliminated.

(viii) Legislation of Local Municipality

According to the Section 75 of the Systems Act By-laws are meant to give effect to policy, among others:

- (1) A municipal council must adopt by-laws to give effect to the implementation and enforcement of its tariff policy.
- (2) By-laws in terms of subsection (1) may differentiate between different categories of users, debtors, service providers" services, service standards and geographical areas as long as such differentiation does not amount to unfair discrimination.

Frameworks as set by the European Program for Reconstruction & Development and the Department for

Provincial and Local Government exist for developing bylaws. But there is no obligation to adopt model by-laws, and no power at higher levels to require it. A municipality may adopt the model "as is", or amend the model to suit its own situation, or draft its own by-laws. Whichever course is chosen, the procedure for making a by-law is exactly the same; the models do not offer any short-cuts around the adoption process itself.

No waste management bylaws exist to ensure compliance to the principles of NEMA. The service recovery systems is developed which also account for the management of waste collection or removal from council jurisdiction.

2.7 Identification of key stakeholders

The Department of Environmental Affairs and Tourism will take overall responsibility for integrated pollution and waste management in South Africa and will execute its responsibilities by concentration and extension, while the Department of Water Affairs and Forestry is the lead agent for water, responsible for managing water quantity and quality.

The provincial government, municipality and the local municipality play an important role in implementing national strategies addressing waste and pollution management. The provincial environmental departments are responsible for monitoring and enforcing waste management issues.

For increasing the decision-making capacity on municipality level it is considered to build a task team for environmental management, which makes recommendations to municipal managers. This task team, formed by local Directors or Officers, concerning environmental issues should coordinate actions in a regional context.

The local government is responsible for providing waste management services and managing waste disposal facilities. Local governments are composed of an executive and a legislative institution. For execution, the municipal manager is the responsible authority. The council as the highest decision-making takes a number of decisions, which it may delegate, to any committee capable of performing functions except the approval of the IDP, the budget and passing of bylaws. Councilors govern the council. Among these are councilors elected in terms of a system of proportional representation and some who represent wards. Ward councilors chair ward committees, which are responsible for conveying local concerns and issues to the ward and to the council and converse. The mayors preside over the executive committee and have executive powers.

2.8 Human resource and organizational structure and capacity

Among others, the TLM derives its mandate from the national constitution for constitutional powers and functions in order to ensure the provision of services to the communities in a sustainable manner and to promote social and economic development. The building of institutional capacity is under development, constituting one of the priority issues for the Municipality. This includes the recruitment of high-quality and committed staff as well as the development of skills of its staff. The administration structure is not complete yet.

2.8.1 Administration Structure

The TLM administrative structure is represented by the Municipal Manager with the support of the managers for the four key organizational departments. The approved structure is represented in the figure below:

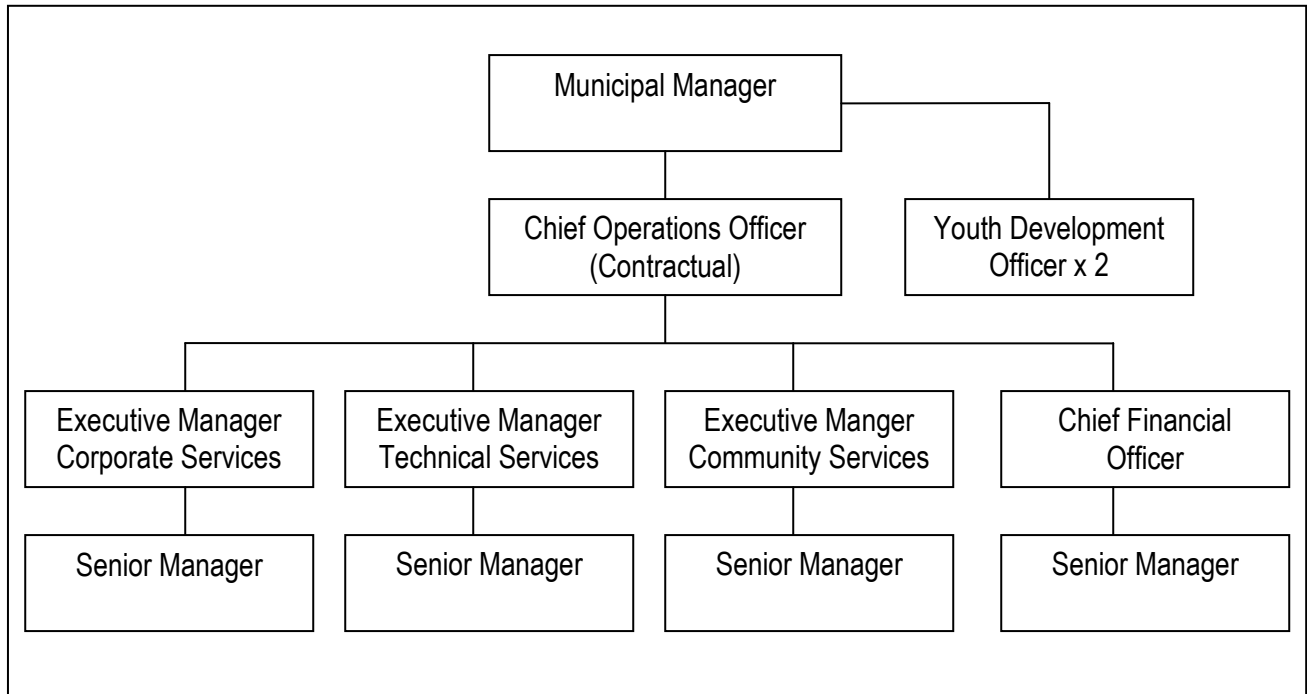


Figure 9: Administration structure TLM

The different departments have specific core functions and responsibilities for providing efficient services. These services as adapted from the IDP: 2006-2011 include:

Corporate services

- General administration
- Executing resolution and directions of council
- Communication between councilors and organization
- Co-ordination of administration and activities of council
- Public liaison
- Securities, legislation, by-laws

Financial services

- Treasury and financial services
- Executing resolution and directions of council
- Contribute to policy

Community services

- Environmental health
- Social services
- Town planning
- Building plans
- Trade licenses
- Executing resolution and directions of council
- Contribute to policy formulation

Technical services

- Protection services
- Electricity, water, sanitation and sewerage
- Mechanical workshop, cemetery, halls and game parks
- Public works
- Executing resolutions and directions of the council
- Contribute to policy

Whilst the Community Service Department is responsible for the above, part of the targeted functions include the refuse collection services which are interlinked with the environmental health issues. The municipality municipality is solely responsible for the management of the landfill sites and hazardous waste (in association with the Provincial department).

The current Community Services structure is shown in Figure 10.

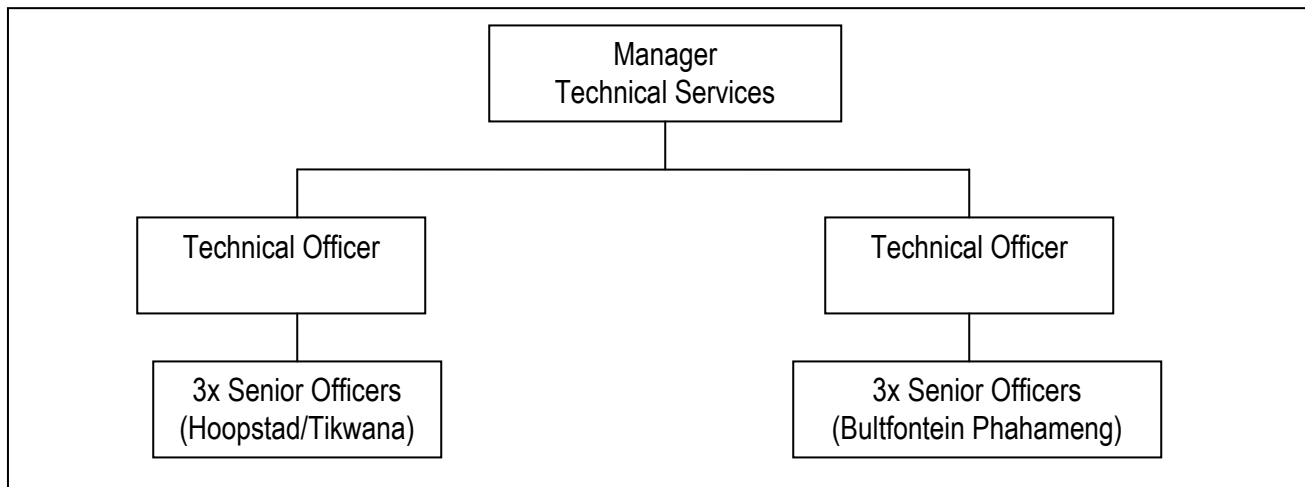


Figure 10 : Organogram of the Community Service Department TLM

* Verbal communication with manager, community services

2.9 Waste Sources/Generators, Main Pollution Hot Spots

Generally everywhere, where human activity takes place waste is generated. To identify different generation features and effects, different waste streams and waste characteristics, a determination of the sources and the generators is essential. A logic division into waste generation areas will facilitate a functional waste management as the locating of waste disposal sites, waste handling facilities, transfer stations, minimisation and recycling initiatives and other.

A significant determination of waste generation areas can be done into wards of the urban areas. A further definition is necessary where areas exhibit a particular waste generation profile and thus a specific requirement profile. The waste generation profile can be determined by the amount of waste generated per service point or the amount per capita in a specific area.

Within the scope of the IWMP a distinction is made between: urban and rural (including farm areas) areas with different socio-economic status areas with a specific generation profile distribution and number of service points per unit area

2.9.1 Households

TLM has by far more urban community settlements than farm settlements. The socio economic category, income, level of education and age all determine to extent the amount of waste that a person generates. Defining the socio-economic status is quite controversial, however as quantitative information is the only tangible information upon which to base estimations; information about individual income ranges is taken into account. The socioeconomic status of each municipality as a whole can be defined. A distinction of specific areas within the municipal boundary could not be established.

2.9.2 Businesses

Business areas show a different generation profile than other areas, especially in terms of capacity for recycling due to a higher packaging material presence. Businesses are not only significant waste generators but can also contribute to a sustainable solution for waste management. The areas cannot always be clearly demarcated from the residential areas as a result of mixed land uses. Also loads of waste which are usually removed from the areas can contain fractions of household waste.

The following table illustrates the types of formal businesses situated in TLM taken from the Municipal Register supplied by the Assistant Manager: Social Services. The additional number of informal businesses is difficult to determine.

