Assessment of the status of waste service delivery and capacity at the local government level

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Executive Summary

By virtue of the fact that waste service delivery has traditionally been viewed as the collection and disposal of waste, it has been deemed unsustainable. Recently there has been a paradigm shift in the way that waste delivery is perceived; the emphasis is now on waste minimisation and reduction at source with the ultimate goal being a National sustainable waste service delivery program. One of the primary obstacles to achieving this goal is that the present level of waste service delivery and capacity at a local municipal level is not known. This report attempts to answer this by providing an assessment of the current level of service delivery and capacity with regards to solid waste management.

In order to get a full continuum of the capacity of the Local Municipalities, institutional arrangements with respect to waste services management, staffing, business structure and integrated waste management planning is provided. Waste management planning in the six Metros and secondary cities is primarily a Local Municipality function whereas the smaller, predominantly rural towns share the function with the District Municipality. In many instances the waste services function is not accounted for in the small rural towns. As one moves from the Metros to the more rural towns the staffing structure is skewed towards labourers with very little middle and top management, indicating that the type of service provided shifts from a well run service in the Metros to a basically non-existent service in the small rural areas. In most cases disposal, collection and recycling is carried out by the local municipality, but there is a shift towards outsourcing the recycling function to small community contactors.

It is noteworthy that with the drive towards waste minimisation 87% of municipalities do not have the capacity or infrastructure to pursue waste minimisation as opposed to the core functions. In excess of 80% of the municipalities are initiating recycling activities in some form or another but these projects are struggling to gain momentum due to lack of capacity. In all six Metros a waste collection service is typically provided to almost all urban households including informal settlements. However, rural areas within those metros still appear to be poorly serviced. Most of the smaller rural town are also poorly serviced indicating a discrepancy in services delivered in urban and rural areas. The Metros and secondary cities have the highest percentage of households provided with a weekly waste collection however, together they account for 54 % of the National backlog in waste services.

The obstacles that are preventing local municipalities from providing a sustainable waste service are numerous. These range from budget restrictions to illegal dumping, service backlogs, lack of effective bylaws and insufficient skills development.

In order to provide a sustainable waste service that is based on waste minimisation principles and to address the obstacles being faced by local municipalities a host of interventions can be implemented. These include institutional arrangements, financial, technical and service delivery.

At a municipal level the primary obstacle to a sustainable waste management service at a municipal level is the lack of 'in house' capacity to run the service in an efficient and effective manner as well as the lack of knowledge to move the service from an 'end of pipe' scenario to a waste minimization approach. The primary intervention that is recommended in this vein is the strengthening of municipal human resource capacity. To further augment the waste minimization approach cooperation is required between the waste producers and the local municipalities; this can be reinforced by

bylaws. Furthermore, the provincial and national government should act in a supportive and complementary role to the local municipalities by providing policy guidance; developing legal deterrents against illegal dumping of wastes and the use of open dumps, coupled with adequate capacity for enforcement; and providing assistance with standards for segregation, storage, treatment, and disposal of each category of waste.

From a financial perspective, implementation of full cost accounting services for all municipalities should be provided such that they can account for all costs and expenditures for waste operations and maintenance. This should cover collection, transportation, landfill, street cleansing, fee collection, debt payment and depreciation at a minimum.

Technical interventions should be aimed at moving away from considering waste as solely a disposal issue but to viewing it as having income generation potential at a municipal, community and household level. This can be done in numerous ways. At a household level, monetary savings can be realized by producing less waste and recycling if the solid waste tariff is driven by the quantity household waste produced. Recycling at a household level can also be encouraged by providing for the collection of recyclables from the household. On a community level, local community contractors should be encouraged to sort the waste at transfer stations, before it reaches the landfill, and then selling the waste to companies that will use them. Composting, on a community and household level, should be carried out especially in areas where waste collection is difficult due to geographical location.

In moving towards a sustainable solid waste service the question of 'level of service' becomes an imperative one. By promoting recycling and composting the need for the weekly kerbside removal of refuse becomes redundant. This is particularly the case for the rural and geographically remote areas where providing a weekly kerbside service would result in exorbitant transport costs. In these cases communal dumpsites, composting and recycling should be encouraged.

In terms of addressing the backlogs so as to provide the majority of the people of South Africa with a sustainable solid waste service it is recommended that the backlogs in the Metros and secondary cities be addressed first as they account for 54 % of the total backlog in the country. The cost of addressing these backlogs will be less than addressing the backlog in other smaller and predominantly rural areas where waste transport costs will be prohibitive resulting in an unsustainable service.

It is therefore apparent that the delivery of a sustainable solid waste service that is driven by waste minimization rather than waste disposal is an achievable goal in South Africa that can be realized in the not too distant future with many positive spin offs.

Contents

List of Abbreviations

DEAT	Department of Environment Affairs and Tourism
DM	District Municipality
IDP	Integrated Development Plan
IWMP	Integrated Waste Management Plan
LM	Local Municipality
MDB	Municipal Demarcation Board
StatsSA	Statistics South Africa

1 Introduction

This report presents the findings of an assessment of the solid waste service in South Africa. This is done in two ways:

1. By using:
    - Census 2001 data,
    - StatsSA *Non-financial census of municipalities for the year ended 30 June 2005;* and
    - The Municipal Demarcation Board (MDB) capacity assessment for 2005; and
2. By collecting data from the municipalities via a comprehensive survey done by sending out a questionnaire to all local municipalities in South Africa requesting information regarding their solid waste service provision.

The report presents the data and provides a qualitative assessment of the data with particular reference to service delivery and is structured as follows:

- *Section 2 and 3*: Presentation of the study and the survey methodology followed;
- *Section 4*: An assessment of the current status of municipal service delivery;
- *Section 5*: Financial implications of addressing the backlogs
- *Section 5*: Identification of obstacles to service delivery and an assessment of the status of waste services capacity;
- *Sections 6*: Options for sustainable improvements to service delivery; and
- *Section 7*: Recommendations on mechanisms and arrangements for improved municipal waste service delivery

2 Methodology used for assessment study

The initial part of the study involved the collection of existing data with regards to solid waste service delivery and capacity at a provincial level. This part of the study relied heavily on the Census 2001 data, the StatsSA *Non-financial census of municipalities for the year ended 30 June 2005* and The Municipal Demarcation Board (MDB) capacity assessment for 2005.

To provide more recent data a questionnaire developed by PDG together with Arcus Gibb and the Department of Environmental Affairs and Tourism (DEAT) was sent out to all 237 Local Municipalities and District Municipalities in South Africa. The questionnaire is included as an Appendix to this document. The aim of the questionnaire was to assess the current status of waste service delivery and the waste services capacity within the country, and to identify issues that hindered service delivery.

The questionnaire was divided into 6 sections:

1. Institutional arrangements
2. Allocation of responsibilities

3. Access to services
4. Ability to manage waste sustainably
5. Financing of waste services
6. General

In all cases the responses to the questions were used to obtain:

- A quantitative evaluation of the status of waste services delivery and the remaining backlog; and
- An insight into the manner in which waste services are being delivered and managed at a local level and the major constraints on the delivery of municipal solid waste services.

The questionnaire data gathering was supported by:

- Data obtained from the Municipal Demarcation Board's (MDB) 2006 municipal capacity assessments and Statistics SA's (StatsSA) non-financial assessments of municipalities in South Africa as well an analysis of available Integrated Development Plans (IDP's) and Integrated Waste Management Plans (IWMPs).

The questionnaires were faxed and emailed to municipalities where an email address was available. Every municipality that did not respond within the requested time was followed up with a telephone call in which they were requested to complete the questionnaire.

Where questionnaires were returned either missing information or with information that seemed to be incorrect the information was verified from secondary sources where possible. These sources included the MDB and StatsSA data mentioned above, as well as Integrated Development Plans and Integrated Waste Management Plans published by the municipalities.

A diagrammatical representation of the data gathering process is shown in Figure 1. The data gathering phase consisted of two distinct phases. The initial was to access all available data reading solid waste service delivery in South Africa and the second was to do a survey of the local municipalities in South Africa. The survey results were supplemented with one on one interviews with selected municipalities to more insight into the issues that they are faced with when providing a solid waste service. Where data was not forthcoming IDPs and IWMPs were used as a secondary data source.

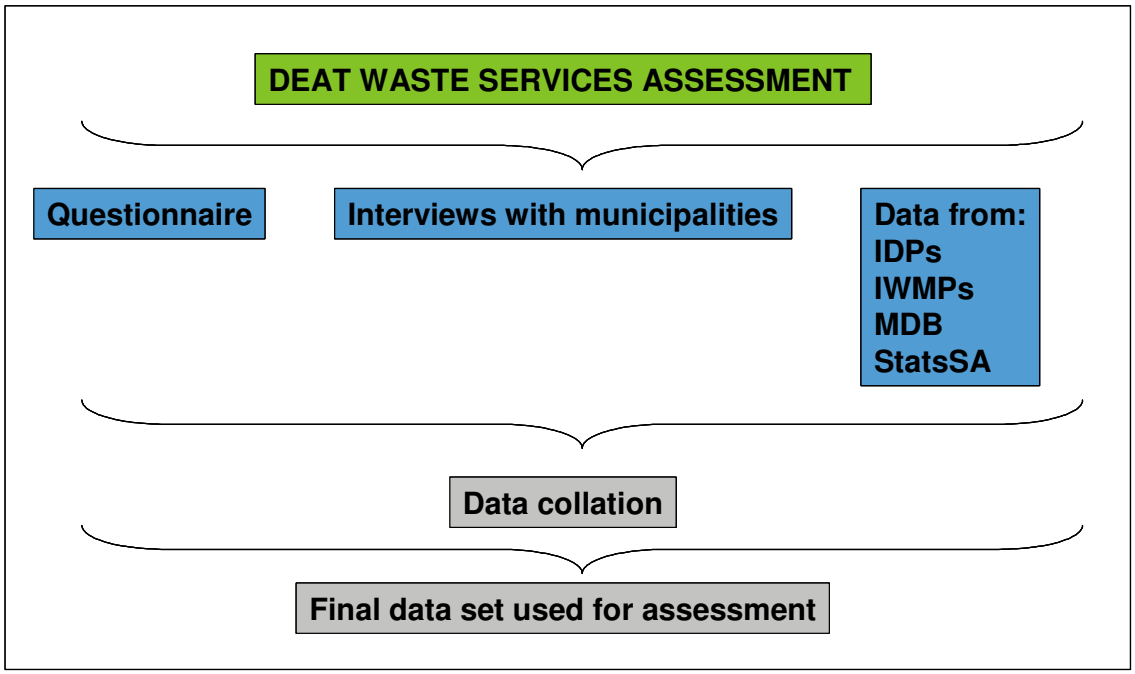

Figure 1: Representation of data collection process

3 Responses

Of the 237 Local Municipalities that received the questionnaire, 147 responded. Typically, the municipalities that did not respond indicated a lack of information and personnel to complete the questionnaire (follow up phone calls were made to determine why there was no response).

The response rate was 62%, i.e. 62 % of the total municipalities in the country responded. However, the coverage accounted for a far greater percentage of total households in the country. A total of 9,022,906 households were covered by the responses received accounting for 77% of the total households in South Africa. In our view this coverage provides a sufficient basis from which to draw sound policy conclusions. A more detailed analysis of the responses is provided in the tables below.

Table 1: Responses received in terms of percentage household coverage

Responses Received	*Households Covered*	*Total SA Households*	*% Households Covered*
147	9,022,906	12,377,513	77

The data that was received has been analysed according the municipal categories as defined by **dplg** and National Treasury. The full datasets are available as a separate document. The municipal categories are:

- **A:** Metros, 6 in total.
- **B1:** Secondary cities: the 21 local municipalities with the largest budgets.
- **B2:** Municipalities with a large town as core (29 in total).

- **B3:** Municipalities with relatively small population and significant proportion of urban population but with no large town as core (111 in total).
- **B4:** Municipalities which are mainly rural with, at most, one or two small towns in their area (70 in total).

The responses received by the municipal categories presented above are given in Table 2 and Table 3 below.

Table 2: Breakdown of responses received in terms of municipal category

Municipal category	*Number of municipalities*	*Responses received*	*% response*
A	6	6	100%
B1	21	17	81%
B2	29	19	66%
B3	111	68	61%
B4	70	37	53%
Total	**237**	**147**	**62%**

Table 3: Breakdown of responses received in terms of municipal category and household coverage

Municipal category	*Households covered*	*Total households*	*% households covered by responses*
A	4,914,930	4,914,930	100
B1	1,628,766	2,048,937	79
B2	665,741	1,063,207	63
B3	1,062,044	1,575,946	68
B4	1,316,785	2,774,493	47
Total	**9,588,266**	**12,377,513**	**77%**

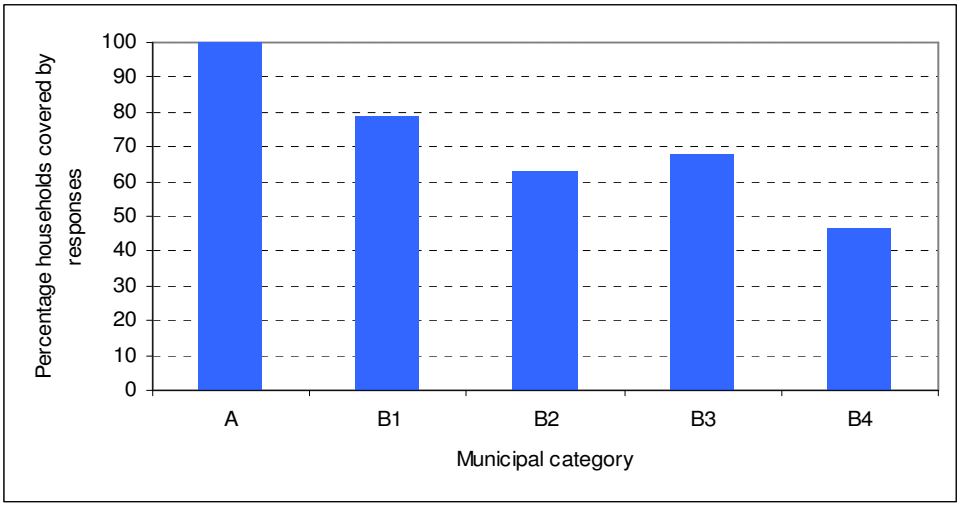

Figure 2: Percentage households that are covered by the responses received

All the Metros and 81 % of the secondary cities (B1) responded. The response rate decreased as the municipal category shifted from urban to rural. The predominantly rural municipalities (B4) had the lowest response rate, 53 %. The highest number of responses was received from the B3 municipalities (68), however this accounted for only 61 % of the municipalities in that category. Even though the B2 municipalities had a higher response rate than the B3 municipalities the household coverage for the B2 municipalities was 63 % and for the B4's it was higher at 68 %.

The assessment presented in this report is based on the responses received from the 147 municipalities. Because the responses do not provide a 100% coverage of the country it is not possible to use the survey results to provide a comprehensive analysis of trends in service delivery since the 2001 Census (the last date at which there is comprehensive national information on access to waste services).

To address this issue the StatsSA non-financial assessments of municipalities' data was also used to provide a supporting assessment of trends in service delivery. This data is presented in a separate "status quo" section (Section 4). The data is presented separately because the basis of analysis (sampling methodologies and collation of data at the District level) is different from the municipal level survey conducted and therefore direct comparisons are not possible.

3.1 Data reliability

Using a chi test (a statistical test used to determine what percentage response rate is required to provide different levels of confidence is inferences made from the data) it was determined that a 60 % response rate to the questionnaire was required to provide 90 % confidence that the conclusions drawn from the data was reliable. For this study the response rate was 62 %, indicating that the conclusions drawn from the data received would be accurate over 90 % of the time.

4 Assessment of the current status of municipal solid waste service delivery

In this section an assessment of the National solid waste service delivery is presented by initially providing data obtained from existing sources and then presenting the findings of the questionnaire responses received.

4.1 Assessment of solid waste service using existing data

This data presented here was sourced from:

- Census 2001 data;
- StatsSA *Non-financial census of municipalities for the year ended 30 June 2005; and*
- The Municipal Demarcation Board capacity assessment for 2005.

The assessment is based on a provincial level with a breakdown at district level and presents data on access to services and the capacity within the provinces to deliver the services. A breakdown of the data at a municipal level was not possible as the data available only gave district and provincial totals.

4.1.1 Eastern Cape

The Eastern Cape has a total of 6 DMs and 38 LMs. The six DMs are:

- Cacadu DM (DC10)
- Amatole DM (DC12)
- Chris Hani DM (DC13)
- Ukhlahlamba DM (DC14)

- O R Tambo DM (DC15)
- Alfred Nzo DM (DC44)

There are a total of 1 580 000 households in the Eastern Cape, 32 % of which are urbanized and 68 % live in rural areas. O R Tambo (Table 4) has the highest population but is the most under-serviced in terms of refuse removal. On average the worse delivered service compared to water, electricity and sanitation is refuse removal.