Table 19 Registered Businesses in TLM

| Kind of Business | Phahameng & Bultfontein | |
|--|-------------------------|------------------------------------|
| | Potential GW | Potential Chemical & Medical Waste |
| Dealers | 72 | - |
| Services | 39 | 3 |
| Filling stations | 3 | 3 |
| Industry including agricultural products | 7 | 2 |

In Appendix 1, businesses that feature higher potentials for generating and disposing hazardous waste among the existing businesses in TLM are indicated. There was no information as to the extent to which old batteries and waste oil are returned as part of existing recycling and reuse initiatives operating nationally.

Beside the official businesses, the informal sector as a relevant waste generator has to be taken into consideration although it is not possible to verify the number of informal businesses operating within TM, these businesses are not registered. Due to this fact, it is more difficult to control the informal businesses.

Generally, they are not contributing to a formal cleaning or waste removal service either. Consequently, problems of littering and illegal dumping particularly at concentration points arise. Furthermore, it was observed that in some town areas the fact is critical at this stage because certain business people 'are withholding payment of their rates in protest against ongoing problems with the hawkers in respective towns. In general, it was indicated by a study prepared in TLM that the informal business sector is heavily orientated towards trading.

2.9.3 Farming/Agricultural Land

Agricultural producers and farms generate a variety of waste depending on the processes on each farm. The type and size of cultivation, the use of fertilizers and pest control can have a strong effect on quantities and qualities of generated waste, particularly in terms of hazardous potentials. Residential areas for farm workers can have similar generation characteristics as settlements outside of the farmland and they are not to be covered by the municipal administration because they are on private land.

The total sum of property counts in TLM in 1993 occupied 622 851.34 hectares of agricultural activities with extensive dry and wet farming taking place. The production includes maize, cows, goats, sheep etc. More of the farming occurs in the Bultfontein area owing to substantive irrigation water availability.

The norm demands that the farmers implement a sound waste management system, aiming at "appropriate handling" of general, organic, specific/hazardous waste substances, including the implementation of reuse, recycling and composting. A statistic summary of the farms in TLM in terms of waste generation potentials and implementation of waste management systems could not be made.

2.9.4 Service points

A significant profile of a waste generation area is exhibited by refuse removal service points. These areas are more likely to supply reliable data on generation features in the respective areas. Currently, all the wards are serviced by the Local Municipality within TLM, and supplemented by an own refuse removal service, Formal refuse removal is a function of the TM municipality and relates more to the urban areas and their surroundings. Phahameng, Bultfontein, Hoopstad and Tikwana are the urban areas where a formal refuse removal is performed. The number of private service points such as in industrial or farming areas is not known.

Table 20 : Number of service points per serviced area

| TM Settlement | House holds in the area* | Service points house holds** | Service points businesses *** | Service points Industrial** | Total |
|---------------|--------------------------|------------------------------|-------------------------------|-----------------------------|-------|
| Ward 1 | 315 | 63 | 51 | 0 | 114 |
| Ward 2 | 2685 | 537 | 51 | 1 | 587 |
| Ward 3 | 5810 | 1162 | 111 | 9 | 1282 |
| Ward 4 | 2475 | 495 | - | - | 495 |
| Ward 5 | 725 | 145 | - | - | 145 |
| Ward 6 | 6145 | 1229 | - | - | 1229 |
| Ward 7 | 4700 | 940 | - | - | 940 |

* assuming 5 persons per household as a mean value for Tswelopele Municipality

** information from 2001 StatsSA

*** business information generated by TM Community Services for Bultfontein/Phagameng

2.9.5 Health Care Facilities

Clinics and Hospitals have to be viewed separately because of their potential to generate health care risk waste (HCRW), which is by definition hazardous and has to be treated in a specific way. Due to the lack of appropriate HCRW treatment facilities these generation points represent a critical pollution spot. All public clinics and hospitals are under the control of the respective Provincial Department of Health. Environmental Health Practitioners, who are stationed at hospitals, are responsible for the control of waste management at hospitals and clinics, being under the supervision of a Chief EHP. Parallel Infection control officers at hospitals are responsible for appropriate waste handling including staff training.

The number of health care facilities including the private clinics operating in the area of TM is shown in Table 21 below.

Table 21: Number and type of health care facilities in the area of TLM

| Facility | Ward 1 | Ward 2 | Ward 3 | Ward 4 | Ward 5 | Ward 6 | Ward 7 |
|-----------------|--------|--------|--------|--------|--------|--------|--------|
| Hospital | - | - | - | - | - | - | 1 |
| Health Centre | - | - | - | 1 | - | - | - |
| Clinic | - | 1 | - | - | - | - | - |
| Old Age home | - | - | - | 1 | - | - | - |
| Private Doctors | - | - | - | 3 | - | 2 | 1 |

To summarize the findings on relevant waste generators in the area the following waste sources can be named:

- Residential areas including gardens
- Businesses and offices
- Industries, including light industrial activities commercial farms and small farming
- Healthcare facilities

2.10 Volumes of Waste Generated

The most common method to quantify the amounts of waste generated in a specific area is by using weighbridge records. There are no available weighing facilities at disposal sites in TLM. Since there are no weigh bridges available, to gain data on the amounts, per capita waste generation rates are used to determine the amounts of waste generated. Furthermore loads of waste removed and disposed was recorded to calculate the amounts. To guarantee a consistency of information one unit should be used for all specifications preferably in tonnes. But due to the lack of weighing facilities, cubic meters (m³) were used, enabling a more accurate estimation of the amounts when recording vehicle loads of removed or disposed waste. For comparison and summary common density factors were applied to calculate the weight of waste, basing on estimated and determined waste density.

Household waste will have different densities as it depends on the composition of the waste, moisture content and other factors. Composition is affected by the socio-economic status of the waste generation area. In the literature, it is suggested to use, for loose waste, densities of 0.13- 0.17 tonne/m³, for high inform groups to an average of between 0.29 and 0.33 tonne/m³ for low income group. Where waste is removed by compaction vehicles the compacted density has been taken into consideration, which can reach up to 0.45 tonne/m³ depending on the compaction factor of the vehicle.

It has to be emphasized that the gained data can only present a snapshot of the situation because of differences in waste management and generation during the various times of the year. In order to give a statement of the situation for a longer period of time the obtained data during the field survey has been extrapolated. Though the amounts generated and disposed in the TLM can not only roughly be estimated

because no proper waste control facilities are in place, nor is any detailed waste information system set up by the local municipality to monitor the waste situation including waste analysis on a regular basis. Waste delivery vehicles are currently being recorded at the Bultfontein dump whereby the type of waste being dumped, the relative volume of the truck and whether it is private or municipal trucks.

As mentioned, waste generation per capita depends on the socio-economic profile of a defined area. Various studies have shown that people in the low-income group generally generate less waste per capita than people in high-income areas. Applying all the available demographic data for the TLM a socio-economic level could not be assigned to different waste generation areas within the local municipality.

Table 22 suggests waste generation rates per capita and day for household and garden waste according to the income group. Other figures can contain business and industrial waste also given per capita for a specific waste generation area but should be verified because of high variation possibility from area to area. The number of business activities in a particular area in relation to the population residing in the same area has of course an effect on the proportions of household and business waste in the waste stream of the area. A figure from the WHO for Maseru in Lesotho suggested 0,65 kg/cc/d including business and institutional waste. Whereby the composition of the general waste stream is estimated 60% household and street cleaning, 15 - 30% is 'business and other', and 10 % institutional waste.

Table 22 Approximate per capita waste generation rates for different income groups

| Income group* | Kg/person/day |
|----------------------|----------------------|
| High and very high | 1.2-2.5 |
| Middle to high | 1.1-1.2 |
| Low to middle | 0.7-1.1 |
| Very low to low | 0.4-0.7 |
| Informal settlements | 0.2-0.4 |

*Income group not defined

A waste analysis which was conducted by SEMO at the dump of Bultfontein and the landfill located in Hoopstad. Waste generated from town in Bultfontein accounted for 1.13kg/person/day whilst the latter was determined to be at a waste generation rate per person of 0.35 kg/day for very low to low household waste including small amounts of garden waste.

In regard of the presented rates a general waste generation rate of 0,5 kg / person / day is chosen for the waste generation rate for the TLM. These rates include small generators of business waste in all the settlements.

2.10.1 Estimation of generation per capita

Applying 0,5 kg/cc/d for all inhabitants and assuming that this waste is composed as suggested by the WHO to 60% household and garden, 30% of business (which could presumably be less in the more rural areas) and 10 % of institutions (likely to be less) the following waste generation situation for general waste (municipal waste) can be established:

Table 23: General waste amounts in tonnes per day according to estimated per capita rates

| Type of waste | Tswelopele Municipality | | | | | | | Total waste amounts |
|----------------------------------|-------------------------|--------|--------|--------|--------|--------|--------|---------------------|
| | Ward 1 | Ward 2 | Ward 3 | Ward 4 | Ward 5 | Ward 6 | Ward 7 | |
| Household and garden Waste | 1.89 | 16.11 | 34.86 | 14.85 | 4.35 | 36.87 | 28.2 | 137.13 |
| Business waste | 0.765 | 7.65 | 16.65 | 0 | 0 | 0 | 0 | 25.07 |
| Institutional/Agricultural waste | 0.0 | 0.005 | 0.045 | 0 | 0 | 0 | 0 | 0.05 |
| Total Waste amount's | 3.655 | 25.765 | 54.555 | 18.85 | 9.35 | 42.87 | 35.2 | 190.25 |

The density of the waste can vary significantly. In order to make estimations comparable with volumes of waste which were recorded, a general density of 0.25 t / m³ is assumed.

2.10.2 Recorded waste amounts

Generation areas which are serviced offer a more reliable figure on the real waste amounts generated in the areas. Nevertheless it has to be taken into account that loads of removed waste from those areas should be monitored during a longer period of time preferably throughout the major seasons in the year. Also the service coverage has to be considered as usually a part of the generated waste is removed and disposed illegally sometimes not being even recognized. The average amounts that are removed from different service areas of Phahameng and Bultfontein are given in the local reports, however they could not be quantified owing to the lack of weigh bridge on site.

2.10.3 Landfill record

Landfill records were not carried out during the study owing to the lack of information to confirm the waste quantities disposed off on sites. Information from the dump site in Bultfontein is very sketchy and no reliable information can be drawn. The Hoopstad site apparently has been permitted though no confirmation of the availability of the permit was done.

During the surveys, the loading spaces of the incoming vehicles were roughly measured in m³ since there were no weighing facilities available. The rate of filling of each truck was estimated and the composition and type of loaded waste, as well as the origin were kept in a logbook. More details on the recorded are available in the Mayibuye reports for the Bultfontein dump.

The amounts of waste studied from the Mayibuye Foundation recorded data of daily disposal at the dump of Bultfontein were used to extrapolate for the Hoopstad landfill site.