Table 4: Demographics for the Eastern Cape

DM or Metro	*Population*	*Households*
Amatole	1 161 406	240 000
Ukhlahlamba	350 000	90 185
O R Tambo	1 710 000	360 000
Chris Hani	810 000	200 000
Alfred Nzo	400 000	98 895
Cacadu	399305	110 000
Nelson Mandela	1 033 109	281 261
Total	**6 388 295**	**1 581 092**

Data from Census 2001

At the end of June 2005, 758 593 households (Table 5) were receiving a basic level of refuse removal and of this 273 013 (36 %) received a free basic service.

Table 5: Number of households is each DM receiving a basic level of solid waste management

DM or Metro	*Number of households*	*% served*
Amatole	201 146	84
Ukhlahlamba	32 158	36
OR Tambo	75 114	21
Chris Hani	57 334	29
Alfred Nzo	26 347	27
Cacadu	103 738	94
Nelson Mandela	262 756	93
Total	**758 593**	**48**

Data from Stats SA (2005)

An indication of capacity has traditionally been the staffing levels, in the Eastern Cape for the 2005 period, 3 020 people were employed in the solid waste management division; this was approximately 10 % of the total staff in the province. In Table 6 the DM or Metros that have responsibility for providing the solid waste

service and the number that are actually providing the service is presented. In some instances the figure for those presenting the service is higher that the figure for whether they have the power to do so. This is because in some instances the DM is providing the service to Local municipalities in other Districts. This applies to data for all the other provinces as well.

Table 6: Number of LMs that have the infrastructure to provide services, that are responsible under the power and functions to provide the solid waste function and who provide the solid waste service

DM or Metro	*Total number of municipalities*	*Infrastructure*	*Powers and functions*	*Providing the service*
Amatole	9	8	8	7
Ukhlahlamba	5	3	4	4
OR Tambo	8	7	7	6
Chris Hani	9	8	8	8
Cacadu	10	10	8	10
Alfred Nzo	3	3	2	3
Nelson Mandela	1	1	1	1
Total	**45**	**40**	**38**	**39**

Data from MDB capacity assessment (2005)

4.1.2 Free State

The Free State has a total of 5 DMs and 20 LMs. The 5 DMs are:

- Xhariep DM (DC16)
- Motheo DM (DC17)
- Lejweleputswa DM (DC18)
- Thabo Mofutsanyane (DC19)
- Northern Free State DM (DC20)

There are a total of 787 996 households in the Free State, of which 86 % are urbanized and 14 % are located in rural areas. Thabo Mofutsanyane (Table 7) is the most under serviced in terms refuse removal. The most poorly delivered service in the Free State is sanitation and then refuse removal.

Table 7: Demographics and refuse removal for the Free State

DM or Metro	*Population*	*Households*
Motheo	750 000	220 000
Thabo Mofutsanyane	750 000	200 000
Lejweleputswa	660 000	190 000
Northern Free State	470 000	130 000
Xhariep	140 000	42 529
Total	**2 771 534**	**787 996**

DM or Metro	*Population*	*Households*

Data from Census 2001

As of June 2005 the number of households receiving basic and free basic solid waste management services were 627 172 and 196 974 (19.1 %) respectively.

Table 8: Number of households is each DM receiving a basic level of solid waste management

DM or Metro	*Number of households*	*% Served*
Motheo	194 035	88
Thabo Mofutsanyane	154 338	77
Lejweleputswa	137 599	72
Northern Free State	113 499	87
Xhariep	27 701	65
Total	**627 172**	**80**

Data from Stats SA (2005)

For the 2005 period, in the Free State Province, 2 544 people were employed in the solid waste management division; this was approximately 13 % of the total staff in the province (19 052).

Table 9: Number of LMs that have the infrastructure to provide services, that are responsible under the power and functions to provide the solid waste function and who provide the solid waste service

DM or Metro	*Total Number of municipalities*	*Infrastructure*	*Powers and functions*	*Providing the service*
Motheo	4	3	3	3
Thabo Mofutsanyane	6	5	5	5
Lejweleputswa	6	5	4	5
Northern Free State	5	4	4	4
Xhariep	4	3	3	3
Total	**25**	**20**	**19**	**20**

Data from MDB capacity assessment (2005)

4.1.3 Gauteng

The Gauteng province has a total of three DMs and nine LMs. The three DMs are:

- Sedibeng DM (DC42)

- West Rand CBDM (CBDC8)
- Metsweding DM (CBDC2)

There are a total of 477 148 households in Gauteng (excluding those in the Metros), of which 90 % are urbanized and 10 % are located in rural areas. Metsweding is the most under-serviced municipality in the province in terms of refuse removal.

Table 10: Demographics and refuse removal for the Gauteng

DM or Metro	*Population*	*Households*
Metsweding	210 000	60 266
West Rand	620 000	190 000
Sedibeng	900 000	270 000
Ekhurhuleni Metro	2 480 259	911 975
City of Johannesburg	3 753 967	1 230 191
City of Tshwane	2 224 250	661 310
Total	**10 595 023**	**3 319 098**

Data from Census 2001

As of June 2005 the number of households receiving basic and free basic solid waste management services were 2 316 765 and 2 205 892 (95.2 %) respectively.

Table 11: Number of households is each DM receiving a basic level of solid waste management

DM or Metro	*Number of Households*	*% Served*
Metsweding	21 452	36
West Rand	177 655	94
Sedibeng	169 942	63
Ekhurhuleni	550 000	60
City of Johannesburg	965 387	78
City of Tshwane	432 329	65
Total	**2 316 765**	**70**

Data from Stats SA (2005)

For the 2005 period, in the Gauteng, 6 155 people were employed in the solid waste management division; this was approximately 8 % of the total staff in the province (78 688).

Table 12: Number of LMs that have the infrastructure to provide services, that are responsible under the power and functions to provide the solid waste function and who provide the solid waste service

DM or Metro	*Total Number of Municipalities*	*Infrastructure*	*Powers and Functions*	*Providing the Service*

DM or Metro	*Total Number of Municipalities*	*Infrastructure*	*Powers and Functions*	*Providing the Service*
Metsweding	3	2	2	2
West Rand	5	4	4	4
Sedibeng	4	3	3	3
Ekhurhuleni	1	1	1	1
City of Johannesburg	1	1	1	1
City of Tshwane	1	1	1	1
Total	**15**	**12**	**12**	**12**

Data from MDB capacity assessment (2005)

4.1.4 KwaZulu Natal

The KwaZulu-Natal has a total 10 DMs and 50 LMs. The 10 DMs are:

- Ugu DM (DC21)
- Umgungundlovu DM (DC22)
- Uthukela DM (DC23)
- Umzinyathi DM (DC24)
- Amajuba DM (DC25)
- Zululand DM (DC26)
- Umkhanyakude DM (DC27)
- Uthungulu DM (DC28)
- Ilembe DM (DC29)
- Sisonke DM (DC43)

There are a total of 2 422 169 households in KwaZulu-Natal, 30 % are urbanized and 70 % are in rural areas. Umkhanyakude DM is the most under serviced municipality in terms of refuse removal. On average 27 % of households have access to refuse removal.

Table 13: Demographics and refuse removal for the Kwa-Zulu Natal

DM or Metro	*Population*	*Households*
Ilembe	602 205	135 723
Umgungundlovu	1 000 000	240 000
Umzinyathi	516 406	106 442
Uthukela	723 430	155 819
Ugu	764 328	171 475
Uthungulu	980 000	200 000
Sisonke	492 084	117 095

DM or Metro	*Population*	*Households*
Zululand	855 892	161 894
Umkhanyakude	628 681	116 856
Amajuba	510 000	110 000
Ethekweni	3 375 631	902 442
Total	**10 444 074**	**2 422 169**

Data from Census 2001

The number of households receiving basic solid waste management services at the end of June 2005 was 877 614 and of this 19.1 % (168 002) received a free basic service.

Table 14: Number of households is each DM receiving a basic level of solid waste management

DM or Metro	*Number of households*	*% Served*
Ilembe	26 657	20
Umgungundlovu	90 217	38
Umzinyathi	13 085	12
Uthukela	41 625	27
Ugu	49 620	29
Uthungulu	40 404	20
Sisonke	17 428	15
Zululand	29 492	18
Umkhanyakude	6 669	6
Amajuba	53 876	49
Ethekweni	508 541	56
Total	**877 614**	**36**

Data from Stats SA (2005)

For the 2005 period, in the Kwa-zulu Natal Province, 3 752 people were employed in the solid waste management division; this was approximately 7 % of the total staff in the province (51 693).

Table 15: Number of LMs that have the infrastructure to provide services, that are responsible under the power and functions to provide the solid waste function and who provide the solid waste service

DM or Metro	*Total Number of Municipalities*	*Infrastructure*	*Powers and Functions*	*Providing the Service*
Ilembe	5	2	2	2
Umgungundlovu	8	5	7	6
Umzinyathi	5	4	4	4

DM or Metro	*Total Number of Municipalities*	*Infrastructure*	*Powers and Functions*	*Providing the Service*
Uthukela	6	3	3	3
Ugu	7	4	4	3
Uthungulu	7	6	6	6
Sisonke	6	5	4	5
Zululand	6	5	4	4
Umkhanyakude	6	2	3	3
Amajuba	4	3	2	3
Ethekweni	1	1	1	1
Total	**61**	**40**	**40**	**12**

Data from MDB capacity assessment (2005)

4.1.5 Limpopo

The Limpopo province has a total of 6 DMs and 26 LMs. The 6 DMs are:

- Bohlabela DM (CBDC4)
- Sekhukhune Cross Boundary DM (CBDC3)
- Mopani DM (DC33)
- Vhembe DM (DC34)
- Capricorn DM (DC35)
- Waterberg DM (DC36)

There are a total of 1 240 000 households in the Limpopo province, 13 % of which are urbanized and 87 % in rural areas. Between 22 and 30 % of households have access to refuse removal, with the provincial average being 28 %.

Table 16: Demographics and refuse removal for the Limpopo Province

DM or Metro	*Population*	*Households*
Sekhukhune	1 020 000	220 000
Waterberg	660 000	170 000
Capricorn	1 220 000	300 000
Bohlabela		43 035
Mopani	1 120 000	270 000
Vhembe	1 270 000	290 000
Total	**5 290 000**	**1 240 000**

Data from Census 2001

The number of households receiving basic solid waste management services at the end of June 2005 was 341 923 and of this 65 155 (19.1 %). The number of staff

employed in solid waste management was 821 (7 % of total staff which was 12 157). Table 17 provides a breakdown of households receiving a solid waste service.

Table 17: Number of households is each DM receiving a basic level of solid waste management

DM or Metro	*Number of Households*	*% Served*
Sekhukhune	50 396	23
Waterberg	50 997	30
Capricorn	92 902	31
Bohlabela	12 050	28
Mopani	59 489	22
Vhembe	76 089	26
Total	**341 923**	**28**

Data from Stats SA (2005)

For the 2005 period, in the Limpopo Province, 3 752 people were employed in the solid waste management division; this was approximately 7 % of the total staff in the province (51 693).

Table 18: Number of LMs that have the infrastructure to provide services, that are responsible under the power and functions to provide the solid waste function and who provide the solid waste service

DM or Metro	*Total Number of Municipalities*	*Infrastructure*	*Powers and Functions*	*Providing the Service*
Sekhukhune	6	3	3	3
Waterberg	7	6	6	6
Capricorn	6	5	5	4
Bohlabela	3	3	2	2
Mopani	5	3	3	4
Vhembe	5	4	4	4
Total	**32**	**24**	**23**	**23**

Data from MDB capacity assessment (2005)

4.1.6 Mpumalanga

The province of Mpumalanga has 3 DMs and 26 LMs. The DMs are:

- Gert Sibande (DC 30)
- Nkangala (DC 31)

- Ehlanzeni (DC 32)

There are a total of 886 876 households in Mpumalanga, of which 36 % are in urban areas and 64 % in rural areas. On average, 44 % of the households located in the DMs receive a basic level of refuse removal.

Table 19: Demographics and refuse removal for Mpumalanga

DM or Metro	*Population*	*Households*
Gert Sibande	980 000	240 000
Nkangala	1 080 000	270 000
Ehlanzeni	1 560 000	370 000
Total	**3 620 000**	**890 000**

Data from Census 2001

Table 20: Number of households is each DM receiving a basic level of solid waste management

DM or Metro	*Number of Households*	*% Served*
Gert Sibande	158 837	66
Nkangala	110 581	41
Ehlanzeni	118 530	30
Total	**387 948**	**44**

Data from Stats SA (2005)

As of June 2005 the number of households receiving basic and free basic solid waste management services were 387 948 and 74 324 (19 %) respectively. Of the 81 917 households classified as indigent 61.7 % (50 565) received a basic level of refuse removal. For the 2005 period, in Mpumalanga, 1 212 people were employed in the solid waste management division; this was approximately 10 % of the total staff in the province (12 629).

Table 21: Number of LMs that have the infrastructure to provide services, that are responsible under the power and functions to provide the solid waste function and who provide the solid waste service

DM or Metro	*Total Number of Municipalities*	*Infrastructure*	*Powers and Functions*	*Providing the Service*
Gert Sibande	8	7	7	7
Nkangala	7	6	6	6
Ehlanzeni	5	4	4	4
Total	**20**	**17**	**17**	**17**

Data from MDB capacity assessment (2005)

4.1.7 Northern Cape

The Northern Cape has a total of 5 DMs and 27 LMs. The 5 DMs are:

- Namakwa DM (DC6)
- Karoo DM (DC7)
- Siyanda DM (DC8)
- Frances Baard DM (DC9)
- Kgalagadi DM (CBDC1)

There are a total of 243 273 households in the Province of which 69 % are in urban and 31 % in rural areas. Refuse removal is serviced to between 18 % and 76 % of households in the Northern Cape.

Table 22: Demographics and refuse removal for the Northern Cape

DM or Metro	*Population*	*Households*
Siyanda	200 000	50 465
Karoo	160 000	42 315
Francis Baard	330 000	88 854
Kgalagadi	200 000	50 465
Namakwa	110 000	28 908
Total	**1 010 000**	**260 000**

Data from Census 2001

Table 23: Number of households is each DM receiving a basic level of solid waste management

DM or Metro	*Number of Households*	*% Served*
Siyanda	33 587	67
Karoo	32 632	77
Francis Baard	79 794	89
Kgalagadi	12 083	24
Namakwa	24 247	84
Total	**182 434**	**70**

Data from Stats SA (2005)

As of June 2005 the number of households receiving basic and free basic solid waste management services were 182 434 and 70 128 (39 %) respectively. Of the 81 582 households classified as indigent 76 % (62 307) received a basic level of refuse removal. For the 2005 period, in the Northern Cape, 853 people were employed in the solid waste management division; this was approximately 11 % of the total staff in the province (7 530).

Table 24: Number of LMs that have the infrastructure to provide services, that are responsible under the power and functions to provide the solid waste function and who provide the solid waste service

DM or Metro	*Total Number of Municipalities*	*Infrastructure*	*Powers and Functions*	*Providing the Service*
Siyanda	7	7	6	7
Karoo	9	8	8	8
Francis Baard	5	5	4	5
Kgalagadi	3	3	2	3
Namakwa	7	7	6	7
Total	**31**	**30**	**26**	**30**

Data from MDB capacity assessment (2005)

4.1.8 North West

The Northern West Province has a total of 4 DMs and 25 LMs. The 4 DMs are:

- Bophirima DM (DC39)
- Central DM (DC38)
- Bojanala DM (DC37)
- Southern DM (DC 40)

There are a total of 920 000 households in the Province of which 48 % are in urban and 52 % are located in rural areas. Refuse removal is serviced to between 32 % and 52 % of households in the North West Province.

Table 25: Demographics and refuse removal for the North West Province

DM or Metro	*Population*	*Households*
Bophirima	450 000	110 000
Central	820 000	200 000
Bojanala	1 270 000	360 000
Southern	880 000	240 000
Total	**3 410 000**	**920 000**

Data from Census 2001

Table 26: Number of households is each DM receiving a basic level of solid waste management

DM or Metro	*Number of Households*	*% Served*
Bophirima	34 615	32
Central	60 938	30

Bojanala	130 654	36
Southern	125 898	52
Total	**352 105**	**38**

Data from Stats SA (2005)

The number of households receiving basic and free basic solid waste management services were 352 105 and 135 762 (38.6 %) respectively. Of the 116 973 households classified as indigent 51 % (59 560) received a basic level of refuse removal. For the 2005 period, in the North West Province, 1 517 people were employed in the solid waste management division; this was approximately 12 % of the total staff in the province (13 464).