Table 24 Formally removed amounts by municipality in m³ per week

| Municipality | Total amounts per day of municipal waste disposed * |
|------------------|---|
| Municipal waste | 204 |
| Green waste | 118 |
| Builders rubble | 12 |
| Industrial waste | 7 |
| Total | 441 |

* Mayibuye Foundation

** SEMO on site

2.10.4 Health care waste

Waste that is generated in hospitals, clinics and private doctors can roughly be divided into Health Care Risk Waste (HCRW) and general waste (household like waste). Generally the hospital which is operating in the area of Hoopstad has a waste management system that is implemented with accurate record of waste kept by the independent service providers. The service provider manages the H&MW from the clinics, medical doctors, old age homes from around the two major towns except for two doctors located in Tikwana. They dispose their waste together with the general waste (which is illegal and dangerous).

Attempts to get the records from Millennium Waste Collectors were unsuccessful.

2.11 Characteristics of the Waste

Waste type characterisation/analysis involves a logical and systematic approach to obtaining and analysing data on one or more waste types. The various components or fractions of a waste type, such as household waste, need to be determined for planning purposes, for instance to determine the feasibility of introducing source separation initiatives for recyclables and organics or waste processing facilities..

2.11.1 Analysis household waste

Within the scope of the IWMP a particular waste analysis could not be undertaken for each ward instead the waste from the township was separated from the one coming from town. Five waste type analysis were carried out in Bultfontein and Phahameng, representing a general situation in the TLM.

All waste that was generated in one day was collected and weighed at the source to be later separated into fractions, which were weighed per group. The table below represents the outcome.

Table 25 Waste composition from TLM

| Waste Type | Municipality | | Total Private | Total waste |
|-------------------------|---------------|-------------|---------------|----------------|
| | Phahameng | Bultfontein | | |
| Paper | 8.9 | 8.6 | - | 17.5 |
| Cardboard | 16.9 | 56.6 | - | 73.5 |
| Bottles | 43 | 92.6 | - | 135.6 |
| Platics (PET+NPET) | 53.5 | 24.1 | - | 77.6 |
| Garden/Putrisible waste | 43.75 | 190.1 | - | 233.85 |
| Clothes | 11.5 | - | - | 11.5 |
| builders rubble | | - | 684 | 684 |
| Steel | 3.6 | - | 0.5 | 4.1 |
| Aluminum | 1.5 | - | 0.5 | 2 |
| tin/can | 2.5 | - | 6.7 | 9.2 |
| Total Waste | 185.15 | 372 | 883.5 | 1068.65 |

For the analysis a total amount of 1068 kg was classified, separating all recognizable fractions and group them into the major secondary fractions. As a result of the analysis the rounded correlation of the primary fractions is as follows: 58.17% wet: 13% dry / 28.6% other.

Thus the total of organic component amounts to more than 86% and included garden waste, builders rubble, nappies/diapers and clothes.

2.11.2 Characteristics of other waste types

(i) Business and industrial waste

The composition of business and industrial waste can vary a lot between the different types of businesses and industrial. Both waste categories have in general higher potentials for recycling owing to the fact that materials can be more homogeneous or exist in higher concentrations within the waste stream, than for example can be found in household waste. At the same time, the potentials for hazardous waste can be higher especially from industrial waste. For business waste a study prepared in Lesotho suggested that at least 60% of the waste could be recycled, not regarding different scenarios. Most of the businesses generate to a certain extent general waste, originating from offices, common areas and lounges, service areas etc. Whilst Senwes Corporation generate waste almost all of it is recyclable by selling to the farmers. No waste type was collected directly from the business community.

(ii) Agricultural Waste

Similar to business and industrial waste, the breakdown of the agricultural waste category can vary between different farms, depending on the production process and the type of products. Relevant factors are the kinds of fertilizers and pesticides which are used and the degree to which a shift from non-organic to organic production has been implemented. The existence of workers villages on the farms generating household waste will add these characteristics to the general waste stream. No waste characterization was undertaken from the farming community owing to the no service by the municipality.

(iii) Health care waste

In accordance with the international UN Regulations of dangerous goods and the South African National Standards (SANS) No. 10248, hazardous waste is divided in 9 different classes. Some of these classes are divided in divisions. The classes can be found if the waste depends on the treatment level of the healthcare facilities. Hazardous health care waste that can be found in every healthcare facility is infectious waste - including sharp waste. This waste is classified as a Class 6 waste (toxic and infectious) with the division 6.2: Infectious substances.

Additionally SANS 10248 classifies the waste streams within healthcare facilities in different Hazardous Ratings (HR 1.4) and in different waste streams. These streams are supposed to be packaged, labeled, handled, stored and treated in accordance to their level of hazard in order to create a safe and environmental sound healthcare waste management:

- Human or anatomical waste
 - Infectious human anatomical waste (colour code RED -labelling Class 6.2)
 - Infectious animal anatomical waste (colour code ORANG_ -labelling Class 6.2)
 - No-infectious animal anatomical waste (colour code BLUE)
- Infectious non-anatomical waste (colour code RED -labelling Class 6.2)
- Sharps (colour code YELLOW -labelling Class 6.2)
- Chemical waste including pharmaceutical waste
 - Pharmaceutical or chemical waste (colour code GREEN - labelling different Hazardous Classes)
 - Cytotoxic pharmaceutical waste (colour code GREEN - labelling specific sign: red triangle on black background with bold letters: Cytotoxic)
- Radioactive waste (labelling Class 7: Radioactive Material)
- General Healthcare waste (colour code BLACK)

Due to the lack of statistical data the data of the World Health Organisation (WHO) provides an overview about the proportions of the hazardous components within the healthcare waste:

- Infectious waste (15% to 25% of total health care waste) among which sharp waste (1 %),
- Body part or anatomical waste (1 %),
- Chemical or pharmaceutical wastes (3%), and
- Radioactive and cytotoxic waste or broken thermometers (about 1%).

A general characterisation of health care waste was prepared by the local EHPs³⁸ for training measures in order to improve the infection control at hospitals and to promote an appropriate handling of waste. In the investigated area the following different fractions were characterised by the EHPs:

- Sharps (needles, razor blades, suture needles, ampoules etc.)
- Soft waste (surgical gauze, bandages, gloves, swabs, sanitary pads, etc.)
- anatomical waste (human tissues / organs i.e. placenta)
- pharmaceutical waste (discarded / expired solid, liquid gaseous chemical or medicines)
- general refuse (paper" plastics, cans, kitchen waste)

Sharp wastes, although produced in small quantities, are highly infectious. Poorly managed, they expose

healthcare workers, waste handlers and the community to infections. Contaminated needles and syringes represent a particular threat and may be scavenged from waste areas and dump sites and be reused.

There are no information on the general relation of these fractions in the waste stream of the hospital and clinics. General waste finds itself at the HCRW stream as a result of poor segregation at source.

3. Current Strategies, Systems and Practices

3.1 General

Waste Management Services are rendered in almost all the urban areas of the TLM by the Municipality. The farms do not have any form of formal refuse removal. This poses a very serious health risk especially given that there is also no access to clean water, these areas may be prone to the spread of cholera and other communicable diseases. Dumping and burning of waste is typical for the Bultfontein dump and the Hoopstad landfill site. To have a "waste pit" in the backyard is a regional tradition for households and other small generators. Bigger generators are not unlikely to dump illegally in places which seem appropriate for them as holes created by erosions, creek or river valleys, and old quarries and so on. Accumulation of waste can frequently be seen along the roads. To reduce the amounts of waste in dumping areas burning is practiced, pit burning is very typical for households. By that, bigger parts of the caloric waste fractions as plastics are burnt at a low temperature which causes critical air pollution. These are also burning in combination with firewood and coal, added as fuel. The particles released into the air are carcinogenic and can include dioxins, a persistent organic pollutant that is particularly dangerous.

Specialised waste related activities are performed by the EHPs concerning health care waste as well as pollution control and hygiene issues. Among their responsibilities is the identification of pollution hot spots and to take actions for compliance of environmental and health policies. Business registrations are held by the EHPs to check on environmental health situation of businesses. At present stage no systematic approach is done in terms of the identification and remediation of pollution hot spots caused by illegal dumping and inappropriate waste handling.

Responding to the Minimum Requirements for the Handling, Classification and Disposal of General Waste the Municipality Municipality of Lejweleputswa is currently developing the IWMP for general waste. A key element in the development process is the Waste Information System that will be used as a database, containing information on hazardous waste streams and loads as well as GIS data on the area. For building the database, checklists and spread sheets are used to keep information on identified waste generators, processors, transporters as well as treatment and disposal facilities.

The responsible department for pollution and waste management issues is the Department for Agriculture, Conservation and Environment. One part of the environmental management is to determine legal compliance of all existing general landfill/waste sites in the Province. The outputs for this activity include:

- Identification and mapping of all existing waste and landfill sites in the province.
- Audits of all existing waste and landfill sites in the province
- Consolidated Compliance and Audit Report for all waste and landfill sites of the province.

National Government is preparing a national waste information system as part of the recently launched

implementation of the National Waste Management Strategy and municipality will be responsible for the provision of required data. The specific elements of the system have not yet been developed.

3.2 Waste prevention and minimization

Waste minimisation suggested by National Waste Management Strategy aims at among other:

- Introduction and enforcement of appropriate regulatory instruments
- Development and implementation of appropriate economic instruments and other financial incentives
- Facilitating and coordinating the implementation of existing successful waste minimization and recycling initiatives

Within the TLM initiatives by the Mayibuye Foundation and independent scrap dealers have implemented the prevention or minimization of waste methodologies in respect to recycling activities. Also the legislation on Plastics has indirectly caused plastic bags' indiscriminate disposal reduction by imposing charges. Other initiatives for using more recyclable materials or to change consumption patterns and lifestyles of the population included creation of ornamental elements like wire balls, bicycles, flower pots, etc. This has lot to do with public environmental awareness and participation which is on the whole still developing owing to the Mayibuye Foundation's environmental workshops and recycling initiatives. In addition, there are national initiatives to collect and reuse waste oils (ROSe Foundation) and to collect used batteries (industry based).

The national government "plastic bag regulation" bans certain types of plastic bags in order to increase the reuse of plastic. Shops, particularly, supermarkets were encouraged to charge for plastic bags instead of giving them away for free. As a result, the amount of plastic bags in the waste stream has already been reduced. At supermarkets and other stores in TLM plastic bags are charged at cents per bag.

In September 2001, the Polokwane Declaration on Waste Management was signed by national, provincial and local representatives as well as representatives from civil society and the business community. Through this declaration the urgent need to reduce, reuse and recycle waste was officially recognized in order to protect the environment. The goal was expressed to reduce waste generation and disposal by 50% and 25% respectively by 2012 and develop a plan for Zero Waste by 2022. Each party committed itself to take measures to reach the formulated goals.