Table 27: Number of LMs that have the infrastructure to provide services, that are responsible under the power and functions to provide the solid waste function and who provide the solid waste service

DM or Metro	*Total Number of Municipalities*	*Infrastructure*	*Powers and Functions*	*Providing the Service*
Bophirima	8	6	6	6
Central	6	4	4	4
Bojanala	6	5	5	5
Southern	5	4	4	4
Total	**25**	**19**	**19**	**19**

Data from MDB capacity assessment (2005)

4.1.9 Western Cape

The Western Cape has 5 DMs, 1 Metro (City of Cape Town) and 30 LMs. The 5 DMs are:

- Boland DM (DC2)
- Overberg DM (DC3)
- Central Karoo DM (DC5)
- Eden DM (DC4)
- West Coast DM (DC1)

There are a total of 1 380 000 households in the Province of which 75 % are in urban and 25 % are located in rural areas. Refuse removal is serviced to between 60 % and 88 % of households in the Western Cape, with the average being 82 %.

Table 28: Demographics and refuse removal for the Western Cape

DM or Metro	*Population*	*Households*
Boland	700 000	170 000
Overberg	240 000	69 116
Central Karoo	66 634	17 358

DM or Metro	*Population*	*Households*
Eden	520 000	140 000
West Coast	320 000	87 779
City of Cape Town	3 240 000	890 000
Total	**5 080 000**	**1 380 000**

Data from Census 2001

Table 29: Number of households is each DM receiving a basic level of solid waste management

DM or Metro	*Number of Households*	*% Served*
Boland	101 669	60
Overberg	46 548	67
Central Karoo	11 504	66
Eden	115 393	82
West Coast	64 882	74
City of Cape Town	780 000	88
Total	**1 119 996**	**82**

Data from Stats SA (2005)

The number of households receiving basic and free basic solid waste management services were 1 119 996 and 518 004 (46 %) respectively. Of the 308 645 households classified as indigent 93 % (300 365) received a basic level of refuse removal. For the 2005 period, in the Western Cape, 5 167 people were employed in the solid waste management division; this was approximately 12 % of the total staff in the province (42 572).

Table 30: Number of LMs that have the infrastructure to provide services, that are responsible under the power and functions to provide the solid waste function and who provide the solid waste service

DM or Metro	*Total Number of Municipalities*	*Infrastructure*	*Powers and Functions*	*Providing the Service*
Boland	6	5	5	5
Overberg	5	4	4	4
Central Karoo	4	4	3	4
Eden	8	8	7	8
West Coast	6	6	5	6
City of Cape Town	1	1	1	1
Total	**30**	**28**	**25**	**28**

Data from MDB capacity assessment (2005)

4.1.10 Levels of Service

According to a document published by the **dplg** in June 2005 a basic level of service with regards to solid waste disposal is that "a refuse removal service" be provided at least once a week. This can be interpreted as any arrangement to remove solid waste from an area at least once a week.

The options for refuse removal and the approximate associated costs are given in Table 31. Note that for the purposes of the financial modeling conducted these costs have been updated.

Table 31: The options for refuse removal and the associated costs

Option	*Level of Service*	*Cost (R/hh/month)*
Household transfer to communal skip	Basic defined as collection from skip once a week	7
Organised transfer to communal skip	Basic defined as collection from skip once a week	12
Kerbside collection	Full defined as collection from kerbs outside the households once a week	15

Data obtained from dplg website, no formal document associated with information

4.2 Assessment based on the survey results

This section presents the findings of the survey done to determine the current state of play with regards to solid waste services in the local municipalities across South Africa. The results are presented as follows:

- Institutional arrangements;
    - Waste services management responsibility;
    - Staffing structure;
    - Business structure;
    - Integrated waste management planning;
- Technical capacity; and
- Access to services.

The results are presented by their municipal categories previously discussed.

4.2.1 Institutional Arrangements

The following parameters fall under the general umbrella of institutional arrangements:

- *Allocation of waste service management responsibilities*: the waste management services responsibilities can be separated out into the various functions required to provide a complete waste management service. These functions involve general area cleansing, waste minimisation, waste collection, transport, disposal and planning.
- *Staffing structure*: This indicator provides the number of staff at the various levels e.g. labourer, intermediate and management

- *Business structure*: The functions performed by the municipality can be outsourced, done privately, corporatised or done by community contractors.
- *Integrated Waste Management Planning:* This indicator determines the municipality has a IWMP or is in the process of producing one.

These indicators will be discussed for both the Metros and the LMs based on the responses received as well on what data that was obtained from the IDPs, IWMPs, StatsSA and the MDB.

Waste services management responsibility

The Municipal Systems Act allocates responsibility for managing all processes involved in the solid waste management function to the local municipality. These processes involve:

- General area cleansing,
- Waste minimisation,
- Waste collection,
- Waste transportation,
- Waste disposal site, and
- Planning.

Metros

All the Metros indicated that they are responsible for performing all the waste services management functions; this is shown in Table 32.

Table 32: Indication of the allocation of responsibility of the waste services management functions within the Metros

Metro	***Waste services management function***					
	General area cleansing	Waste minimisation	Waste collection	Waste transportation	Waste disposal site	Planning
City of Cape Town	M	M	M	M	M	M
City of Joburg	M	M	M	M	M	M
City of Tshwane	M	M	M	M	M	M
Ekurhuleni Metro	M	M	M	M	M	M
Ethekwini	M	M	M	M	M	M
Nelson Mandela Metro	M	M	M	M	M	M

M indicates that the Metro performs the function

Local Municipalities

The responses received from the Local Municipalities varied. In general all the LMs reported that they were responsible for the full spectrum of waste management activities. In cases where they were not the District Municipality assumed the relevant responsibility.

B1 Municipalities

A summary of the responses for the B1 municipalities received is given in Table 33 below.

Table 33: Indication of the allocation of responsibility of the waste services management functions for the B1 municipalities

Municipality	***Waste services management function***					
	General area cleansing	Waste minimisation	Waste collection	Waste transportation	Waste disposal site	Planning
Buffalo City	LM	LM	LM	LM	LM	LM
City of Klerksdorp	LM	LM	LM	LM	LM	LM
Drakenstein	LM	LM	LM	LM	LM	LM
Emalahleni (Mp)	LM	LM	LM	LM	LM	LM
Emfuleni	LM	LM	LM	LM	LM	LM
George	LM	LM,DM	LM	LM	DM	LM,DM
Govan Mbeki	LM	LM	LM	LM	LM	LM
Madibeng	LM	LM	LM	LM	LM	LM
Mangaung	LM	LM	LM	LM	LM	LM
Matjhabeng	LM	LM	LM	LM	LM	LM
Mogale City	LM	LM	LM	LM	LM	LM
Msunduzi	LM	LM	LM	LM	LM	LM
Ngqushwa	LM	LM	LM	LM	LM	LM
Potchefstroom	LM	LM	LM	LM	LM	LM
Sol Plaatje	LM	LM	LM	LM	LM	LM
Stellenbosch	LM	LM	LM	LM	LM	LM
Steve Tshwete	LM	LM	LM	LM	LM	LM

LM indicates that the Local Municipality performs the function

DM indicates that the District Municipality performs the function

For the B1 municipalities there does not appear to be a problem with the division of responsibility, i.e, no waste service responsibilities are unallocated. Responses were received from 81% of B1 municipalities and these results are likely to be indicative of this municipal category

B2 Municipalities

The responses received from the B2 municipalities are presented in Table 34, these account for 66% of this municipal category. It is clear that all the functions are accounted for with waste minimisation, waste planning and waste disposal sites typically being shared with the District Municipality.

Table 34: Indication of the allocation of responsibility of the waste services management functions for the B2 municipalities

Municipality	***Waste services management function***					
	General area cleansing	Waste minimisation	Waste collection	Waste transportation	Waste disposal site	Planning
Khara Hais	LM	LM, DM	LM	LM	LM, DM	LM
Breede Valley	LM	LM	LM	LM	LM	LM,DM
Greater Kokstad	LM	LM, DM	LM	LM	LM,DM	LM
Hibiscus Coast	LM	LM,DM	LM	LM	LM,DM	LM,DM
Highlands	LM	LM	LM	LM	LM	LM
Koukamma	LM	LM,DM	LM	LM	DM	LM,DM
Kwa Dukuza	LM	LM	LM	LM	LM	LM
Makana	LM	LM,DM	LM	LM	LM	LM,DM
Merafong City	LM	LM,DM	LM	LM	LM,DM	LM,DM
Metsimaholo	LM	LM	LM	LM	LM	LM
Midvaal	LM	LM	LM	LM	LM	LM,DM
Mogalakwena	LM	LM	LM	LM	LM	LM
Moqhaka	LM	LM	LM	LM	LM	LM
Mossel Bay	LM	LM,DM	LM	LM	LM,DM	LM,DM
Oudtshoorn	LM	LM,DM	LM	LM	LM,DM	LM,DM
Overstrand	LM	LM	LM	LM	LM	LM,DM
Randfontein	LM	LM	LM	LM	LM,DM	LM,DM
Umngeni	LM	DM	LM	LM	LM,DM	LM,DM
Westonaria	LM	LM,DM	LM	LM	LM,DM	LM,DM

LM indicates that the Local Municipality performs the function

DM indicates that the District Municipality performs the function

B3 Municipalities

For the B3 municipalities 68 responses were received accounting for 61% of the category. From the respondents, five municipalities (Kungwini, Lesedi, Thaba Chweu, Nokeng Tsa Taemane and Tokologo) did not account for any of their waste services management activities. Given the numbers of responses the allocation of responsibilities is most easily shown in a graph, see Figure 3 below. The full list is included in the appendix.

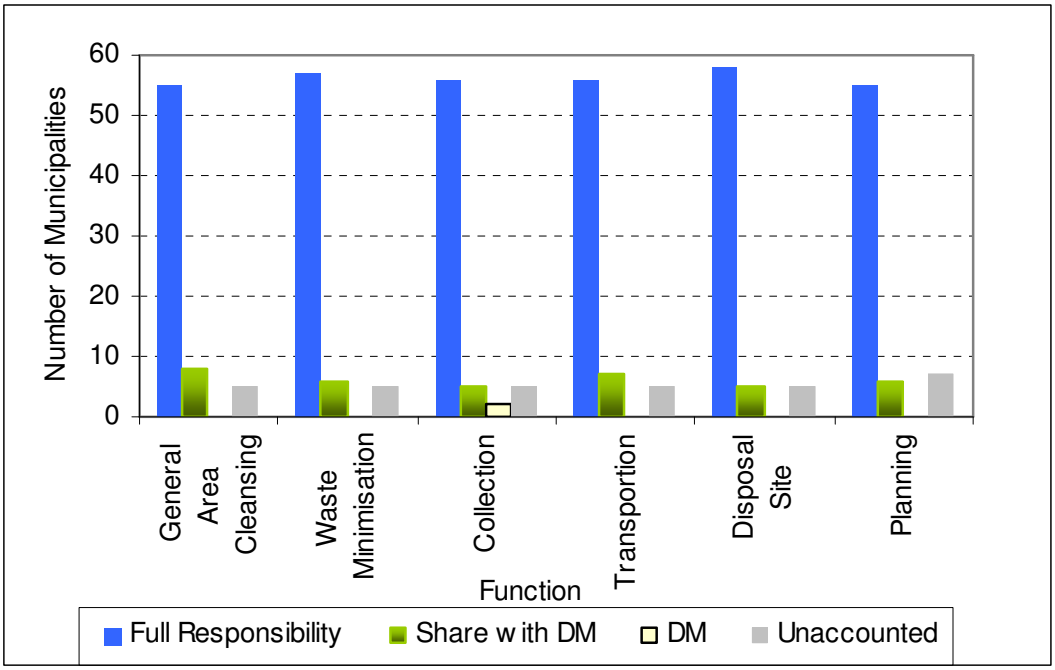

Figure 3: Summary of allocation of responsibilities for B3 municipalities

The list of LMs that either share or where the DM takes full responsibility for the spectrum of solid waste functions is shown in Table 35 below.

Table 35: B3 municipalities that either share or where the DM has full responsibility for the waste services management function

Waste services management function	***Share with DM***	***DM***
General area cleansing	Blue Crane Route Hessequa Ndwedwe Tsolwana Umuziwabantu Umvoti	
Waste minimisation	Blue Crane Route Hessequa Ndwedwe Tsolwana Umuziwabantu Umvoti	
Collection	Blue Crane Route Ndwedwe Tsolwana	Kai Garib Utrecht

Waste services management function	***Share with DM***	***DM***
	Umuziwabantu Umvoti	
Transportation	Blue Crane Route Ndwedwe Tsolwana Umuziwabantu Umvoti	
Waste disposal site	Blue Crane Route Ndwedwe Tsolwana Umuziwabantu Umvoti	
Planning	Blue Crane Route Ndwedwe Prince Albert Tsolwana Umuziwabantu Umvoti	

B4 Municipalities

The responses received from the B4 municipalities is summarised in Table 36. In many cases the function could not be accounted for and it was indicated my the municipalities that the functions were not being performed.

Table 36: Indication of the allocation of responsibility of the waste services management functions for the B4 municipalities

Municipality	***Waste services management function***					
	General area cleansing	*Waste minimisation*	*Waste collection*	*Waste transportation*	*Waste disposal site*	*Planning*
Albert Luthuli						
Blouberg						
Dannhauser						
Dr J.S. Moroka	LM	LM	LM	LM	LM	LM
Elundini						
Emalahleni (Ec)						
Engcobo						
Fetakgomo						
Greater Taung	LM	LM	LM	LM	LM	LM
Greater Tzaneen	LM	LM	LM	LM	LM	LM
Hlabisa						
Imbabazane						
Impendle						
Indaka						
Ingwe						
Jozini	LM	LM	DM	LM	LM	LM
Lepelle Nkumpi	LM	LM	DM	LM	LM	LM
Makhado	LM	LM	LM	LM	DM	DM

Municipality	***Waste services management function***					
	General area cleansing	*Waste minimisation*	*Waste collection*	*Waste transportation*	*Waste disposal site*	*Planning*
Makhudutamaga	LM	LM	LM	LM	LM	LM
Mbhashe						
Mbizana	DM	DM	DM	DM	DM	DM
Moses Kotane						
Msinga						
Mutale	LM	LM	LM	LM	LM	LM
Newcastle	LM	LM	LM	LM	LM	LM
Nkonkobe	LM	LM	LM	LM	LM	LM
Nongoma						
Nyandeni	DM	DM	DM	DM	DM	DM
Qaukeni	DM	DM	DM	DM	DM	DM
Seme						
Senqu						
Thembisile						
Thulamela						
Umlalazi	LM	LM	LM	LM	LM	LM
Umshwathi						
Umzimvubu						
Uphongolo						

LM indicates that the Local Municipality performs the function

DM indicates that the District Municipality performs the function

Staffing structure

The organization structure of the Metros and LMs is inferred from the number of staff at the various operational levels. The staff numbers presented are those that work within the municipality (i.e. not outsourced), at times there is sharing of staff with other departments. Based on international literature (Henderson, 2005) the optimum staff breakdown should be:

- 65 % labourer,
- 25 % intermediate; and
- 10 % management;

Based on the same literature source the optimum number of households served by one solid waste staff member should be between 150 and 200.

Metros

For the Metros the split between the three categories of staff was relatively constant although the exact numbers varied, this is shown in Table 37 below. The staffing structure has a bias towards labourers, with 75 % of the staff in the solid waste division being labourers. None of the Metros reach the optimum 10 % of staff being management as indicated by international best practise. The average number of households served per solid waste staff member was 273. This is higher than the international best practise of between 150 and 200.

Table 37: Staffing breakdown in Metros

Metros	*Staffing level breakdown (%)*			*Total staff*
	Labourer	**Intermediate**	**Management**	
City of Cape Town	71	27	2	2071
City of Johannedburg	74	21	5	2571
City of Tshwane	79	20	1	1876
Ekurhukeni Metro	70	25	5	1652
Ethekwini	70	25	5	2171
Nelson Mandela Metro	73	23	4	1754

Local Municipalities

The responses received for the LMs varied considerably and are presented according the four **dplg** municipal categories viz B1, B2, B3 and B4, as above.

B1 Municipalites

In general over 80% of the staff employed by the B1 municipalities in the solid waste division consists of labourers with less than 5% of staff dedicated to management (See Figure 4: Employee breakdown for B1 municipalities below).

As can be seen from the graph the B1 municipalities have a much smaller "intermediate" staff complement than the Metro's. This probably indicates a smaller middle management capacity and generally lower management capacity and human resource skills than the larger municipalities.