There is nothing that is supposed to come out specifically from the Declaration in practical terms. Rather, it represented a commitment by key stakeholders to support national policies and the process of implementation of the National Waste Management Strategy.

3.3 Collection

Generally in terms of refuse collection in the TLM, the municipal refuse removal services are being rendered in seven wards.

The service within each of the wards is not rendered in the entire municipal area but only in few areas particularly the main towns. The number of households that receive refuse removal service in the entire municipality municipality is much larger than those that do not receive services. The farm areas are left out of any removal service at all. In order to extent collection services, the road condition's have to be taken into consideration particularly in rural areas and areas associated with the newly build RDP houses and informal settlements as most of the roads are in a deficient state.

3.4 Recycling, reuse and composting

There are several recycling projects in the TM, which are mostly private initiatives. The main reason for starting recycling was business creation rather than aiming at a cleaner environment with an exception of the Mayibuye Foundation NGO project which was funded by the Provincial Social Development Department for waste recycling and management. There is a functioning partnership with municipality in which the municipality supports recycling activities in principle where the Bultfontein dump is controlled for access and information collected.

Private businesses and industries already practice recycling of their own waste materials. Contracts with providers exist, that take back certain recyclable material as well as hazardous substances. As an example, mechanisms like taking back fertilizer packaging by the distributor or old agro-technical equipment are practised on farmlands.

Local recyclers have agreements with local businesses to receive recyclables directly or to be allowed to pick them from their premises. Also local recyclers usually work with salvagers or waste pickers from towns and townships. In general, recycling facilities can cause certain emissions, such as wind blown waste, spillages of transmission and lubricating oils, but when managed properly these factors can be controlled so that the impact on the environment is limited. But also extremes occur where recyclers use private land inside towns where any kind of waste is disposed to be separated which may inturn have negative impacts on the neighboring areas and zoning specifications.

Based on the conviction that recycling has a big potential in the TLM, scrap recyclers are seriously involved in the business with a total number of six taking place in the municipality. The type of recyclers within TLM is characterized in Table 26.

Table 26 Shows a number of recycling projects in TLM and the amounts of the recycled

| Recycler | Waste type | Quantities per month (kg) |
|----------------------------|---------------------|---------------------------|
| *S.P.Q.R | Copper | 10032.6 |
| | Brass | 1345.8 |
| | Al | 3581 |
| | Lead | 194.07 |
| | ****Stainless steel | 195925.8 |
| | Zinc | 328.8 |
| | Foil | 0.8 |
| | Pistons, | 1141.4 |
| | Braizzen | 168 |
| Mayibuye | Paper | N/C |
| | Plastics (PET) | N/C |
| | Bottles (PET) | N/C |
| | Whisky bottles | N/C |
| | Brandy bottles | N/C |
| *S.P.Q.R | Iron | 200 |
| | Copper | 300 |
| | Aluminum | 6000 |
| | Bones | 6000 |
| **Tinus Cornelissen | Cu mix | Not issued |
| | Al cast | Not issued |
| | Brass | Not issued |
| | Pistons | Not issued |
| | Zinc | Not issued |
| | Battery | Not issued |
| | Radiators | Not issued |
| Tinus Cornelissen | Steel | 29 |
| | Zinc | 10.5 |
| | Tin/Can | 10 |
| | Bones | 55.5 |

*Information provided by SPQR (the recycler)

** Information provided by Tinus Cornelissen

*** this information is questionable and will require further confirmation

As indicated in Table 26, recycling is already carried out in each local municipality throughout TLM, creating business opportunities and contributing to the reduction of final waste disposal of recyclable materials. The recycling projects are better or less established resulting into quite different performances. Key factors are management skills for running the recycling efficiently and viable access to means of transportation.

(i) Potentials for "recycling

Assuming the following scenario that:

- From the general waste stream 25 % of household waste and 60% of the business waste can be recycled
- The proportions of household and business waste in the general waste stream is 60% and 30% respectively.
- By the latter estimate the total capacity for recycling from the general waste stream results in 40%
- The total general waste based on generation per capita in TLM is 17 025 t per month, meaning that 6 810 t out of the monthly amount can be recycled
- That currently the total amount of recycled waste from the municipal waste stream is approximately 300 t

per month (only regarding the main recycling projects that are listed in Table 26), meaning that only 4.4 % of the recyclable material from the general waste stream is currently recycled.

- It can be established that the potentials for recycling i.e. the chances for minimization of the waste amounts to approximately 6 500 t / month.

(ii) Use of old tyre's

A kind of improper use of waste tires causes critical environmental pollution. No evidence of tyre hazards or wastes witnessed so far at the urban areas. At the farms the old tires are used on farms for landscaping or they are burnt during winter times around the fields to protect the plants from frost, especially in potato farming causing hazardous dark smoke.

Another contamination by tires occurs when salvagers burn them in order to extract the metal belt from the tire to sell it "this work poses a health risk while producing life financial benefits. Currently a new regulation on tyres is expected to be issued in the near future. It is supposed to facilitate the recycling of rubber and to have by that an impact on reduction of the disposal of tyres. By imposing levy of new tyres the process of building up a recycling sector will be empowered.

(iii) Composting

As a waste minimisation and or reduction strategy composting is being practiced at farms, taking advantage of the organic production leftovers and/or through a Shift from non-organic to organic production. A problem of compost application for cultivations is the varying quality of generally low commodity products. So far in most of the cases it is used as a supplement.

Other farms use organic material to produce a half organic liquid fertilizers, based on humic extracts. A combination of extractions from organics with synthetic fertilizers, which are produced in the factory ill a compound. Current fertilization costs per year and hectare can be reduced and at a same time a waste reduction can be achieved.

As an example, simple composting in open windrows without aeration, using parts of the organic waste from the productions and green cuts from the farmland is implemented.

3.5 Treatment / Health Care Waste

At present the incineration of medical waste is the only known treatment in the area. Other forms of specific handling can be described as special disposal practices. Waste Management at clinics and hospitals is supervised by the EPS in cooperation with infection control nurses. Different coloured bags are used in bins to collect separately. Red bags for medical i.e. infectious waste and black bags for general waste. In all hospitals and clinics special sharp containers, (resp. needle buckets) of usually 10-litre volume for sharps are provided and collected.

All medical waste, i.e. infectious waste is supposed to be taken to the incinerators. But from the clinics usually it is only the sharp containers that are taken by the EHP.s for incineration while other medical waste is burnt usually in a pit on the premises on a regular basis with the general waste from the clinic. Placentas are generally burnt at the hospitals and at clinics there exist either small gas fired incinerators or they are buried in a separate lockable pit. At the same time the placenta is frequently taken home by the mothers, where it is

buried or burnt.

The operating hospital in Hoopstad has outsourced the waste collection function to Millenium Waste Management. This company is equipped with the waste collector systems and an incinerator (by legislation) where medical/infectious waste from the hospitals as well as from the clinics has to be burnt. Sometimes general waste from the hospital is burnt too. Usually old coal or diesel-fueled incinerators are used. Main general problems of the health care waste management system:

- Small incinerators at "clinics work mostly with gas. When it run out it is not made immediately available. Some have been standing still for long because no provisions were made at all. The gas incinerators run inefficiently (can take up to 3 hours to burn a placenta) and breakdowns are common.
- Incinerators at Hospital may be old and ineffective. Health care waste is partly not burnt properly, there is no flue gas treatment including scrubber systems installed. Breakdowns of incinerators have been reported. In such cases the other hospitals have to cater for the medical waste with their incinerators, although bags with medical waste are not appropriate or safe for transporting.
- The clinics do not normally have their own vehicles and are thus dependent on other vehicles to come and collect the waste - a proper logistic system for the collection is not everywhere available.
- No different bags available permanently, confusion of bags and containers between medical and general waste is likely to happen.

Low segregation quality - hazardous waste is mixed with household waste - sharps are dumped into the general waste bags and bear a high risk of needed sticks and infections for workers and salvage us.

Potentially infectious "placentas are taken home by mothers i.e. due lto the fear that placentas will be sold to witch or others. No safe system for the collection, of infectious anatomical waste is available.

The sharp containers cannot be sealed properly. When transported to the hospitals on untarred roads there is a risk of spillage.

The dumping of ashes from the incinerators is not controlled neither is it taking place on landfill sites for hazardous waste, but mostly in open area when people can still have contact with the ash or even can take it to use for landscaping or building material.

The medical waste from the practicing doctors with surgeries and from the old age home are not adequately accounted for and will need proper and closer management.

3.6 Final Disposal of waste

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Throughout TLM, there is one general waste permitted disposal site (landfill), which is located in Hoopstad. Another waste disposal dump is in Bultfontein and has since not been offered the permit to operate. The TLM Municipality does not have any legal communal site for refuse disposal. There are also several illegal waste refuse dumps at the backyards and on vacant land. Estimates of how many illegal sites are within the TLM can hardly be made. Usually every settlement has a kind of dumpsite or dumping area. Waste is dumped in been spaces where it is seen to be suitable but not limited to certain areas. This dumping practice causes littering of the surroundings and environmental pollution, particularly where holes or water runoffs are used for dumping. As a result, surface and groundwater is affected and people can be directly exposed to contact with leachate

and gases.

During the survey undertaken, it was noted that from the permitted disposal site no adherence to the permit conditions and with the Department of Water Affairs and Forestry's Minimum Requirements for Waste Disposal By Landfill, while the rest were not following the requirements the fact that waste disposal sites are not being operated in line with the minimum requirement has various reasons, among them the lack of resources within the municipality or a lower priority for an appropriate waste management.

3.7 Education and training

At present there is intervention through the MF and the Environmental Clubs in educating or training measures in terms of environment waste management. An example for a public initiative is a training course carried out by MF, aiming also at participants from the community and the municipality. The representative of MF has been undergoing training which was provided by DEAT and the TLM. The main topics of the workshop consisted of guidelines on recycling and waste collection

There are awareness campaigns in terms of waste or recycling carried out by the MF, Environmental Clubs, TLM and schools.

The MF has passion for the waste management however it is hampered by the insufficient income and operational costs on a regular basis. With some training and professional guidance the current operation could be improved significantly. The training plan foresaw need based training interventions. This was meant to include community management structures and manufacturing practices, following the principles of:

- Transfer of learning at the work situation
- On the job coaching sessions and
- Follow up sessions as extension approach
- Project start and management
- Introduction to business management
- Financial issues
- Staff planning, organisational control and leadership issues
- Practical sessions on recyclables

The implementation support had to consist in operational establishment and capacity building.

4. Financing and budgets cost related to waste management

4.1 Tariffs

In the local towns of TLM where refuse removal services are rendered and no tariff structure for administration is applied. While the tariffs are supposed to be regulated by the bylaws, in TLM there is no legislative basis in the form of local bylaws to impose charges. Only in TLM the tariffs generate sufficient income to cover the costs of refuse removal. Flat rates that are charged for basic services include a fee for refuse removal. This amount is generally not clearly defined. The same charges apply to areas where refuse services are rendered or not. Charges "are usually realised through user accounts held at municipal offices. The exact number, how many households / stands/ businesses is paid for the service could not be made available by the Municipality. Problems are reported from municipal offices that a larger part of the population is not paying or delaying remarkably the payment of the charges.

Considerations to implement tariffs to the unserved areas will require funding of the extension of the services. As services begin to be rendered in other outlying areas, cost recovery calculations are supposed to be done and tariffs for these areas and services have to be set and approved.

In TLM town as an example the average rate of payment is very high, probably in the region of 85 - 90 percent in the same month as billing. Due to strict credit control, outstanding debtors remain very low at any given time. As far as outlying areas are concerned, rate of payment is very low. Reasons given for this include poor or inconsistent service delivery as well as inaccessible points of payment. The possibility of reaching an agreement with the Post Office to make use of their infra structure as pay points is currently being investigated and will probably be implemented as of next financial year.

4.2 Income and Expenditures

Information on income and expenditure for refuse removal in the Municipality of TLM was made available through financial statements from the financial departments. The statements are usually declared for the vote "refuse" in the financial year, from July to June. The main Income to cover operational costs is derived from the tariffs while for investment costs usually other sources as national grants and subsidies are used. The towns where tariffs are applied represent the most relevant factors for revenues.

Table 27 Income expenditure situation in the municipality in Rand per Year

| TM Municipality | *Income from tariffs including incl. contributions | *Total Expenditure (excl. Cap Investment) | *Cap outlay | *NP/NL |
|-----------------|--|---|-------------|---------|
| 2007/08 | 3 090 000 | 2 677 400 | 0 | 412 600 |
| 2008/09 | 3 667 300 | 3 022 300 | 250 000 | 480 900 |
| 2009/10 | 3 667 300 | 3 022 700 | 250 000 | 394 600 |

* taken from TM operating budget 2006/07 includes other income

**taken from TM operating budget 2007/08

4.3 Budgets

At present there are budgets allocated for waste management in TLM. The development of waste management, i.e. the establishment of refuse removal service is depended on the income generated for the services offered. The Municipality for gap financing between expenditures and income from tariffs, including extra charges the equitable shares are used as a resource. The budgeting for refuse removal begins at the beginning of each year and has to be approved before the financial year starts in July. In TLM additional budgets for specific service extension and/or improvement to the rural or farms has not been granted for the financial year 2008/2009.

The Municipality has no plans to encourage the local recycling sector. A proposal to intensify collection and commercialisation of recyclables must be developed and submitted. The waste recycling services are supposed to be outsourced in the future.

In the meanwhile a budget of R250 000 has been set aside for equipment which is not clear on the type of equipment as it can be for trucks or spares thereof. It would be enforced that the equipment targeted should be the weighbridge at the Tikwana/Hoopstad landfill side. This fund can also be increased to cater for:

- Establishment, operation and maintenance of waste transfer stations
- Waste removal from all rural areas
- Operation and maintenance of Bultfontein landfill site
- Establishment of the composting plant
- Strengthening the NGO's and community recycling projects

The proposed landfill site for Bultfontein approximately 500m out of town was identified though currently used as a municipal dump. It is planned to be a local landfill site. It is an old quarry that is on the Municipal land. It is reported that an application for the permit was launched with the Department of Water Affairs and Forestry yet no approval has been made to date. Should the approval of the site be attained, the site could be excellent for the hierarchy of waste management implementation.

A business plan be prepared for extending refuse removal services to all the wards in the Municipality including a proper disposal service. Equitable shares provided by the Provincial Government can finance it.

Further targets:

- Community based re-use collection service
- Utilization of current equipment for the collection and disposal
- Budgeting for the weigh bridge
- Utilization of human resource for the implementation
- Upgrading of the current permitted disposal site to constitute a required landfill site
- Re-application for the permitting of the Bultfontein dump
- Training and skills development
- Supporting community environmental workshops and campaigns
- Development and implementation of the Waste Information System

The ambitious turnaround plan for technical services waste management should be based on the following vision: Viable and sustainable solid waste section that provides an essential service that will ensure a cleaner, healthier environment to the residents within the municipality.

Furthermore and Integrated Environmental Program (IEP) for TM should be developed to address pollution prevention and pollution minimization. For the purpose of the plan waste was distinguished as:

- municipal solid waste
- liquid discharges such as sewage and industrial effluents,
- atmospheric emissions,
- hazardous waste such as medical and chemical.

5. Gap Analysis and need assessment

The gap analysis seeks to identify those issues and gaps that need to be addressed in the IWMP. Issues and gaps have been identified from the review of the current situation regarding waste management by the Tswelopele Local Municipality within Hoopstad/Tikwana and Bultfontein / Phahameng.

The areas of concern within the categories of legislation and policies, institutional and organizational structure, information management, medical waste, cleansing services, waste disposal, waste minimization, waste management costs and education and awareness have been identified.

Definitions and details of the gaps identified during the study are shown in Table 28 below.

Table 28 Gaps identified during the study

| Area of Concern | Gaps and Issues | Needs Assessment |
|--|---|--|
| Policies and legislation | <p>Waste management by-laws do not reflect the current legislation or national environmental policies or have not yet been developed by the Municipality.</p> <p>Provision has not been made in the 2007/08 IDP document for environmental by-laws to be developed or revised</p> <p>A waste management policy that guides waste management activities has not been developed by the municipality</p> | <p>The municipality should develop waste management by-laws that take cognisance of current legislation and the requirements of the IWMP. These can form the framework for the development of local by-laws that reflect the municipal situation.</p> <p>By-laws should clearly describe acceptable waste management practices and the roles and responsibilities of stakeholders.</p> <p>Appropriate funding should be allocated to waste management functions to ensure compliance with the by-laws.</p> <p>Mechanisms should be developed to ensure effective compliance monitoring of the by-laws.</p> <p>Appropriate training programmes and awareness raising programmes to be formalized and implemented at the municipality. The CBO's and communities to ensure the comprehension of the requirements of the by-laws and the responsibility of the waste generator.</p> |
| | | <p>The municipality should develop a waste management policy that reflects the priority issues identified in the IWMP that will guide waste management at the local municipality level</p> |
| | Waste management is often considered to be a low priority | <p>Awareness should be raised at management level of the importance of proper waste management and the impacts of poor management to promote adequate resource allocation</p> |
| | There is currently limited long-term planning for waste management | <p>The IWMP should be reviewed and updated annually to meet the changing situation</p> |
| Institutional and Organisational Structure | Limited capacity at the local municipality level to manage waste management activities | <p>An assessment should be made on the number of staff required for effective waste management.</p> |
| | Waste management is not a separate function within the organisational structure at the municipality and is the responsibility of environmental health services | <p>The appropriate organisational structure should be developed that is linked to ensure effective service delivery</p> <p>Competencies and job descriptions should be developed for all posts</p> <p>Necessary funding to be allocated for the required staff</p> |

| | | |
|-------------------------------|---|---|
| | Limited waste management training implemented and inadequate provision is made in the Skills Development Framework | <p>Training needs assessment should be undertaken for all staff engaged in waste management and a training programme developed and implemented</p> <p>Waste management training needs should be incorporated into the Skills Development Framework</p> <p>Ongoing interaction between the District municipality and the local municipality to ensure exchange of information and experiences.</p> |
| | Transferring environmental health functions to the municipality level has impacted on the responsibility of medical waste management | Appropriate co-operative committee between the municipality and municipality should be developed and implemented. |
| Information Management | Limited information management systems implemented. Key performance monitoring indicators can not be fully implemented due to a lack of baseline information. | Integrate and align a waste information system with the information management system at the Municipality, province or national waste managing organ of state. |
| | No information on scientifically recorded waste quantities at the landfill sites | Implement the weigh bridge to measure the quantities of waste disposed |
| | Information on the type of waste dumped or recycled at the landfill sites is not available | Implement waste characterisation protocol and data recording process |
| | No information maintained on the quantity of waste illegally dumped or collected through street cleaning | Develop a system to monitor quantities of waste collected |
| | <p>Lack of information on all waste generators and recyclers in the municipality, particularly in the rural areas, scrap recyclers, old age homes and medical waste generators</p> <p>No differentiation of waste generation by domestic, commercial and industrial sectors</p> | <p>Implement the develop mechanism to collect key information, including number of service points, quantities of waste collected and waste currently not disposed at the municipal landfill site</p> <p>Recommendations should be developed on information to be provided by service providers and the private sector</p> |
| Cleansing services | No rural areas are currently serviced | <p>Information should be collected on the number and location of waste generators and the type and quantity of waste generated</p> <p>The extension of tourist facilities should be linked to the implementation of proper waste management</p> <p>The role of public-private partnerships should be investigated</p> |
| | <p>The extension of collection services to new residential developments (both formal and informal) in the urban areas with the existing resources</p> <p>The actual number of service points serviced by each collection vehicle is not known</p> | <p>Round waste collection routes should be optimised based on current and future service areas to ensure the optimum use of resources</p> <p>All new developments (residential, commercial and industrial) should be identified and the impact on waste services established</p> <p>Cleansing service standards should be developed by the</p> |

| | | |
|----------------|--|---|
| | Collection cycles not adhered to at the Bultfontein areas | <p>Municipality or be revised to suit local conditions by the local authority</p> <p>Key performance indicators (based on national benchmarks) should be developed against which collection services are monitored to identify any problem areas to enable corrective action to be implemented</p> |
| | Collection round in some areas is long where services are provided to rural settlements located far from the disposal site | Economic optimisation of collection services should be undertaken based on the distance to landfill site, number of service points and the quantity of waste generated |
| | The CBD, taxi ranks and entrance to towns experience problems of litter and illegal dumping requiring daily cleansing | <p>Awareness raising campaigns should be implemented at hot spot areas to promote proper waste management</p> <p>Awareness raised of procedure to be followed and the municipal contact person for reporting illegal dumping</p> <p>Adequate waste containers to be placed in hotspot areas</p> <p>Mechanism should be implemented to monitor hotspot areas regularly</p> |
| Waste disposal | <p>Of the 2 landfill sites that are operating in the Municipality, only 1 has valid permit and 1 is not permitted.</p> <p>There is an urgent need to establish a licensed site at Bultfontein as the current is a dump and not licensed.</p> | <p>The current and future landfill requirements should be established and mechanisms implemented to ensure that the operating landfill site is permitted.</p> <p>Assist the Municipality with the registration application for a new landfill site</p> |
| | <p>No results of regular auditing on the operation of the licensed landfill site at Hoopstad/Tikwana are available</p> <p>The level of compliance with permit conditions or DWAF Minimum Requirements though not known is unacceptable.</p> | <p>A programme should be implemented to the audit license landfill site operating within the Municipality to establish legal compliance</p> <p>Based on the results of the audit a rehabilitation programme should be developed and implemented, including adherence to operating procedures</p> <p>Annual monitoring and auditing should be implemented to ensure corrective action is implemented timeously</p> |
| | Uncontrolled informal salvaging is ongoing at Hoopstad/Tikwana and at the Bultfontein dump site | <p>Salvaging activities should be controlled to limit the number of salvagers working at the site</p> <p>Mechanisms should be implemented to control the activity of the salvagers at the working face</p> <p>Salvagers should be trained regarding the health and safety issues of this activity</p> <p>Safety equipment and protective clothing should be made available to the salvagers</p> |