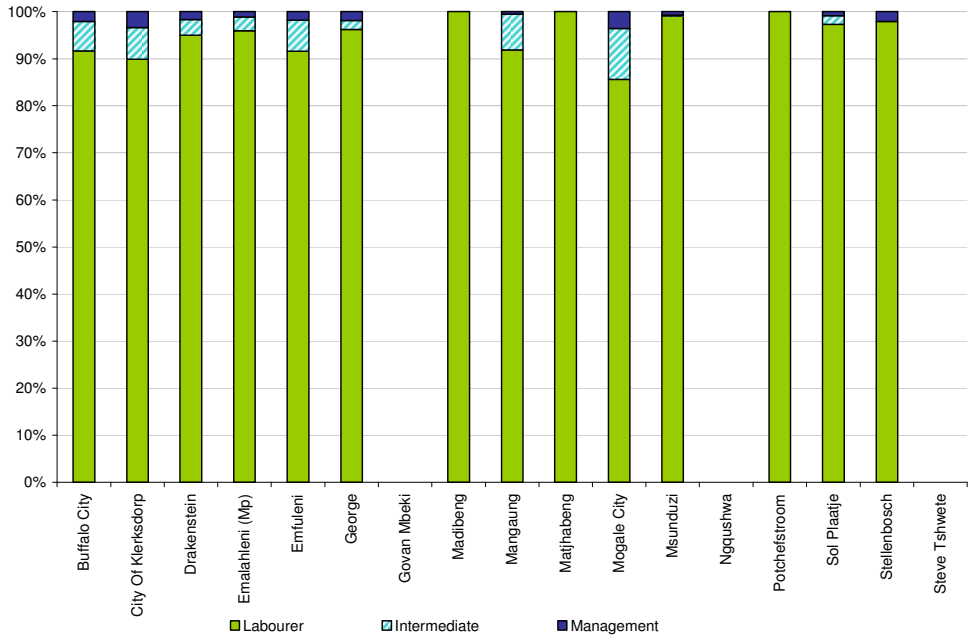

Figure 4: Employee breakdown for B1 municipalities

The ratio of total staff to number of households and number households being served by the LM's is presented in Figure 5 below. For the range of municipalities the ratio of households served to staff varied between 182 and 630 with the average being 350, indicating that there is one municipal solid waste employee per 350 households served.

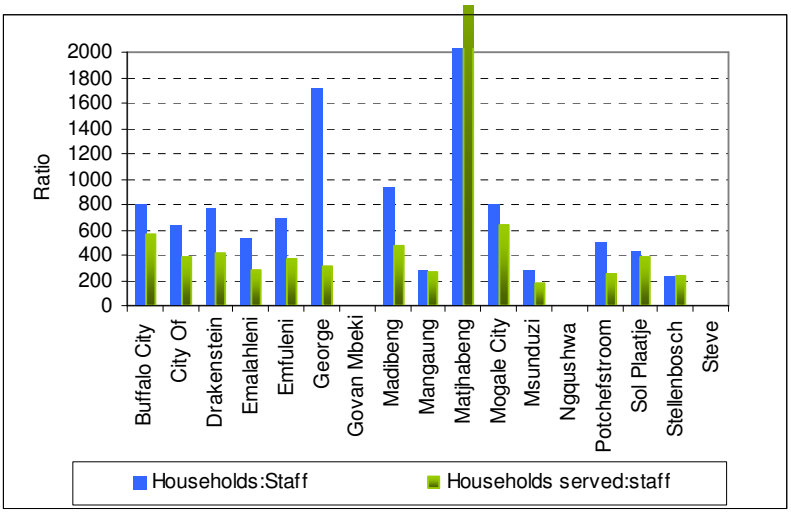

Figure 5: Ratio of total staff to total households and households served for B1 municipalities

There is a fairly wide range of household:staff ratios. It is likely that some of the reasons for this wide range are valid operational reasons (such as the need to service larger geographical areas). The differences in ratios may also indicate operational inefficiencies in the cases where there are large staff complements relative the number of households served.

B2 Municipalities

The staffing data received back from the B2 municipalities was not very comprehensive. In general it is apparent that most of the employees are labourers (Figure 6: Employee breakdown for B2 municipalities) and that on average 400 households are served per employee.

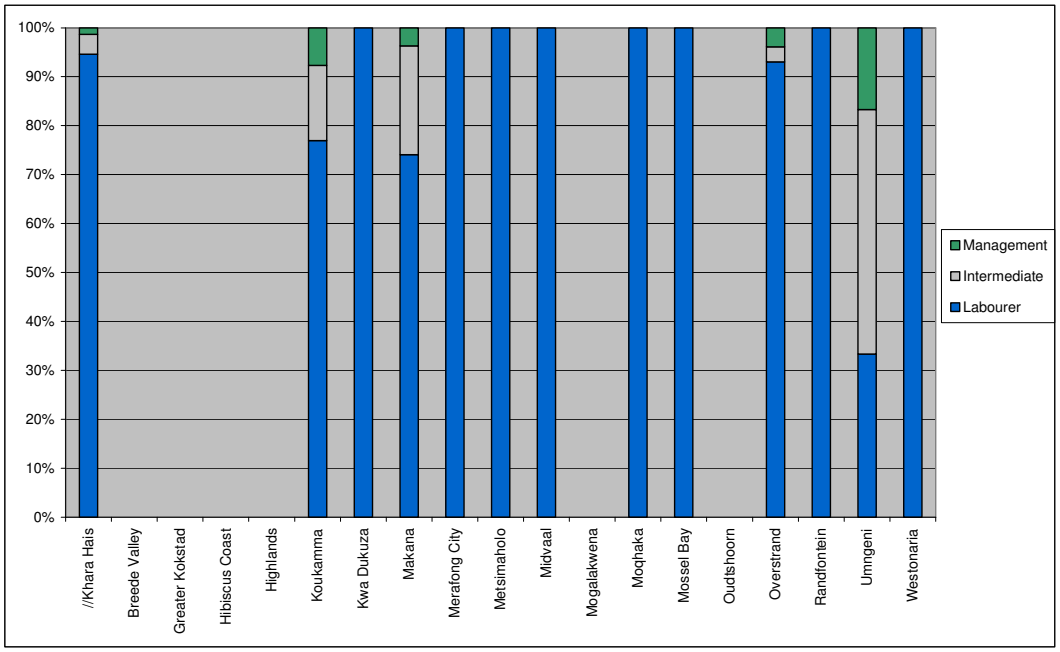

Figure 6: Employee breakdown for B2 municipalities

It is interesting to note that there are fairly significant differences in the staffing structures of the B2 municipalities. Some of the municipalities appear to have no managerial staff, while others have fairly significant percentages of intermediate and management staff – more in line with the staffing structure found in Metro's. This may be due to differences in interpretation of the questionnaire; to historical differences in the municipal capacity or to different business and organisational models. For example, some municipalities may allocate all their management staff to a central infrastructure planning division and therefore only allocate unskilled staff to the specific waste management function. Further, some municipalities may be carrying out functions not carried out by others, such as the management of a permitted landfill site, which may require additional management staff.

Again, there is a wide variation in the staff to household ratios. There are no clear indications that can be drawn from this but similar considerations to those outlined for the B1 municipalities will apply.

B3 Municipalities

As with the B1 and B2 municipalities the staffing profile is skewed towards labourers as is clearly indicated in Figure 7 below.

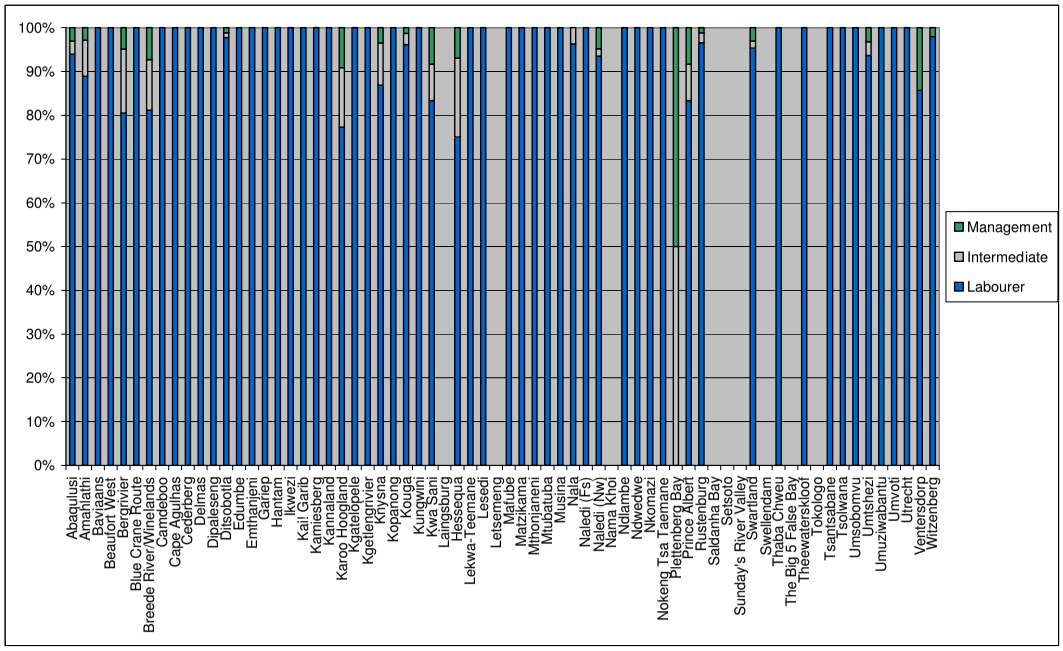

Figure 7: Employee breakdown for B3 municipalities

There is clearly a smaller proportion of managerial staff as one moves towards the smaller municipalities. This is to be expected but does raise concerns about the capacity of these municipalities to manage waste management activities beyond basic service delivery.

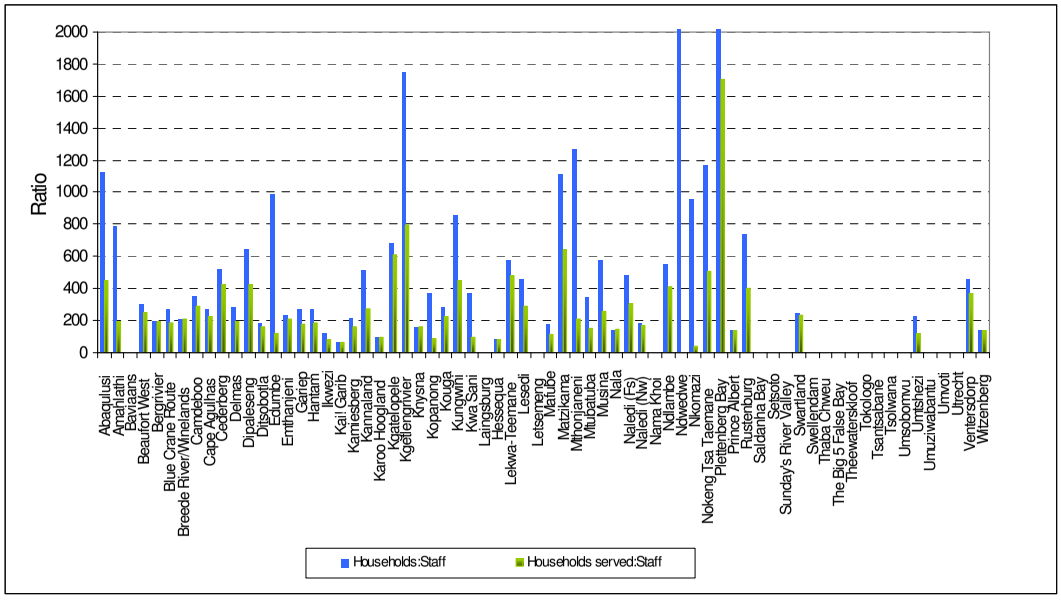

Figure 8: Ratio of total staff to total households and households served for B3 municipalities

B4 Municipalities

The data received from the B4 municipalities was very limited and appears to be erratic. From Figure 9 and Figure 10 below it is apparent that there are no clear

trends in the spilt of employees according to level of employment as well as the number of households served by employee.

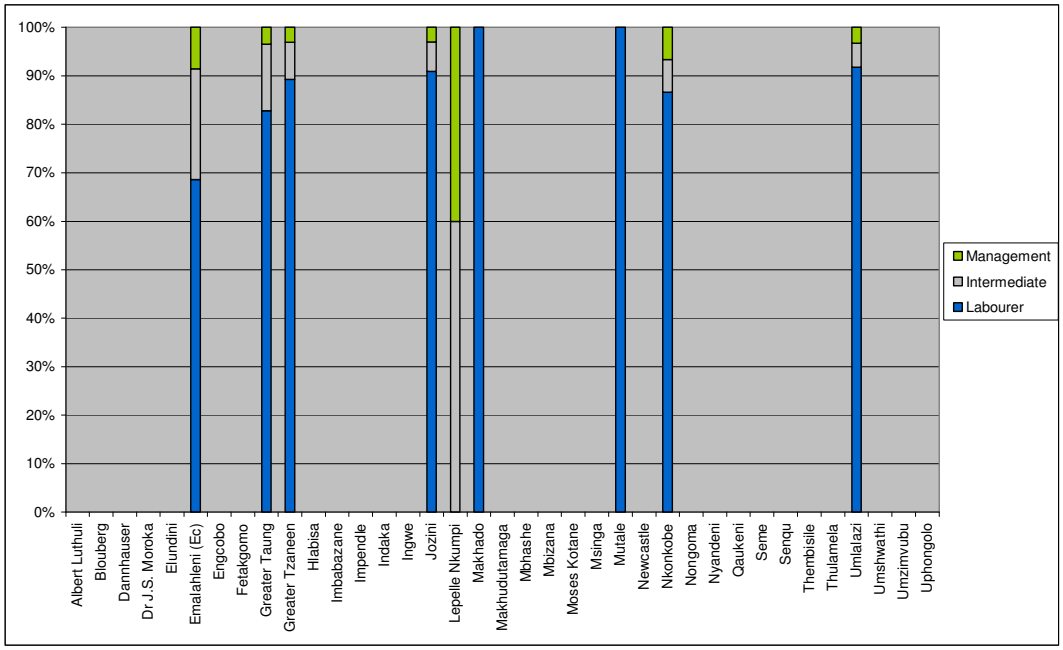

Figure 9: Employee breakdown for B4 municipalities

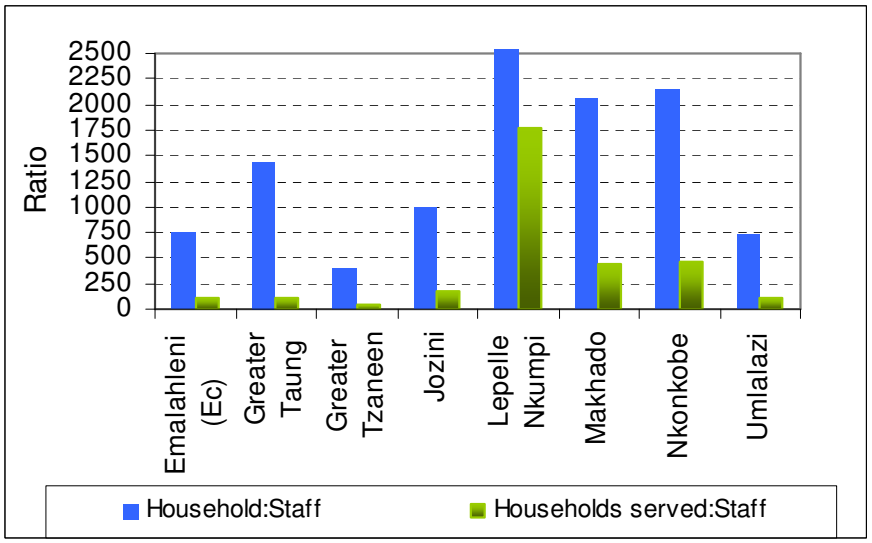

Figure 10: Ratio of total staff to total households and households served for B4 municipalities

As with the staff breakdown the data from the B4 municipalities was very limited and not much can be gleaned from these results.

Business structure

The following functions are considered to form part of the business being performed when providing a waste service:

- Recycling
- Collection
- Disposal

The response as to whether this function is physically carried out by the local municipality or carried out via some other arrangement is presented here.

Metros

In general, the metros perform all of the functions themselves and where this is not the case it is presented in Table 38 below. For all the Metros (except for Johannesburg where this function is performed by the municipally owned entity, Pikitup) recycling is carried out by external parties.