| | | |
|----------------------------------|---|--|
| | The actual remaining airspace of the Tikwana/Hoopstad landfill site is not known and lifespan estimated as limited records are maintained of quantities of waste disposed | An assessment should be undertaken of each landfill site capacity and estimation of remaining lifespan Mechanisms should be implemented to monitor the quantity of waste disposed at the landfill site and the future increase in waste to monitor airspace |
| | The municipality is considering the licensing of the dump site in Bultfontein | The siting of landfill should be finalised once the technical information has been generated. An EIA studies will be required before such as landfill could be established |
| | Formalised landfill site operating procedures not developed | Landfill operating procedures should be developed in line with the DWAF Minimum requirements. Regular auditing against the operating procedures should be undertaken and the results should guide corrective action |
| | Poor operation of the Hoopstad/Tikwana landfill sites will result in a reduction in the lifespan of the site | Formal operating procedures should be implemented and a rehabilitation programme developed and implemented |
| | There is a lack of staff, landfill equipment and budget to operate the landfill properly | Actual costs of disposal should be established and an appropriate budget developed to ensure sufficient resources are allocated to the disposal site |
| Waste minimisation and recycling | Despite the recycling initiatives occurring, no reliable data available on all recycling initiatives currently taking place | Recycling information should be collected and incorporated into the waste information system Systems should be developed and implemented to maintain the waste recycling information. The Mayibuye NGO should be trained and be used in the waste recycling services. Proper contractual agreement on the reliable delivery of the recycling by the NGO should be developed and implemented. |
| | Limited to no control by the municipality on the scrap recyclers is taking place | Dedicated inspectors for the scrap recyclers should be undertaken to ensure curbing of the scrap theft. The services of the Mayibuye NGO's should be procured in assisting with the compliance monitoring of scrap recyclers |
| | SEMO consulting conducted a high level waste characterisation studies and a potential for recycling is not known | A detailed waste characterisation studies should be undertaken to confirm the waste composition and the sources of the waste streams. |
| | Limited infrastructure available for the public to deposit recyclable | Infrastructure needs should be identified based on the feasibility of |

| | material | recycling |
|------------------------|---|---|
| | Feasibility of recycling is not known for both towns | <p>A recycling strategy should be developed for each Municipality that defines the level of recycling that is feasible and describes the most appropriate system to be implemented</p> <p>The role of economic instruments to promote recycling within the Municipality should be investigated</p> <p>Sources of funding to establish infrastructure requirements should be identified and business plans for facilities developed</p> |
| | <p>There is limited separation of waste at source</p> <p>No policies or initiatives to promote recycling activities implemented at the municipality</p> | <p>The feasibility of the separation and collection of garden waste for manufacture of compost should be investigated</p> <p>An Environmental Management System, including a Green Procurement Policy should be developed for implementation by the Municipality</p> |
| Waste Management Costs | Widespread poverty within the municipality Municipality will impact on households ability to pay for services | Indigent policy should be revised to incorporate waste collection services |
| | Actual costs for each waste management activity are not known | <p>Number of households that are not able to pay collection tariffs should be established and appropriate funding mechanisms established to ensure that sustainable services are implemented</p> <p>Key performance indicators should be developed based on national benchmark figures to monitor the municipal performance</p> <p>Financial data should be appropriately captured to enable performance monitoring to be implemented</p> <p>Activity Based Costing accounting should be undertaken</p> |
| | No recovery of disposal costs from general public using the landfill site and the dump | <p>The actual cost for disposal should be calculated and a Council resolution taken on a appropriate disposal tariff</p> <p>Access to the landfill site will have to be controlled to implement the tariff system</p> |

| | | |
|-------------------------|---|--|
| Education and Awareness | Formal education and awareness raising programmes exist | <p>A education and awareness raising campaign should be re-engineered along all the waste streams generated Tswelopele residents carbon prints.</p> <p>Annual, bi-annual and tri-mester competitions in waste recycling, re-use, waste avoidance techniques should be implemented.</p> |
| | Specific waste management issues are raised through the Ward Committee structures within the Municipality | Councillors and Ward Committee members should receive waste management training to raise the profile of waste management within the community |
| | Environmental management forums and activities supported by the NGO should be implemented. | Establishment of waste management forums to be investigated or ratified as a mechanism of concern and to raise awareness of waste management practises |
| Medical waste | The Local Municipality do not have information of medical waste management | <p>Sources of medical waste generation should be known by the municipality and be communicated to the municipality municipality</p> <p>Medical waste management agencies procured by municipality and operating within the footprint of the municipality should be known.</p> <p>Co-operative governance need to be encouraged and strengthened between the Department of Health, the Municipality Municipality and the Local regarding medical waste management</p> |

5.1 Waste Management Challenges for the Tswelopele Local Municipality

The gaps and needs analysis has highlighted a number of challenges regarding waste management within the municipality.

There is a lack of strategic planning by Local Municipality for waste management.

Information regarding waste management including waste generators, quantities and type of waste generated, collected and disposed, remaining landfill airspace and financial information is not readily available to inform the analysis. The development and implementation of a waste information system would assist the Local Municipality in future strategic waste management planning.

Waste management by-laws specific for waste management are not in place and cannot reflect the recent developments in environmental legislation or are not available. Enforcement of compliance with by-laws is limited due to capacity constraints at the municipality. Waste management by-laws will have to be developed to incorporate the requirements of the IWMP.

Waste management policies have not been developed by the Local Municipality to guide and inform waste management planning and service delivery.

The geographic area has rural areas, with low population densities and poor quality roads. Regular waste management services are currently mostly provided to the urban areas with limited municipal services available to the rural areas, including farming communities. Consequently, the ultimate disposal destination of a large quantity of waste generated in the municipality is not known. Appropriate policies and technologies will need to be investigated and implemented to extend service delivery to all households of the municipality.

The estimated increase in residential development within the urban located wards has and will also result in an extension of service delivery to accommodate increased waste loads. Optimisation of resource utilisation and round waste collection within the Municipality to meet current and future requirements needs to be investigated.

Currently, only one landfill site in operation in the municipality has valid permit. Another one is not permitted but instead is an official dump despite an application having been compiled for permit to use as a landfill. Regular formal auditing of the Tikwana/Hoopstad site for compliance with either permit conditions or the DWAF Minimum Requirements is not implemented. Proper operation of many of the sites is compromised due to a lack of staff, dedicated equipment and limited operating budgets.

The lack of a communication vehicle with the province regarding the medical waste management, the performance of the contracted service provider cannot be accounted for. Furthermore the medical wastes produced by the private medical institutions like the doctors consulting rooms, old age-homes and etc located within the municipality jurisdiction cannot be accounted for. Hence the lack of information management systems and formal monitoring procedures for performance monitoring of service providers appointed to provide medical waste management services.

The current organisational structure, responsibilities and competencies for waste management will need to be reviewed to meet the requirements of the IWMP. Currently, limited waste management training is implemented and inadequate provision is made in the Skills Development Framework. Appropriate training programmes will be needed to ensure the sustainable implementation of integrated waste management planning and the specific requirements of this IWMP.

Currently, limited information on the actual costs for the different components of waste management impact on motivating for appropriate budgets and setting realistic tariffs. .

The high levels of poverty within the Municipality will impact on the ability of households to pay for waste management services, particularly in the rural areas and RDP/informal settlements. Appropriate tariff structures will need to be investigated and an indigent policy for waste management implemented.

No effective and committed consideration is currently by the Municipality given to waste minimization, composting and recycling. Initiatives that are ongoing are undertaken by the private sector with no support from the Municipality. Uncontrolled informal salvaging is widespread at the dump and the Tikwana/Hoopstad landfill site.

The high level assessment of the waste produced within the Municipality has high amounts of garden waste which presents opportunities of composting projects and job creation.

There is a lack of education and awareness for municipal staff members and the public regarding issues of waste management. Although the ward committee structures are used by the municipality to raise issues of concern and clean-up campaigns implemented, no provision has been made for ongoing awareness programmes. This will be necessary of the IWMP is to be effectively implemented.

No documented policy or strategy of involvement of the municipality with the civil society in respect of initiatives of waste management and other environmental initiatives.

6. Goals, Objectives and Targets

The priority issues of concern identified in the gaps and needs analysis are:

- Development and implementation of a waste information system.
- Development of waste management by-laws that reflect the requirements of the IWMP.
- Investigation on provision of sustainable services to unserved areas.
- Availability of permitted landfill sites to meet future needs whose operation complies with permit requirements.
- Development of organisational structures, jobs descriptions and competencies to effectively manage waste.
- Incorporate waste minimization, composting and recycling into waste management, where appropriate.
- Implement education and awareness initiatives to promote proper waste management.
- Co-operative involvement of the waste management initiatives by the civil society and communities

For each priority objective, a goal, objectives and provisional target dates set (Table 29). Targets are either short-term activities (1 - 3 years), medium-term (4 - 5 years) or > 5 years for the long term goals.

A goal is defined as the long-term ends toward which programmes, activities and projects are ultimately directed. Whereas objectives

are specific measurable intermediate ends that are achieved which mark the progress towards a goal.

6.1 Waste Information System

Goal

To establish, implement and maintain a Waste Information System (WIS) that will incorporate Information for the waste cycle that will facilitate the effective and sustainable management of waste.

Objectives

- Develop and implement an easy to use computerised WIS that is compatible to the municipality/provincial/national system and be accessible to municipal officials.
- Capture relevant data from the public and private sector for current operations and future planning for optimum waste management and budgeting.
- Establish appropriate mechanisms and resources to collect the information.
- Build municipal capacity in the WIS and raise public awareness
- Establish a monitoring and information system to track waste generation, collection, re-use, recycling, reprocessing and disposal in terms of waste flow and facilitate waste exchange.
- Assist in the delivery of information on waste services.

Targets

Short-term: Computerised WIS designed and installed at the municipality incorporating available information

WIS capacity developed and awareness raised

Data gathering programme developed and initiated

Medium-term: Additional data incorporated into the WIS Tracking of waste flow implemented

6.2 Waste Management By-laws

Goal

To compile and implement waste management by-laws that reflect the requirements of the IWMP and relevant legislation and facilitates the municipality in meeting their legal obligations.

Objectives

- Develop standardised waste management by-laws for municipality-wide application that can meet the specific local situation.
- Incorporate the requirements of the IWMP and relevant legislation, policies and strategies into the new by-laws.
- Develop and implement mechanisms for enforcement of the by-laws.
- Implement awareness programme to raise awareness of the responsibilities of all stakeholders.

Targets

Short-term:

- By-laws developed and implemented
- Awareness raising programme implemented
- Procedures to enforce by-laws implemented

6.3 Extend Service Delivery to Unserviced Areas**Goal**

To provide sustainable waste management services to all households in the Municipality

Objectives

- Identify current and future waste generators and the amount of waste generated quantified. . Allocate appropriate resources required for sustainable service delivery.
- Implement waste management practices and wherever feasible, technologies that are appropriate for the local situation.
- Develop and implement an appropriate tariff structure that reflects the true activity based costing of service delivery and takes due cognisance of indigent households.
- Ongoing monitoring of service delivery through waste collection round the Municipality.

Targets

Short-term:

- Register of all current and future waste generators compiled
- Round waste collection programme developed/reviewed for phased implementation
- Resource requirements established and programme of implementation developed
- Revised tariffs implemented

Medium-term:

- All households serviced
- Ongoing monitoring and reporting to the WIS

6.4 Waste Disposal**Goal**

To ensure sufficient long-term waste disposal capacity that is environmentally and publicly acceptable and to ensure that the landfill and the dump are progressively rehabilitated in such a manner so as to minimise the impact on human health and the environment.

Objectives

- License the existing dump located in Bultfontein
- Ensure compliance to the relevant laws, regulations, standards and guidelines to operate the landfill site in Tikwana/Hoopstad
- To control the access to the site with emphasis on waste type to be disposed, quantities, including salvaging

Targets

Short-term

- Compile a permit application for the dump site currently in operation
- Demarcate an area for the composting activity
- Initiate the rehabilitation plan/operational plan of the Tikwane/Hoopstad landfill site
- Initiate audit and monitoring programme

Medium-term

- Review strategic plan
- Identify options to meet future waste disposal needs and develop and implement a strategic plan to ensure adequate provision.
- Upgrade operating landfill sites to comply with permit conditions or to meet DWAF Minimum Requirements.
- Ongoing auditing and monitoring of landfill sites to ensure legal compliance.
- Allocate appropriate resources for operation and management of landfill site.
- Develop and implement an appropriate tariff structure that reflects the true cost of waste disposal.

6.5 Organisational Arrangements**Goal**

To develop and implement an organisational structure that is appropriate to the requirements of the IWMP and which ensures implementation of sustainable waste management services.

Objectives

- Allocate waste management roles and responsibilities and develop job descriptions.
- Implement performance monitoring to identify problems timeously and implement corrective action.
- Promote co-operative governance between role players to ensure optimised waste management service delivery.
- Procedures developed for monitoring the performance of service providers and to address non-compliance with contractual obligations.
- Establishment of a waste management forum comprising representatives of the Municipality for exchange of information and experiences.

Targets

Short-term

Resource requirements defined and appropriate organisational structure developed

Performance monitoring protocol for service providers developed and implemented

6.6 Waste Minimisation and Recycling**Goal**

To promote waste minimisation and recycling to a level that is appropriate to the local situation to reduce the amount of waste that is disposed at the landfill site and to control illegal recycling of stolen materials.

Objectives

- Establish the feasibility of waste minimisation municipal wide and develop an action plan to promote their implementation at the local municipality level.
- The quantity of waste disposed to landfill sites is reduced.
- Formalise informal salvaging at the landfill sites in the short-term and phase out in the longer-term.
- Develop and implement an Environmental Management System that promotes integrated waste management practices and green procurement policies.
- Create sustainable employment through local entrepreneur development in waste recycling partnerships.
- Control the recycling of the stolen materials by the recyclers by collaborating with South African Police.

Targets

Short-term

Waste minimisation action plan compiled for the municipality and implemented by the Municipality

Established collaborative forum with SAPS for recycling of stolen goods

Medium-term

Increase the quantity of waste recovered and re-used

6.7 Education and Awareness**Goal**

To ensure that all stakeholders are empowered to meet their responsibilities of integrated waste management.

Objectives

- Capacitate staff members to effectively undertake their responsibilities.
- Develop and implement a programme to educate and empower the community on waste management

issues.

- Report regularly on progress made with regard to the implementation of the IWMP.

Targets

Short-term

Municipal capacity needs assessment undertaken programme developed and implemented

Awareness campaign developed and implemented

NGO/CBO and Municipality collaborative initiatives undertaken

Annual reporting defined and appropriate training

7. Implementation Strategy

This section sets *out* strategies for achieving the identified goals *and* objectives. For each strategy a number of action steps are proposed that should be undertaken to meet the objectives of the IWMP. For each strategy, appropriate resource allocations and implementing instruments will be required for their effective implementation.

7.1 Waste Information System

The management and maintenance of information is essential to inform the strategic planning process and to monitor the implementation of the IWMP. To meet the goal of "establishing, implementing and maintaining a Waste Information System (WIS) that will incorporate information for the waste cycle that will facilitate the effective and sustainable management of waste", the following action steps are tabulated in Table 29.

Table 29: Waste Information System Implementation Strategy

| Activities | Targets | Responsibilities | Implementing Instruments |
|--|---------|--|---|
| Develop information framework for incorporating into the WIS that will align with municipality/provincial and national database and reporting requirements | Year 1 | Local Municipality Municipality Municipality FSDACE DEAT | Budget Leadership with co-ordination capacity |
| Establish computerised WIS incorporating available information onto the database | Year 1 | Local Municipality to develop and incorporate data Local Municipality to provide available information IT Service provider to assist | Funding for assistance from IT service provider |
| Develop programme for gathering of additional information and establish mechanism and resources to <i>implement</i> | Year 1 | Local Municipality | Capacity |
| Develop and implement a capacity building programme on the WIS and its application in waste <i>management</i> planning | Year 1 | Local Municipality | Training and Awareness raising Funding for assistance from training service provider and annual refresher training |

| | | | |
|--|--------------------|--------------------|--|
| Develop template for waste management information to be provided by the private sector and implement | Year 2 | Local Municipality | By-laws defining information to be provided by private sector Public participation Awareness raising |
| Implement information gathering programme | Year 2 and ongoing | Local Municipality | Training |
| Develop performance monitoring programme and annual reporting framework | Year 2 | Local Municipality | Awareness raising Training |
| WIS used for strategic waste management planning | Year 2 and ongoing | Local Municipality | Awareness raising Training |
| Review reporting requirements and amend appropriately | Year 3 and ongoing | Local Municipality | Capacity |

7.2 Waste Management By-laws

Waste management by-laws will be one tool to ensure the effective implementation of the IWMP. The strategy and action steps required to meet the goal of "the compilation and implementation of waste management by-laws that reflect the requirements of the IWMP and relevant legislation and facilitates the municipality in meeting their legal obligations" are tabulated in Table 30.

Table 30 Waste Management By-laws Implementation Strategy

| Activities | Targets | Responsibilities | Implementing Instruments |
|--|---------|--|---|
| Compile waste management policy to guide the development of by-laws | Year 1 | Local Municipality | Public participation |
| Consultation with municipality and provincial department regarding waste management by-laws that have been developed and implemented within the province | Year 1 | Local Municipality | Public participation |
| Develop draft waste management by-laws that are applicable to Municipality and meet the requirements of the IWMP | Year 1 | Local Municipality Legal Service Provider | Funding for the appointment of a legal service provider Public participation |
| Review and revise the by-laws to suit local municipality conditions, where necessary, in consultation with the Municipality | Year 1 | Local Municipality | Public participation |
| Develop mechanisms and establish resource requirements for the enforcement of by-laws | Year 1 | Local Municipality | Capacity Budget |

| | | | |
|---|--------------|--|---|
| Develop and implement a training programme for municipal staff and officials on the by-laws and their enforcement | Year 1 | Local Municipality Training service provider | Funding for the appointment of a training service providers Training |
| Develop and implement an awareness raising programme for the public | Year 1 and 2 | Local Municipality Communication service provider | Public awareness |
| Implement by-laws | Year 2 | Local Municipality | Public awareness |

7.3 Extend Service Delivery to unserved Areas

Equitable service delivery is a Constitutional right. The Local Government has the legal *mandate* for provision of waste *management* services. Service delivery to areas that are currently unserved is one of the priority issues identified in the NWMS as uncontrolled and poor waste management impacts negatively on human health and the environment. This needs to be addressed in the Municipality as current level of service delivery is estimated to be about 29% of households. The strategy to meet the goal of "providing sustainable waste management services to all households in the Municipality" is tabulated in Table 31.

Table 31 Implementation strategy for the extension of waste services to unserved areas

| Activities | Targets | Responsibilities | Implementing Instruments |
|--|---------|-------------------------------------|--|
| Compile a database of current and future waste generators, their location and estimate quantities of waste generated | Year 1 | Local Municipality | WIS |
| Review current infrastructure and optimise existing round waste collection and resources and establish additional infrastructure needs | Year 1 | Local Municipality Service provider | Funding for assistance by service provider |
| Develop cleansing service standards | Year 1 | Local Municipality Service provider | Funding for appointment of service provider Public participation |
| Develop an extended collection programme to be phased in as funding becomes available. Establish appropriate technologies, infrastructure and resource requirements and associated budgets | Year 1 | Local Municipality Service provider | Funding for appointment of service provider Public participation |
| Develop appropriate tariff structure and develop indigent policy with regard to waste management | Year 2 | Local Municipality Service provider | Funding for appointment of service provider Public participation Awareness raising |

| | | | |
|---|---------------------|--------------------|--|
| Establish appropriate resources and begin implementation programme | Year 2 and ongoing | Local Municipality | Increased budget allocation By-laws Public Private partnerships Awareness raising |
| Develop appropriate key performance indicators and monitor implementation of service delivery and review infrastructural requirements and systems | Year 3 and annually | Local Municipality | WIS |

7.4 Waste Disposal

Currently, the strategic planning of disposal facility in the Municipality to meet future waste management needs is limited. In addition, many sites are poorly managed due to inadequate resource allocation, which will impact on airspace availability and reduce the lifespan of the site. The strategy to meet the goal of "ensuring sufficient long-term waste disposal capacity that is environmentally and publicly acceptable and to ensure that the landfills are progressively rehabilitated in such a manner so as to minimise the impact on human health and the environment" is tabulated in Table 32.