Table 38: Functions that are not carried out by Metros

Metro	***Disposal***	***Collection***	***Recycling***
City of Cape Town	Transportation of containerised waste from transfer stations to landfill sites is outsourced (by road and rail) Hazardous waste site is privately operated	Approximately 25% of general waste collections to formal residential properties are outsourced. The transportation of general waste from informal areas is outsourced Non-residential properties (trade, institutions, state, etc.) may use any service provider including the Council An integrated collection and area cleaning community based service delivery is offered to all informal areas	Pilot projects for the separate collection of recyclables in both residential and non-residential areas are outsourced. Recycling at council drop-offs are outsourced, which additionally to paper, cardboard, tins, metal, plastics and glass include garden greens (composting) and builders rubble (crushing for reuse) Recycling is not a core council service, many entrepreneurs and business is active in this sector, which inter alia include the recycling of glass (Glass Recycling Company), paper (Mondi, Nampak), tins (Collect-a-can), plastic (PETCO), e-waste (Footprints) and many more schools and buy-back centres. Seed funding provided towards the establishment of recycling facilities by NGO's and CBO's
City of Johannesburg	All these functions are performed by PIKITUP		
Ethekwini			Outsourced and carried out by small community

Metro	Disposal	Collection	Recycling
			operators
Nelson Mandela Metro		Private companies collect a component of the non-hazardous trade as well as toxic hazardous waste	
Ekurhuleni		Private companies collect a component toxic hazardous waste	Outsourced and carried out by small community operators
Tshwane		Private companies collect a component of the non-hazardous trade as well as toxic hazardous waste	Outsourced and carried out by small community operators

Local Municipalities

B1 Municipalities

In the B1 municipalities the majority of the municipalities that responded carried out all three functions, this is shown in Table 39 and the exceptions are listed in Table 40 (for clarity, the first table provides the percentage of LMs that do not provide the function and the second table highlights the municipalities that do not carry out the functions and what alternative arrangements they have). There does appear to be a small but growing trend in the use of small community contractors for solid waste collection services. There is also some use of external expertise, largely via outsourcing rather than privatisation, of waste disposal functions of the B1 municipalities.

Table 39: Percentage of B1 municipalities that outsource, corporatise, privatise or use small community contractors to deliver the waste disposal, collection and recycling function

	Disposal	Collection	Recycling
Outsourced	23%	12%	12%
Corporatised	6%	6%	6%
Privatised			
Small community contractors		12%	6%

Table 40: B1 municipalities that do not carry out functions

	Disposal	Collection	Recycling
Emalahleni (Mp)	Outsourced	Outsourced	
George	Outsourced		Outsourced
Mangaung		Small community contractors	Small community contractors
Msunduzi	All corporatised		
Sol Plaatje		Small community contractors	

Stellenbosch	All outsourced

B2 Municipalities

For the B2 municipalities the disposal is to a small extent outsourced, corporatised or privatised and the same applies to collection. Recycling is predominantly carried out by the LM and when it is not it is either outsourced, corporatised or done by small community contractors (See Table 41 below).

Table 41: Percentage of B2 municipalities that outsource, corporatise, privatise or use small community contractors to deliver the waste disposal, collection and recycling function

	Disposal	***Collection***	***Recycling***
Outsourced	5%	5%	5%
Corporatised	5%	10%	5%
Privatised	5%	5%	
Small community contractors			5%

Table 42: B2 municipalities that do not carry out functions

	Disposal	***Collection***	***Recycling***
Koukamma		Outsourced	
Kwa Dukuza		Privatised	
Makana	Corporatised	Corporatised	
Overstrand	Privatised	Corporatised	Small community contractors and corporatised
Randfontein	Outsourced		

B3 Municipalities

The B3 municipalities that responded predominately carry out the full range of business function with the exception shown in Table 43 and Table 43 below.

Table 43: Percentage of B3 municipalities that outsource, corporatise, privatise or use small community contractors to deliver the waste disposal, collection and recycling function

	Disposal	***Collection***	***Recycling***
Outsourced	7%	3%	3%
Corporatised	4%	7%	
Privatised	4%	2%	6%
Small community contractors		7%	6%

	Disposal	***Collection***	***Recycling***

Table 44: B3 municipalities that do not carry out functions

	Disposal	***Collection***	***Recycling***
Bergrivier	Privatised	Privatised	
Breede River/Winelands	Outsourced	Outsourced	Small community contractors
Cape Agulhas		Small community contractors	
Kai! Garib	Corporatised	Corporatised	
Knysna	Privatised	Outsourced	Small community contractors
Kopanong			
Kouga	Outsourced	Corporatised	Privatised
Musina			Small community contractors
Plettenberg Bay	Corporatised	Corporatised	Privatised
Prince Albert			
Rustenburg	Outsourced	Corporatised, Small community contractors	Outsourced, Small community contractors
Swartland	Privatised	Privatised	Small community contractors
The Big 5 False Bay	Outsourced	Outsourced	
Umtshezi	Corporatised	Corporatised	Privatised and small community contractors
Witzenberg	Outsourced		

B4 Municipalities

The situation with the B4 municipalities that responded is similar to that of the other B1, B2 and B3 municipalities (See Table 45 and Table 45 below).

Table 45: Percentage of B4 municipalities that outsource, corporatise, privatise or use small community contractors to deliver the waste disposal, collection and recycling function

	Disposal	***Collection***	***Recycling***
Outsourced	11%	11%	3%
Corporatised	3%	3%	3%
Privatised	3%	2%	3%
Small community contractors			3%

	Disposal	***Collection***	***Recycling***

Table 46: B4 municipalities that do not carry out functions

	Disposal	***Collection***	***Recycling***
Greater Taung			Outsourced
Greater Tzaneen	Outsourced, privatised	Outsourced, privatised	Privatised
Jozini	Outsourced	Outsourced	Privatised
Lepelle Nkumpi	Outsourced	Outsourced	
Makhado	Outsourced	Outsourced	
Umlalazi	Corporatised	Privatised, corporatised	Small community contractors

Integrated waste management planning

In terms of the Municipal Systems Act, municipalities are required to report on sector plans in terms of the IDP process. Waste is recognised as a sector for the purposes of the IDPs. The majority of the municipalities reported having prepared an IWMP.

All the metros reported having completed their IWMP's and that they were now in the implementation phase. Of the B1 municipalities, Emalahleni is the only municipality that does not have an IWMP and of the B2 municipalities Koukamma and Makana reported not having an IWMP. The more rural B3 and B4 municipalities had a greater number of municipalities not having IWMP's. These were: Ditsobotla, Nala, The Big 5 False Bay, Umtshezi, Utrecht, Witzenberg, Jozini, Umlalazi. In many cases it could not be ascertained whether an IWMP was available which probably was an indication that such a planning document had not been prepared. A breakdown of the percentage of municipalities (that responded) that reported not having IWMPs is given in Table 47.

Table 47: Percentage of municipalities by municipal category that reported not having IWMPs

Municipal Category	***Percentage of Municipalities that reported not having IWMPS***
A	0 %
B1	6 %
B2	11 %
B3	15 %
B4	27 %

4.2.2 Technical Capacity

Performing the waste management function requires a large degree of technical capacity. In this section the technical capacity refers to the ability for municipalities to perform technical functions or activities. Infrastructure resources and technical knowledge influences this ability to perform technical functions. These technical functions are discussed separately below.

Cleansing

Cleansing includes street sweeping, litter picking and the general cleaning of public areas and clearing of illegal dumps. As indicated in Section 0 the majority of municipalities indicated performing this function to varying degrees.

Waste minimisation

The change in focus from 'end of pipe' waste management has led to a national drive through the National Waste Management Strategy to focus on waste minimisation. Waste minimisation includes re-use, recycling as well as cleaner production. At present most of the municipalities (87%) reported a lack of capacity and infrastructure in pursuing waste minimisation as opposed to the core functions. Over 80% of the LM's reported that they are initiating recycling activities in some manner or the other but that they are struggling to get the initiatives off the ground due to lack of capacity.

Waste collection

Traditionally waste collection has been the focus of the waste services provided by the municipalities. In the metros a waste collection service is typically provided to almost all urban households including informal settlements. However, rural areas within those metros still appear to be poorly serviced (see section 4.2.3 for further information).

Metros reported having adequate infrastructure to perform the waste collection services. Of the B1's, B2's, B3's and B4's: 43%, 15%, 37% and 53% respectively reported **not** having adequate infrastructure capacity to perform the waste collection function.

Table 48: Municipalities reporting not having adequate infrastructure to perform the waste collection function

Municipal category	*% reporting not having adequate infrastructure*
B1	43%
B2	15%
B3	37%
B4	53%

The average waste collection fleet (comprising refuse compactors) and the average waste collected per annum for the range of municipalities is given in Table 48.

Table 49: Average fleet and waste collected in the full range of Municipalities

Municipality category	*Average collection fleet*	*Average waste collected*	*Waste/Fleet Vehicle*
A	316	1,752,613	5 546

Municipality category	*Average collection fleet*	*Average waste collected*	*Waste/Fleet Vehicle*
B1	11	247,743	22 522
B2	10	129,351	12 935
B3	5	16,041	3 208
B4	7	98	14

There are substantial differences between the waste per vehicle in different municipalities. The reasons for this may include better resourced A (metro) municipalities have larger vehicle fleets relative to their population size and therefore lower volumes of waste per vehicle than the other predominantly urban municipalities with smaller relative resources (B1 and B2). The small volumes of waste per vehicle in the B3 and B4 municipalities probably reflects the small household waste volumes and much lower population densities. This implies that vehicles are travelling further distances and therefore transporting less waste per day than in the denser urban municipalities.

Waste disposal

The safe disposal of waste requires all elements of capacity including:

- Adequate infrastructure
- Adequate personnel
- Adequate financial resources

Nationally there are over 2 000 waste handling facilities, of which 530 are permitted. A summary of responses received is given in Table 50 below.

From the table it appears that the main problem with un-permitted landfills lies within the B1 and B4 municipalities, followed by the B3 municipalities.

Table 50: Summary of waste disposal capacity for the full range of Municipalities

Municipality category	*Average number of landfills*	*Average landfills licensed (%)*	*Average waste disposed (tonnes per annum)*
A	5	100%	2 41 9100
B1	3	68%	155 684
B2	3	96%	65 410
B3	2	79%	29 478
B4	2	13%	16 607

4.2.3 Access to Services and Service Delivery

According to a document published by the **dplg** in June 2005 (accessed on their website) a basic level of service with regards to solid waste disposal is that "a refuse removal service" be provided at least once a week. This can be interpreted as any arrangement to remove solid waste from an area at least once a week. The

responses to the questionnaires received used the definition of a weekly refuse removal service as being an adequate level of service.

Access to services

Metros

For all the Metros in excess of 80% of households receive a weekly refuse removal services, this is shown in Table 51. In all cases the backlogs are in the process of being eliminated and in general solid waste services are provided to new houses as they are being developed. The main remaining challenge appears to be rural areas within the Metropolitan boundaries where these exist.

Table 51: Percentage access of households to a weekly refuse removal service

Metro	***Access (%)***	***Backlog (Number of hhs)***
City of Cape Town	100%	0
City of Johannesburg	94%	57,132
City of Tshwane	71%	198,130
Ekurhuleni	95%	39,691
Ethekweni	81%	248,868
Nelson Mandela Metro	100%	0
Total	**89 %**	543 821

Local municipalities

They responses received for the LMs have been analysed according to municipal category and the average per category given.

B1 Municipalities

For the B1 municipalities on average 61% of the households receive a weekly solid waste service. A breakdown of the level of service received is given in Table 52 below.

Table 52: Access to services and the backlog in waste services for B1 municipalities

Municipality	***Access to service (%)***	***Backlog (Number of hhs)***
Buffalo City	71%	54684
City Of Klerksdorp	60%	44848
Drakenstein	54%	21254
Emalahleni (Mp)	53%	43800
Emfuleni	54%	87509
George	18%	147000
Govan Mbeki	81%	18240

Municipality	*Access to service (%)*	*Backlog (Number of hhs)*
Madibeng	51%	47667
Mangaung	98%	3223
Matjhabeng	51%	63071
Mogale City	78%	19717
Msunduzi	66%	39540
Ngqushwa	3%	21293
Potchefstroom	49%	17354
Sol Plaatje	90%	4750
Stellenbosch	100%	0
Total	**61 %**	**633 950**

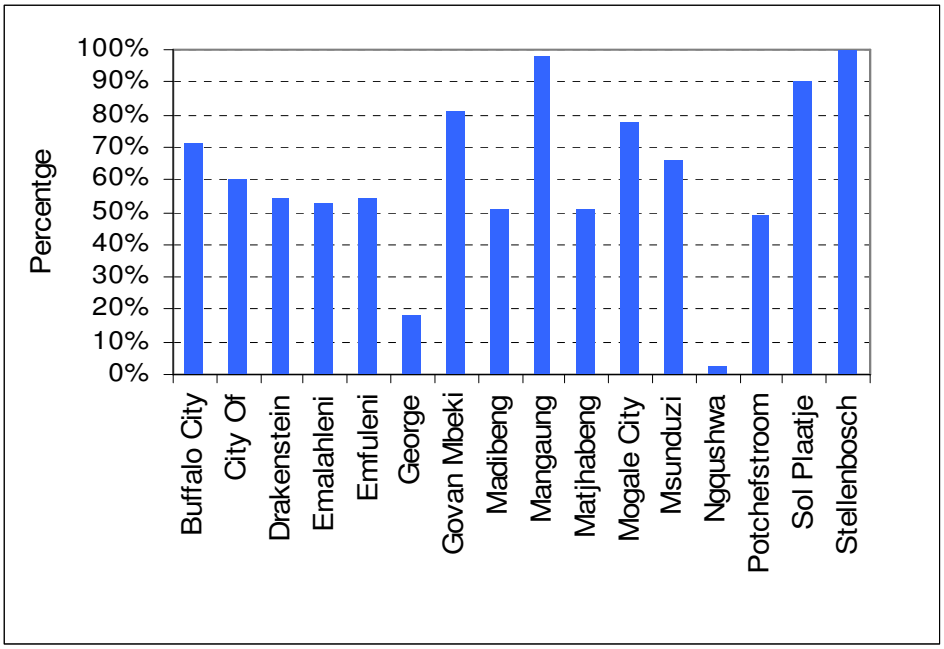

Figure 11: Percentage of households with access to a weekly solid waste service

B2 Municipalities

The B2 municipalities service, on average, 60% of the households in their area of jurisdiction. An indication of the average level of service being experienced by the households in the B2 municipalities is given in Table 53 below.

Table 53: Access to services and the backlog in waste services for B2 municipalities

Municipality	*Access to service (%)*	*Backlog (Number of hhs)*
//Khara Hais	100%	0

Municipality	***Access to service (%)***	***Backlog (Number of hhs)***
Breede Valley	51%	17295
Greater Kokstad	51%	10098
Hibiscus Coast	51%	27094
Highlands	42%	6350
Koukamma	100%	0
Kwa Dukuza	51%	22505
Makana	100%	0
Merafong City	51%	48854
Metsimaholo	51%	16538
Midvaal	51%	10312
Mogalakwena	47%	37373
Moqhaka	51%	21522
Mossel Bay	89%	2969
Oudtshoorn	51%	9926
Overstrand	100%	0
Randfontein	76%	9853
Umngeni	51%	11134
Westonaria	61%	20270
Total	**59 %**	**272 093**

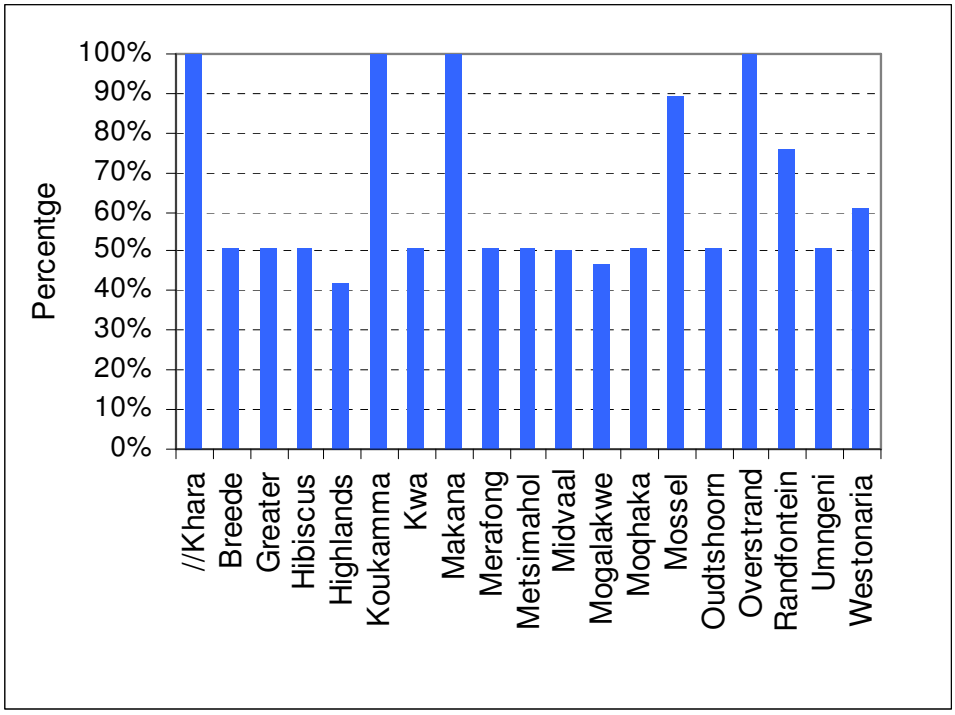

Figure 12: Percentage of households with access to a weekly solid waste service

B3 Municipalities

On average the B3 municipalities service 55% of their households with a solid waste service. The full dataset of responses received is presented as an Appendix and Figure 13 provides a graphical representation of the data. The diagram is difficult to read but does provide an overall picture of the extent to which households in the B3 municipalities are receiving solid waste services on a weekly basis. In general there appears to be a wide spread of the level of service being provided. An initial analysis of the data has shown that the LMs with higher levels of service provision are the predominantly urban municipalities. This discrepancy between the level of service provision in urban and rural areas will be highlighted in a subsequent section that looks at the full dataset.

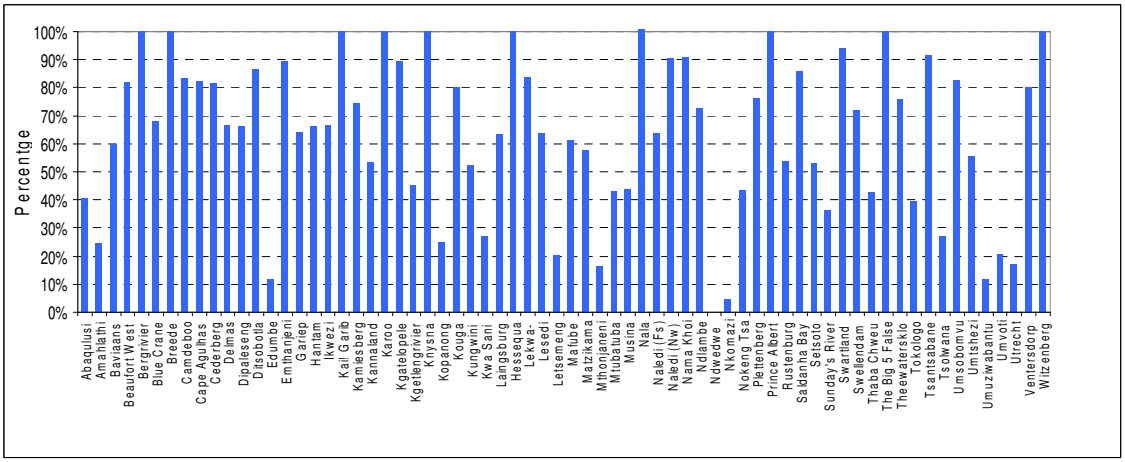

Figure 13: Percentage of households with access to a weekly solid waste service

B4 Municipalities

In the predominantly rural B4 municipalities approximately 20% of the households, with the exception of Newcastle, receive a solid waste service. The data for Newcastle has been verified. The low levels of access to a solid waste service is consistent with what has been stated previously in that the B4 municipalities are predominately rural and consequently have low levels of access.

Table 54: Access to services and the backlog in waste services for B4 municipalities

Municipality	*Access to service (%)*	*Backlog (Number of hhs)*
Albert Luthuli	24%	31362
Blouberg	22%	26518
Dannhauser	21%	15107
Dr J.S. Moroka	20%	43374
Elundini	19%	27259
Emalahleni (Ec)	14%	22350
Engcobo	16%	26519
Fetakgomo	10%	18235
Greater Taung	8%	38285
Greater Tzaneen	12%	70514
Hlabisa	22%	21277
Imbabazane	22%	18160
Impendle	22%	5840
Indaka	22%	16754
Ingwe	17%	18125
Jozini	17%	27600
Lepelle Nkumpi	17%	42744
Makhado	21%	88818
Makhudutamaga	18%	44284
Mbhashe	22%	40950
Mbizana	22%	32231
Moses Kotane	19%	50952
Msinga	22%	25695
Newcastle	75%	18023
Nkonkobe	22%	25116
Nyandeni	18%	40994
Qaukeni	13%	38982
Thulamela	8%	136417
Umlalazi	14%	38367
Total	**20 %**	**272 093**

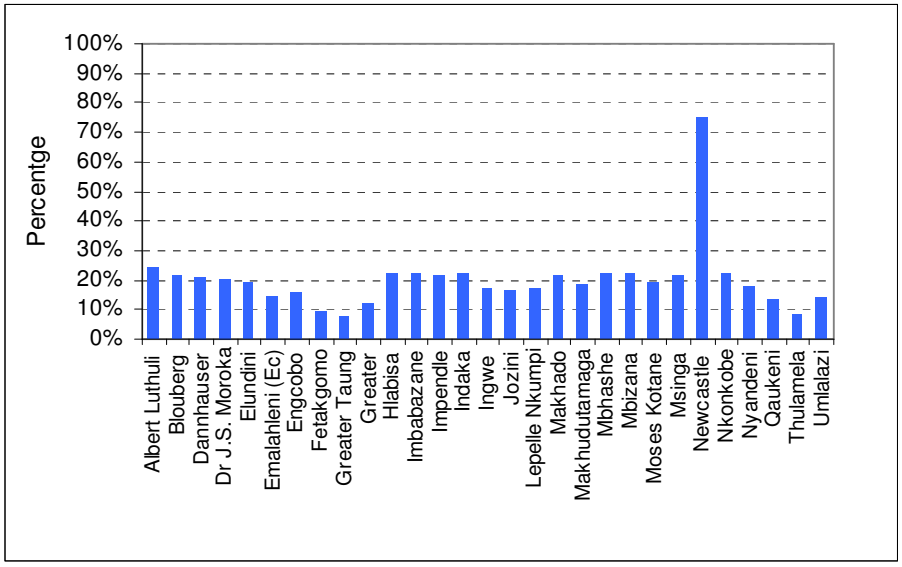

Figure 14: Percentage of households with access to a weekly solid waste service

The national backlogs (on the basis of the survey results) are presented in Table 55 below by municipal category.

Table 55: Backlog in adequate service provision by municipal category

Municipal category	***Percentage of households with an adequate waste management services***	***Number of households without an adequate waste management services***	***Percentage of total backlog***
A	89 %	543 821	25%
B1	61 %	633 950	29%
B2	59 %	272 093	13%
B3	55 %	452 131	21%
B4	20 %	272 093	13%
Total		**2 174 088**	**100%**

4.2.4 Service delivery

A national picture of the level of service delivery with regards to solid waste services can be deemed by comparing the Census 2001 levels of access to those received from the respondents in this study.

The overall trend that has emerged for, for the full range of municipalities that have responded, is an increase in the numbers of households that are receiving access to a weekly waste service. For the Metros this has been particularly apparent for Ethekwini (after data verification). In the other LMs there are instances where the Census 2001 figures are higher than that reported by the municipality for the current

year indicating a decline in access to solid waste services with time. This has been attributed to discrepancies in the Census data, rather than the reported data, after cross checking with the LMs.

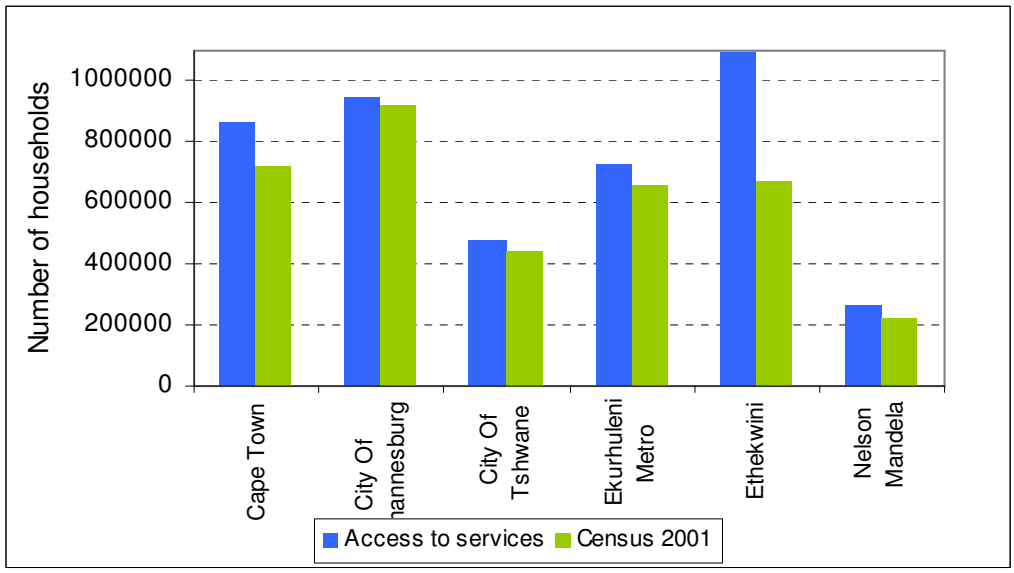

Figure 15: Comparison of access to service from respondents to this study with Census 2001 data for Metros

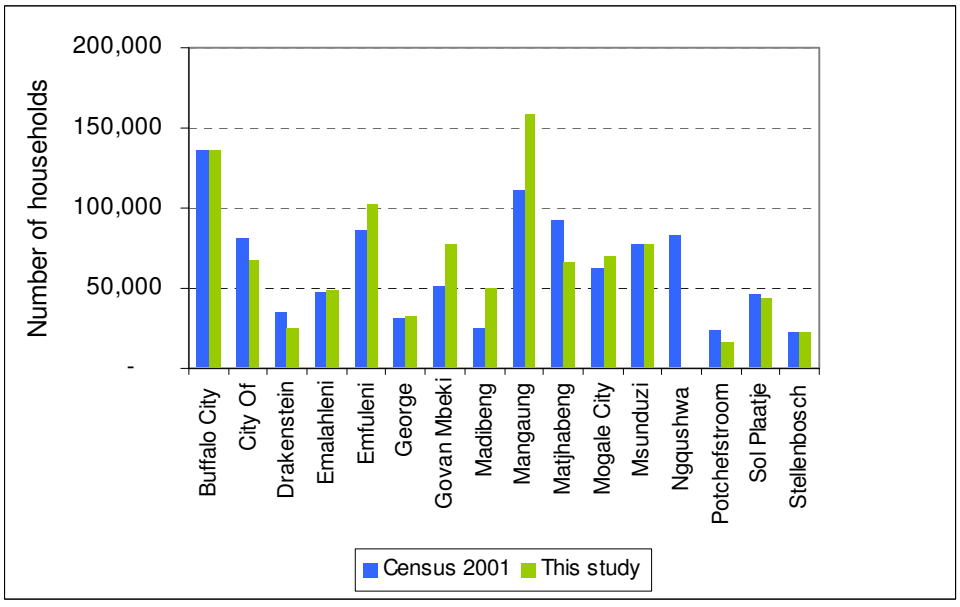

Figure 16: Comparison of access to service from respondents to this study with Census 2001 data for B1 Municipalities

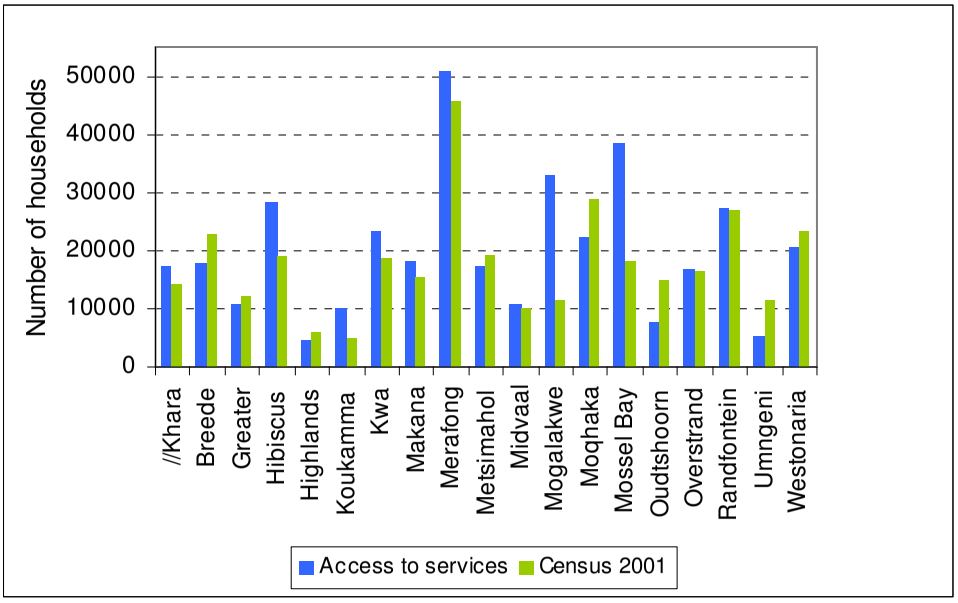

Figure 17: Comparison of access to service from respondents to this study with Census 2001 data for B2 Municipalities

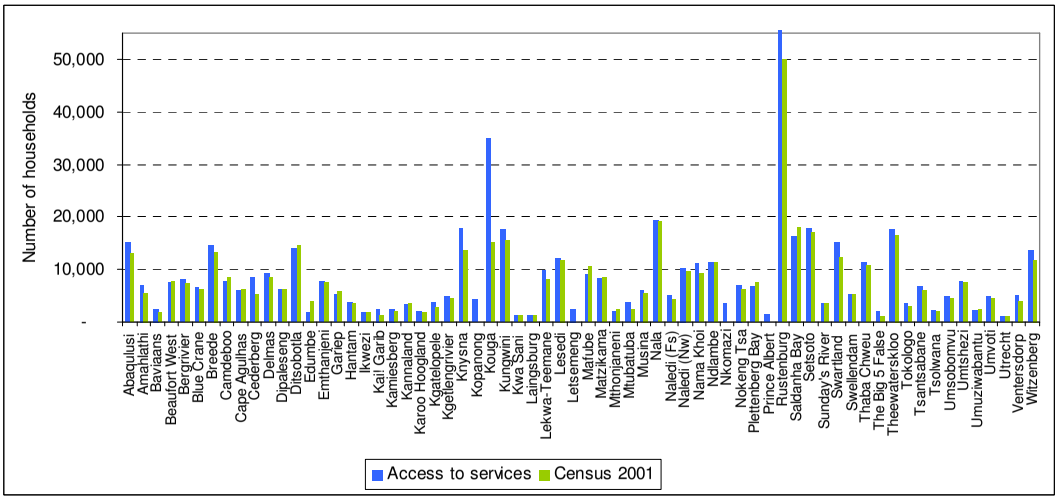

Figure 18: Comparison of access to service from respondents to this study with Census 2001 data for B3 Municipalities

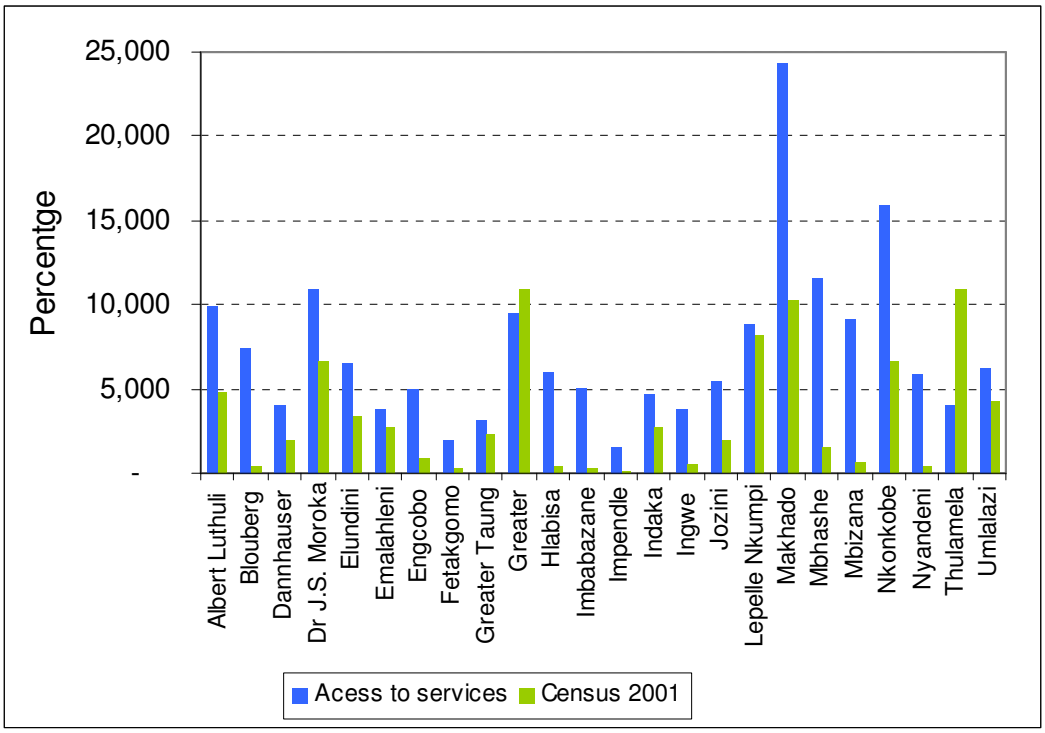

Figure 19: Comparison of access to service from respondents to this study with Census 2001 data for B4 Municipalities

Comparison with South African Cities Network (SACN) data

A comparison of the data obtained from this study with data from the SACN (Figure 20) indicates that on average there has been a decrease in the number of households within the Cities who do not have access to a solid waste service (a decrease from 85 161 to 71 252). This concurs with the comparison with Census 2001 data indicating an improvement in solid waste service delivery. This picture is reinforced with Figure 21, a comparison of percentage of households which do not have access to a solid waste service.