Table 32 Waste disposal implementation strategy

| Activities | Targets | Responsibilities | Implementing Instruments |
|--|---------|--|--|
| Develop landfill site audit questionnaire to evaluate compliance with DWAF Minimum Requirements | Year 1 | Local Municipality Service provider | Funding for appointment of service provider |
| Develop audit programme to evaluate operation of all landfill sites and to estimate remaining airspace | Year 1 | Local Municipality Service provider | Funding for appointment of service provider |
| Develop municipality wide strategic plan for waste disposal based on information gathered on current and future waste generators Establish infrastructure and resource requirements and associated timeline | Year 1 | Local Municipality | Waste Information System Public participation Allocation of budget for Resources |
| Initiate programme for permitting operating landfill site and to obtain | Year 1 | Local Municipality Service provider DEAT | Funding for appointment of service provider |

| | | | |
|---|--------------------|--|---|
| Develop and implement standardized disposal operating procedures for landfill site and composting | Year 1 | Local Municipality Service provider | Funding for appointment of service provider Capital and operating budget allocation for resource requirements |
| Develop appropriate tariff structure and develop indigent policy with regard to waste management | Year 2 | Local Municipality Service provider | Funding for appointment of service provider Public participation Awareness raising |
| Initiate programme for establishment of composting stations and rehabilitate the existing dump | Year 2 and ongoing | Local Municipality Service provider | Funding for appointment of service provider Capital budget for Infrastructure development Operating budget for Resources Public participation Awareness raising |
| Develop appropriate disposal tariff structure | Year 2 | Local Municipality Service provider | Funding for appointment of service provider Public participation Awareness raising |
| Develop and implement rehabilitation programme | Year 2 and ongoing | Local Municipality Service provider | Funding for appointment of service Provider Capital funding for Rehabilitation activities |
| Implement annual audits at all operating landfill sites and transfer stations | Year 2 and ongoing | Municipality Service provider | Funding for appointment of service Provider Annual funding for audit and corrective action Budget allocation for corrective action |
| Develop appropriate key performance indicators and gather information to monitor performance | Year 3 and ongoing | Local Municipality | Waste information system |
| Review strategic plan | Year 5 | Local Municipality Service provider | Funding for appointment of service provider WIS Public participation Allocation of budget for resources |

7.5 Organisational Arrangements

The successful implementation of the IWMP and sustainable waste management will require the appropriate allocation of staff. Based on the requirements of this IWMP, an organisational structure should be implemented

with allocation of waste management activities to specific posts. Job descriptions and competencies for staff to meet the requirements of the different posts will be developed which will facilitate the identification of training needs.

The strategy to meet the goal of "the development and implementation of an organisational structure that is appropriate to the requirements of the IWMP and which ensures implementation of sustainable waste management services" is tabulated in Table 33.

Table 33 Organisational arrangements implementation strategy

| Activities | Targets | Responsibilities | Implementing Instruments |
|--|---------|---|---|
| Develop organisational structure to which waste management roles and responsibilities are allocated | Year 1 | Local Municipality | Operating budget |
| Compile job descriptions and competencies for each post in the organisational structure | Year 1 | Local Municipality Service provider | Funding for service provider Training |
| Review staffing levels for round waste collection and landfill site operation and establish future requirements | Year 1 | Local Municipality Service provider | Funding for service provider |
| Develop and implement protocol for performance monitoring of service providers | Year 1 | Local Municipality | Awareness raising Training |
| Establish inter-municipal waste management forum for the management of the medical waste generators within the footprint of the municipality | Year 1 | Local Municipality Municipality Municipality | Operating budget Organizational capabilities |

7.6 Waste Minimisation and Recycling

Waste minimisation and recycling is the first step in the waste management hierarchy and is therefore an essential component of integrated waste management in the Local Municipality. In terms of the NWMS, waste minimisation comprises any activity that is undertaken by the generator of waste to prevent or reduce the volume and/or environmental impact of waste that is generated, treated, stored or disposed of. Recycling is the recovery and reprocessing of recyclable material.

Recycling activities are currently ongoing within the municipality, which are driven mainly by economic forces and implemented primarily by the private sector. Uncontrolled informal salvaging is widespread at many landfill sites. There is no baseline information available on the quantity of materials recovered.

The intention of this strategy is to present a realistic and practical approach to promote recycling and further extend the current recycling situation in the area. This strategy recognises that an appropriate role and mechanism for recycling must be developed within the context of integrated waste management and that initiatives should be sustainable in the long-term through proper planning of activities. The main barrier to sustainable recycling programmes is the distance from the point of collection to the processing area, which impacts on the transport cost and the financial viability of an initiative.

The strategy to meet the goal of "promoting waste minimisation and recycling to a level that is appropriate to the local situation and to reduce the amount of waste that is disposed at the landfill site" is tabulated in Table 34.

Table 34 Waste minimisation and recycling implementation strategy

| Activities | Targets | Responsibilities | Implementing Instruments |
|--|--------------------|---|--|
| Establish the feasibility in each Municipality by undertaking a waste characterisation, assessing markets for materials, infrastructure requirements and budgets | Year 1 | Local Municipality Service provider | Funding for service provider |
| Collect baseline information on recycling activities and incorporate into the WIS | Year 1 | Local Municipality | WIS |
| Formalise informal salvaging at landfill sites and implement health and safety training programme | Year 1 | Local Municipality Training service provider | Funding for training service provider Public Private partnerships Training Awareness raising Capital budget for protective equipment |
| Develop Business Plan and source funding for implementing viable recycling initiatives | Year 2 | Municipality Municipality Local Municipality Service provider | Allocation of funding for service provider Public Private partnerships By-laws Economic instruments |
| Develop and implement an Environmental Management System and Green Procurement Policy for the Municipality | Year 2 | Local Municipality Service provider | Funding for service provider Awareness raising |
| Monitor levels of materials recovery and reduction of quantity of waste disposed to landfill site | Year 3 and ongoing | Local Municipality | WIS |
| Establish appropriate recycling infrastructure and undertake the necessary environmental assessment and approval | Year 3 | Local Municipality Service provider | Capital budget allocation Funding for service provider Public participation Awareness raising |
| Develop and implement awareness programme for municipal staff, official and the public | Year 3 | Local Municipality Service provider | Funding for service provider Capital and operating budget for programme |

7.7 Education and Awareness

Education and public awareness are key components of the plan to ensure that all stakeholders understand their role in the implementation of sustainable integrated waste management. In terms of the Municipal Systems Act (Act No. 32 of 2000), the local municipality is required to consult with the local community about the level, quality, range and impact of municipal services, the available options for service delivery; and to give members of the local community equitable access to the municipal services to which they are entitled. The rights of the members of the community include the right to contribute to the decision-making processes of the municipality and the access to municipal services. Specific provisions are included regarding public participation.

Waste management training needs are not incorporated into the Skills Development Framework. In addition, the decision-makers at the local municipality are generally not informed about the importance of proper waste management, which is currently not viewed as a priority area when budgets are allocated.

Education and awareness raising initiatives of the municipality and communities is important if they are to be empowered to play their specific role in the development and implementation of the waste management initiatives.

The strategy to meet the objective of "ensuring all stakeholders are empowered to meet their responsibilities of integrated waste management is tabulated in Table 35.

Table 35: Education and awareness implementation strategy

| Activities | Targets | Responsibilities | Implementing Instruments |
|--|---------|--|--|
| Capacity needs assessment and development and implementation of appropriate training for municipal staff members and Councillors | Year 1 | Local Municipality Training service provider | Training Funding for training service provider |
| Develop and implement appropriate awareness campaign regarding waste management issues | Year 2 | Local Municipality Communications service Provider | Funding for service Provider Capital and operating budget for awareness Raising |
| Develop and implement mechanisms for annual dissemination of information on progress with regard to the implementation of the IWMP | Year 3 | Local Municipality | WIS Operating budget allocated for information dissemination |

8. Monitoring and Review of the IWMP

It is important that the implementation of the IWMP is monitored in order to:

- Ensure that the projects are carried out according to the agreed schedule.
- Monitor the performance of the services rendered against agreed upon KPIs.
- Obtain the required information for reporting purposes,
- Obtain data and information to review and refine the IWMP at regular intervals.

Ongoing performance monitoring will enable timeous corrective action to be taken to ensure the successful implementation of the IWMP. Monitoring will be based on key performance indicators (KPIs) against which performance will be measured. Although currently sufficient data may not be available for monitoring performance using the suggested KPIs, this will be addressed during the implementation of the IWMP and more specifically the development of the WIS, as well as future planning.

Criteria for the KPIs include:

- **Measurability:** Indicators can be easily calculated from information that can be easily generated by the municipality.
- **Simplicity:** Measure one dimension of performance
- **Precision:** Measure only those dimensions that the municipality intends to monitor.
- **Relevance:** Measure only those dimensions that the municipality intends to measure progress in terms of its objectives.
- **Adequacy:** Measure quality, quantity, efficiency, effectiveness and impact. Separate indicators set for each priority and objective.
- **Objectivity:** State clearly what is to be measured.

The suggested areas and parameters to be monitored include the following:

(i) Institutional and Regulatory

- Number of vacant posts based on the proposed organisational structure
- Number of persons trained per annum
- Number of waste related complaints received per month
- Number of fines issued for contraventions of the waste management by-laws per month

(ii) Financial

- Level of payment for waste management services
- Actual cost per service point per sub area for round waste collection
- Actual cost per tonne of waste disposed
- Actual cost per tonne of waste collected during street cleaning
- Actual cost per tonne of waste collected from illegal dumping

(iii) Waste Information

- Number of entities reporting to the WIS

(iv) Cleansing

- Quantity of waste per month collected during street cleaning
- Quantity of waste per month illegally dumped Km streets cleaned per worker per day

- Number of households receiving round waste collection
- Number of businesses receiving round waste collection

(v) Waste Minimisation and Recycling

- Number of entities registered with the WIS
- Quantity of waste per month recovered from the general waste stream
- Number of informal salvagers registered at the landfill site

(vi) Transport

- Distance travelled per collection round .
- Fuel consumption per vehicle per round .
- Service points per vehicle per day
- Tonnage per vehicle per day
- Loads per vehicle per day
- Vehicle percentage downtime per annum

(vii) Waste Treatment

- Quantity of waste treated per month by service provider
- Quantity of waste treated with on-site facilities

(viii) Waste Disposal

- Quantity and type of waste disposed per month
- Available airspace calculated annually
- Quantity of waste per month removed from transfer station

An annual report that reports on the monitoring indicators should be compiled annually by each Local Municipality and submitted to Municipality for review and analysis. A critical evaluation and review of the monitoring reports is essential to monitor the implementation of the IWMP and the achievement of the goals and objectives and where amendments must be made.

A formal review and amendment of the IWMP should be undertaken on a five yearly basis.

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