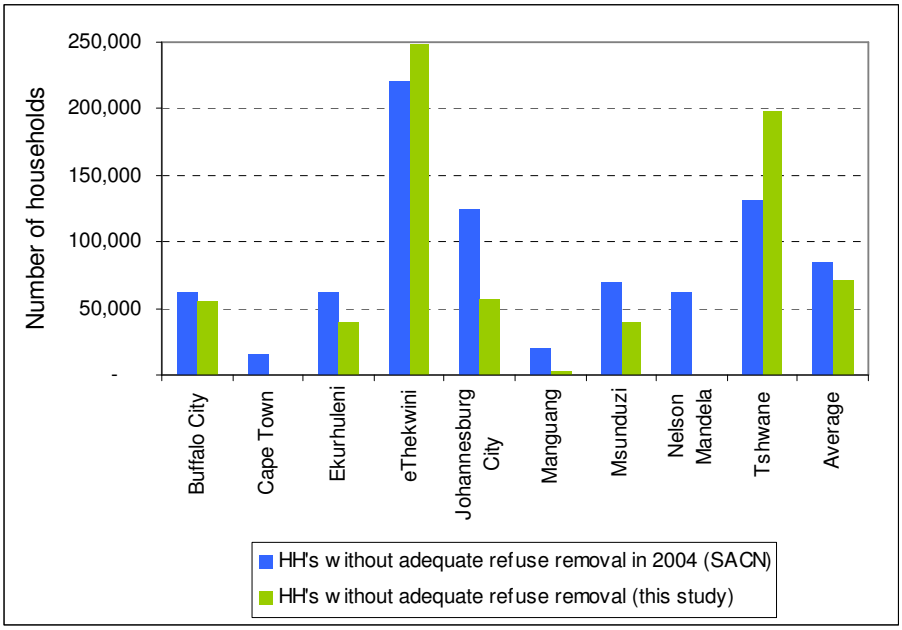

Figure 20: Comparison of access to solid waste services with SACN data (SACN, 2004)

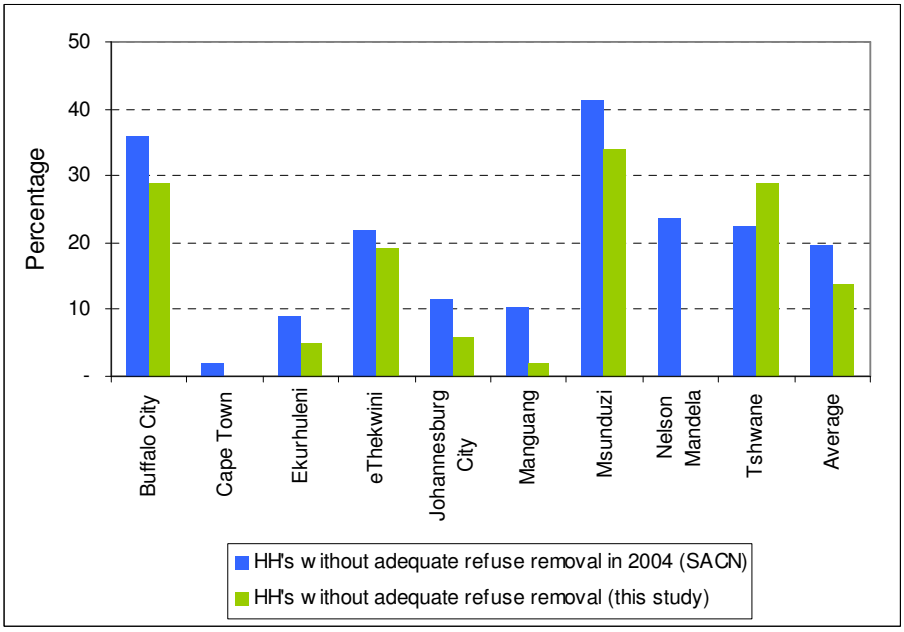

Figure 21: Comparison of percentage access to services with SACN data (SACN, 2004)

4.2.5 Urban vs Rural discrepancy

It is evident from the data presented previously that there are common factors determining the level of access to services being experienced by residents in the range of municipalities. One of these factors is the split of the population into either urban or rural areas. To test this hypotheses the percentage access to service and the percentage urban population, for the range of LMs, were plotted on a common axes as shown in Figure 22 to Figure 25 below. For the B1 and B2 municipalities, which are predominantly urban, no clear trend is evident. In the B3 and B4

municipalities is it very clear that the level of service is dictated by whether the household is in an urban or rural area. The access to a solid waste service, in the majority of these LMs, is dictated by the percentage of the population residing in urban areas implying that it is primarily the households in the urban areas receiving a solid waste service. This finding is not surprising, as supplying a service in the rural areas has historically been problematic, and has been dictated by a number of factors including geographical accessibility.

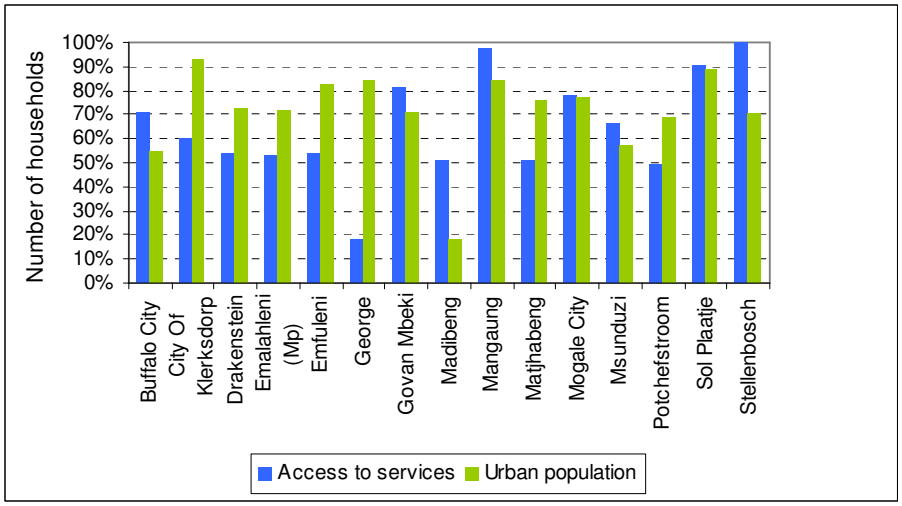

Figure 22: Percentage access to services and percentage urban population for B1 municipalities

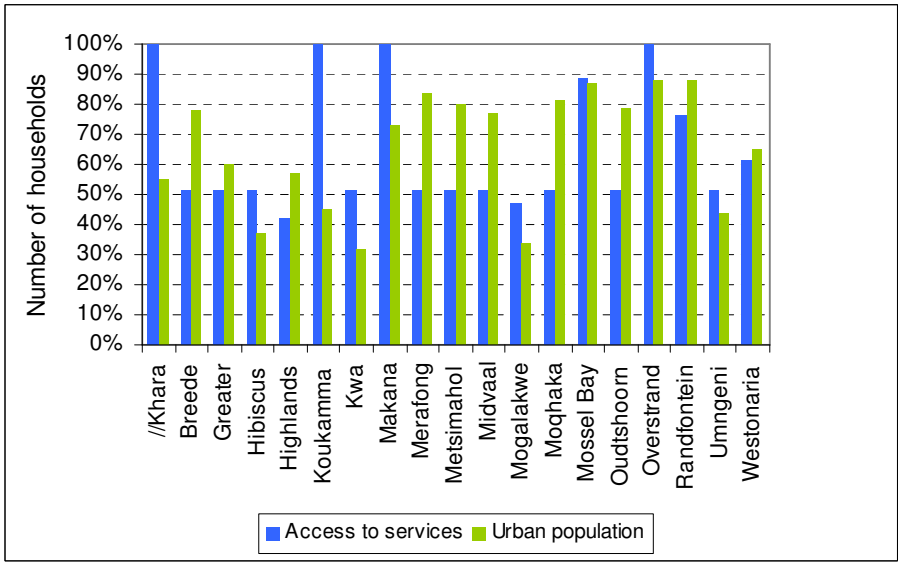

Figure 23: Percentage access to services and percentage urban population for B2 municipalities

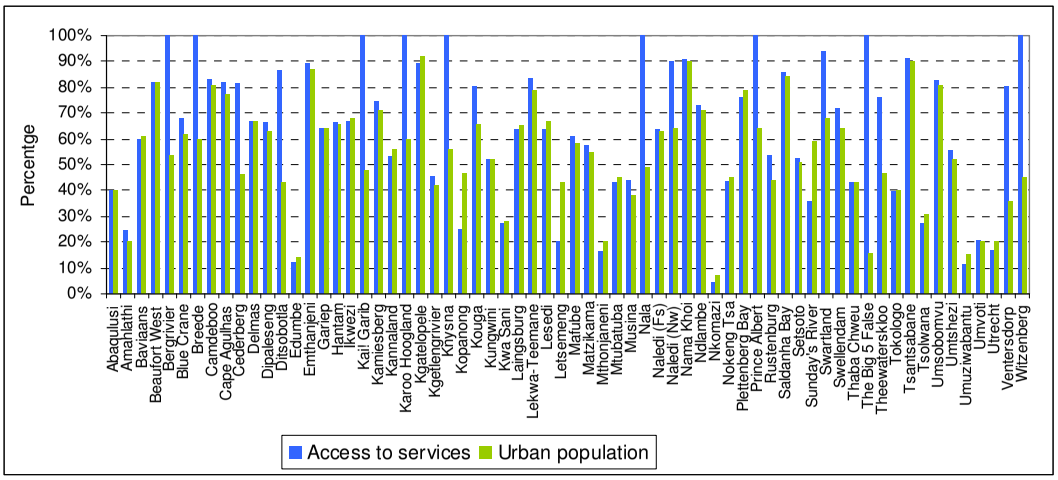

Figure 24: Percentage access to services and percentage urban population for B3 municipalities

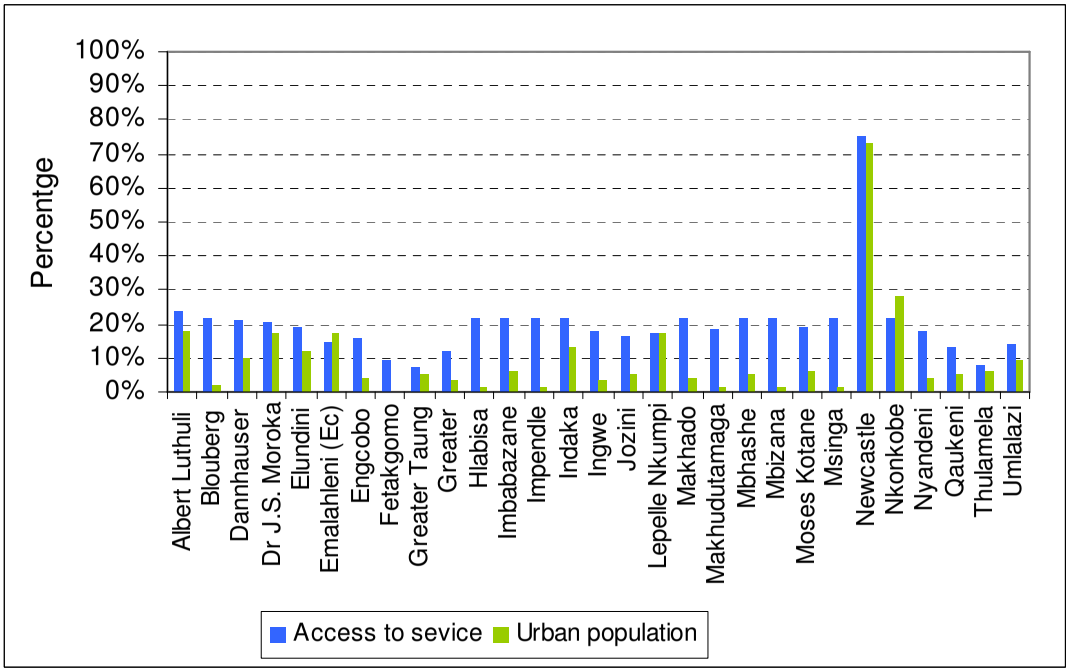

Figure 25: Percentage access to services and percentage urban population for B4 municipalities

5 Financial implications of addressing the backlogs

There is no standard approach to the financing of solid waste services at the municipal level. Previous surveys have shown that about 50-60% of municipalities in South Africa finance waste service **operating costs** entirely from user charges, while the remainder use various mixes of grants, user charges and transfers from general rates revenue to finance the service. Not all municipalities explicitly allocate a portion of the equitable share of revenue specifically to solid waste services (PDG, 2001).

Solid waste **capital costs** are typically funded separately – with municipalities often not matching capital expenditure for a particular service to revenue from that service. Funds to cover capital costs and financing charges are then raised from surpluses on operating accounts (such as water and electricity), property rates and capital grants – primarily the Municipal Infrastructure Grant (MIG). Decisions on capital expenditure are often taken within the Integrated Development Planning (IDP) process which means that solid waste expenditure in effect competes with other infrastructure projects at the local level.

Addressing the backlog in solid waste services implies additional capital expenditure for fixed infrastructure, such as landfill sites and transfer stations, as well as ongoing expansion of operating budgets for increased staff, collection costs and so forth. The unit costs of refuse collection are relatively low and, if appropriate service levels are provided, can typically be financed from user charges at an affordable level. However, it is less clear that municipalities have the ability to finance the capital costs associated with sustainable solid waste management. It is therefore important to understand as far as possible what the capital requirements are for addressing solid waste service delivery backlogs and whether sufficient resources are available to allow municipalities to do this in a sustainable way.

5.1 Predicting the capital and operating accounts

The Municipal Services Financial Model (MSFM) developed by PDG was used to project capital and operating costs for the various categories of municipalities for which the backlog analysis has been done. The MSFM has been extensively used by PDG in support of national infrastructure investment analyses for the DBSA, National Treasury, DPLG and others.

The model is an Excel-based spreadsheet model that allows service delivery scenarios to be developed and analysed. The model will calculate the operating and capital costs associated with these scenarios and provides an evaluation of the financial feasibility of the scenarios. For the purposes of this study the model has been run to analyse the operating and capital accounts for solid waste services up till 2014, for the range of municipalities, in order to give an overview of what the financial implication of addressing the backlogs will be.

It is important to note that the existing and projected service delivery situations that have been modelled depend on a wide range of different assumptions which, when changed, can dramatically alter the final picture. Some of these assumptions relate to given parameters, such as population growth; others relate to policy choices such as service levels. Thus, an exercise such as this cannot give a direct answer to all of

the questions asked but, rather provides a set of likely outcomes based on certain assumptions and choices.

5.1.1 Model structure

The model is driven by the **number of households** in a particular municipal category and provides for up to five settlement types, in order to allow for **different service level costs** associated with particular settlement conditions and for different service delivery programmes for each settlement type. For this exercise the 4 grouped geography types used in Census 2001 were used, namely:

- Urban - Formal
- Urban – Informal
- Tribal Areas (Communal Areas)
- Commercial Farms (Rural Formal)

The model is set up to deal with six groups of municipal functions (for purposes of this study all the services are modelled but only the solid waste service results are presented):

- Water supply and sanitation, referred to as water services.
- Electricity.
- Municipal solid waste or refuse services.
- Roads and storm-water.
- Public services.
- Governance and administration.

Capital and operating costs are estimated in the model using typical unit costs for each type of services and each level of service. There is not yet good data readily available in South Africa on the unit costs of solid waste disposal. These costs are also very variable depending on costs of land and technology used. However, the cost estimates used have been checked against available published sources and appear reasonable.

In the case of the **capital account** the model includes all capital expenditure on municipal services, including infrastructure for households which are not poor and for non-residential consumers. However, it excludes 'internal' infrastructure for residential properties provided to those who do not receive a housing subsidy, as this infrastructure is funded by private developers and included in the house price.

On the capital finance side the model provides for current capital subsidy arrangements and assumes that municipalities will have to finance the capital expenditure through such subsidies, complemented by their 'own sources' of finance, primarily borrowing.

In the case of the **operating account,** the revenue side of the model is based on what consumer units can be expected to pay for services given their income levels recorded in the latest census results and expected patterns of consumption for various services. The patterns of consumption are based, in turn, on given income levels and various assumptions on tariff structures.

Population and population growth

The model provides for infrastructure required to provide services to residential and non-residential households. In the former case the emphasis is on providing for the proportion of the population who currently do not have basic services (referred to as the backlog) and on providing for new population growth (new household formation). This requires an estimate of current population and predictions of population and household growth. Population and household growth are a key variable in the modelling.

Households and consumer units

In assessing access to services the term 'households' is typically used as the unit receiving services.

Economic growth

The model uses an economic growth factor to provide for the increase in number of non-residential consumers and the amount of the service they consume. The amount assumed for the planning period is given in Table 56 below (based on data from National Treasury and SA Reserve Bank)

Table 56: Economic growth rate used in the model

	Economic growth rate (%)
Urban-Formal	3.5
Urban-Informal	1.5
Tribal areas	1.0
Rural-Formal	2.0
National	**2.5**

.

Poverty measures

Household income is used as the measure of poverty in this analysis as this is the information which can be easily accessed from Stats SA, based on the census. The following cut-offs are used:

- The poverty cut-off for providing free basic services is taken at R800 per month in terms of household income. The impact of changing this cut-off can be assessed using the model (See sections on projections).
- A household income of R3 500 per month is used as the cut-off for low-income households, consistent with the approach taken in allocating housing subsidies.

The model separates households into two groups: low income (below R3 500 pm) and high income. For the sake of simplicity no middle income group is used and it is assumed that the high income household group as a whole can cross-subsidise low income households.

Levels of service with regards to solid waste management (refuse)

With regard to household solid waste collection the census includes the following service levels which are assumed to be consistent with Department of Environment Affairs and Tourism thinking:

- No Rubbish disposal.
- Collection less than weekly.

- Own refuse dump.
- Communal refuse dump.
- Collection at least weekly.

The first four service levels are held to be **inadequate** (below basis service level). It is important to note that in some circumstances and settlement types there is an argument that service levels below a full weekly collection may be adequate for meeting environmental, health, and quality of life objectives.

In considering service levels, the situation varies between urban (high density) and rural (low density) circumstances. The definition as to what is a 'basic' service level in a rural area is uncertain and more guidance is required by DEAT in this regard. Considering urban contexts, the model provides for an additional differentiation between kerbside collection and collection from communal bins and both are considered to be at or above basic. There is currently no way of differentiating between the numbers of households which have these two service levels. However, kerbside collection is taken to be dominant.

Service level targets

The model provides for service level targets to be set, including targets for removing backlogs. These relate to the future and therefore represent a variable which can be changed to model alternative scenarios.

Costing methodology

The model estimates the cost of all services provided to both residential (low and high income) and non-residential consumers. However, only costs which are the responsibility of the municipality are taken into the totals. The model is based on unit costs of providing services to households.

5.1.2 Key model inputs

Number of households

The data received from the respondents to this study was escalated to account for the full population based in a municipal category (assuming that the proportions of the total population residing in the municipal category were the same as that dictated by the Census 2001 data). The census baseline data was similarly escalated using reasonable service delivery extension growth rates. Once this exercise was conducted it became apparent that there was not a significant difference between the adjusted survey figures and the adjusted census baseline figures. The census values were therefore used as the base data for the model as they are more comprehensive.

Service level costs

The service level costs used in the model have been derived from various sources[1]. There is not very well researched average cost data on municipal solid waste operating or capital costs and further refinement of these costs over time is probably warranted. The model allows for an adjustment of costs at various service levels (see screenshot below).

[1] See for example: http://www.durban.gov.za/durban/Services/dsw/refuse_sites/new_landfills/landfill17

Municipal Services Model (v1) Run: v2 A Category A Base year = 2004

2.5 UNIT COSTS - SOLID WASTE

Capital costs for waste disposal sites and transfer stations (R per ton)	Urban-Formal	Urban-Informal	Tribal areas	0	Rural-Formal	
	50.0	25.0	22.5	22.5	20.3	47

Operating costs for storage and collection (including vehicle and other finance charges) R per hh pm											Weighted ave.
On-site disposal	na		na		na		0		0		0
Communal dumping sites	na		8		8	0	8	0	8	0	8
Communal bins	11.7	6	25.1	13	41.1	21	57.0	29	57.0	29	18
Kerbside, low income	29.3	15	62.7	32	102.7	53	142.6	73	142.6	73	32
Kerbside, high income	35.1	18	75.3	39	123.2	63	171.1	88	171.1	88	36
Non-residential (Rpm/CU)	136.9	70	293.6	151	480.5	246	667.3	342	667.3	342	

Operating costs for waste disposal (excluding capital charges) R per ton											
	50.0	12	50.0	12	50.0	12	50.0	12	50.0	12	50

Amount of waste produced (kg per household per week)											
On-site disposal		4.0		4.0		3.5		3.0		2.0	3
Communal dumping sites		5.0		6.0		5.5		4.0		3.5	5
Communal bins		8.0		8.0		8.0		8.0		8.0	8
Kerbside, low income		12.0		12.0		13.0		12.0		16.0	12
Kerbside, high income		15.0		16.5		16.5		16.0		15.0	15
(Non-residential entered in section 1)		9.36		5.56		4		0		4.36	

Figure 26: Screenshot of cost input screen of model

Backlog figures

Backlog figures used were considered in a similar way to the total household numbers. Once the adjustments to the survey responses and to the census data were both made and compared there was again not a significant difference and the model was run with the adjusted census information as the base data.

Service level targets

The model was run for a period until 2014. Different service level targets were assumed for the different municipal categories and for different settlement types within these categories. These are discussed in each section below.

5.1.3 Model outputs

This section provides an indication of the capital expenditure required to meet the service level targets set for 2014. The operating expenditure over this period is also provided. The model does also provide operating and capital income estimates. These are, however, not provided here as they are dependent on a range of policy choices at the municipal level which are not that useful to examine for a single municipal service alone.

It must be stressed again that the model results are sensitive to a range of assumptions and not only to the baseline backlog data. The time-frames selected for meeting the backlog and the service level aimed at, as well as assumptions about future demographic changes all impact significantly on projected costs (and revenue). A single model run should therefore be seen as indicative rather than definitive.

It is also important to note that the model tends to smooth capital investment over the period. This is generally appropriate when considering macro-level expenditure, however, at the individual municipal level the capital expenditure will typically occur in more 'lumpy' individual projects.

National

The national picture was modelled on the basis of progress towards adequate refuse removal as shown in the graph below. As can be seen the targets are based on rural areas having only 60% "adequate" refuse removal by 2014, i.e. a weekly refuse collection service.

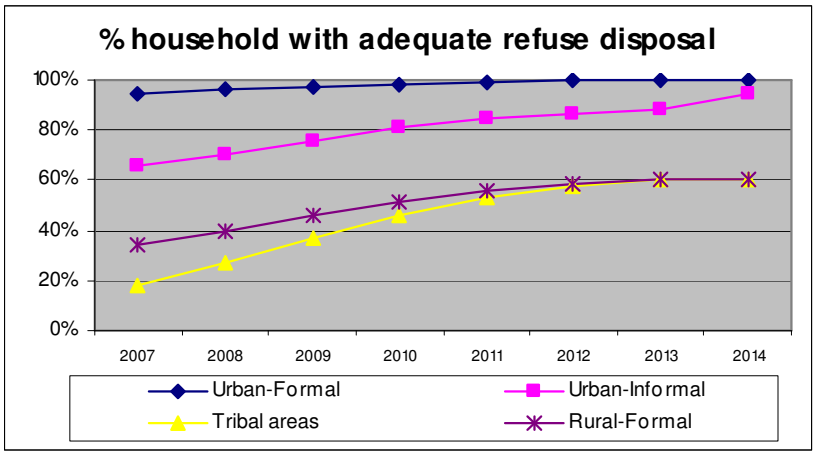

Figure 27: Residential service targets to address the backlogs in Metros

In order to provide all the households in South Africa with the targeted waste collection service a capital investment of about R2 704 million rand over the eight year period will be required (see Figure 28). Note that this does not take into account capital costs associated with the rehabilitation and upgrading to permitting status of un-permitted landfill sites. If a full level of service is aimed at, i.e. weekly refuse collection for all households (including rural) for the same period the capital expenditure increases only marginally to about R2 847 million. This is because of the very low volumes of waste produced by these households in comparison to the total.

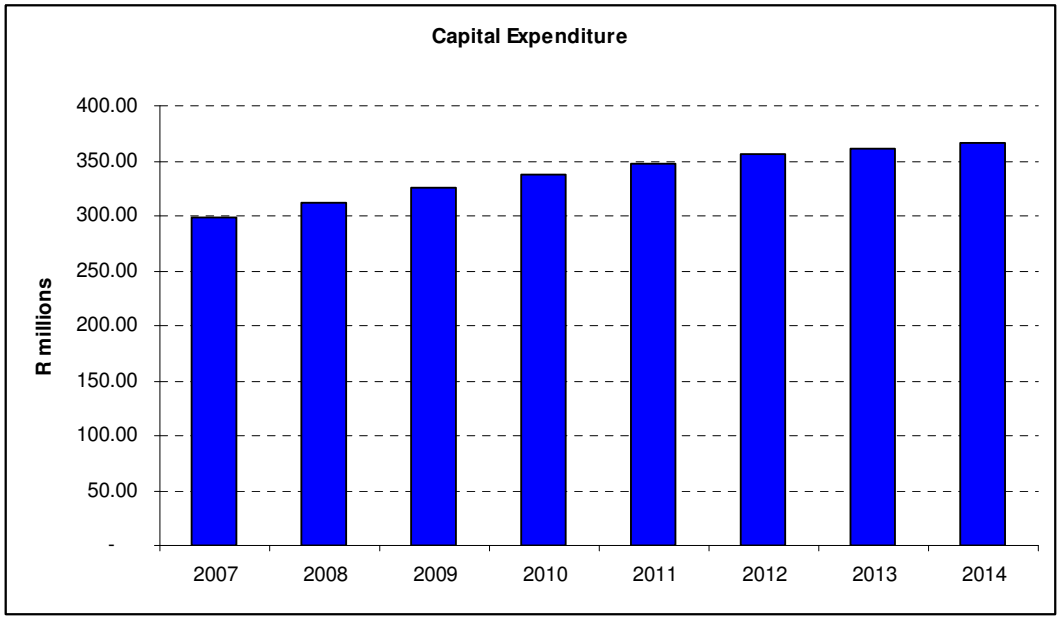

Figure 28: Capital expenditure required to address the National backlogs

In comparison to the required average capital expenditure of about R338 million per year on solid waste services the total MIG expenditure on solid waste services in 2005/6 was about R110 million[2]. It should be noted, however, that municipalities are undertaking capital investments in solid waste infrastructure in addition to their MIG allocations. In particular, the Metropolitan municipalities indicated from the survey an annual average capital expenditure on solid waste services of R237 million. About R49 million of the Metro's capital expenditure on solid waste was funded from MIG grants in 2005/6 – so it can be presumed that about R188 million of Metro expenditure was own-funded.

It appears that outside of the Metro's however, there are relatively low levels of solid waste capital expenditure with varying proportions of this MIG funded. For example, the B1 category municipalities were spending significantly less on average per year than the Metro's with a combined average capital expenditure of about R56 million[3]. The MIG funded about R18 million of this expenditure in 2005/6.

The table below shows the full picture of the capital expenditure estimates as derived from the survey and compares this with MIG grants in 2005/6. These figures are indicative as average capital expenditure values (from the survey) are being compared with a single year sample of MIG funding. Importantly, however, the total level of annual capital expenditure of about R352 million appears to approximate the required annual capital expenditure of R338 million derived from the model. Only about a third of this appears to be funded from the MIG – with the remainder largely coming from own investment from Metros and B1 municipalities.

MIG Funding as a Proportion of Estimated Capital Expenditure on Solid Waste Services (annual averages)

	MIG	***Survey***	***Survey (adjusted)***		***% MIG funded***
	Yr: 05/06	*ave: 03 to 07*		*Response Rate*	
A	48,546,440	236,798,581	236,798,581	100%	21%
B1	18,146,312	44,374,725	56,170,538	79%	32%
B2	22,766,528	14,916,750	23,677,381	63%	96%
B3	522,326	11,736,963	17,260,240	68%	3%
B4	2,985,791	8,521,000	18,129,787	47%	16%
C1	5,322,087	-	-	-	-
C2	11,594,383	-	-	-	-
TOTAL	**109,883,867**	**316,348,019**	**352,036,527**		**31%**

Operating income and expenditure

As discussed it is very difficult to analyse operating income and expenditure out of the context of the broader municipal finance picture. For example, the proportion of the equitable share of revenue allocated to solid waste versus to other services will

[2] Based on PDG own analysis of National Treasury MIG database

[3] Reported expenditure was R44 million which was adjusted by the 79% response rate to extrapolate to the total expected expenditure.

significantly alter the presumed financial viability of the solid waste service. However, to provide an indication of the financial sustainability of the service level targets proposed the operating account for the solid waste service was modelled and reviewed in the Municipal Services Financial Model.

The model suggests that nationally solid waste services could be sustainable but only on condition that they are allocated an adequate proportion of the equitable share grant. Without an equitable share grant allocation to solid waste services they are unlikely to be able to provided in a financially sustainable manner through own revenue sources. Household service charges required to raise the required revenue for the service are unlikely to be affordable to significant numbers of households.

The specific capital expenditure requirements for the various municipal categories are considered separately below:

Metros

The modelled service delivery targets for Metros are shown in the graph below.

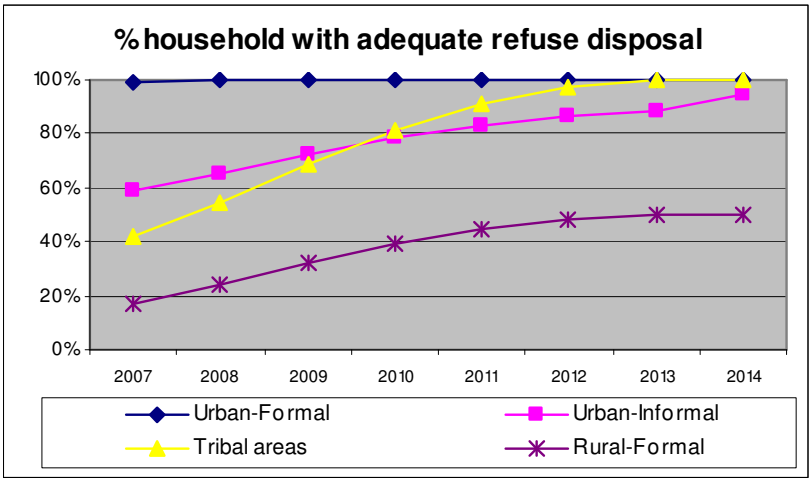

Figure 29: Residential service targets to address the backlogs in Metros

The capital expenditure associated with these targets is shown in the figure below.

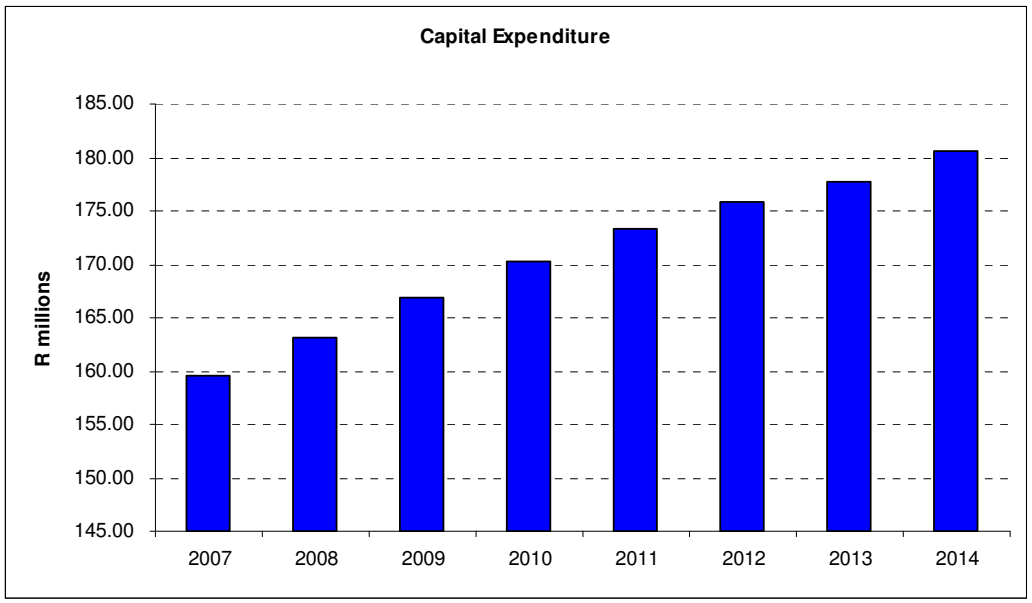

Figure 30: Capital expenditure required to address the backlogs in Metros

Current expenditure of about R236 million per year by the Metro's compares favourably with the required average capital expenditure of R170 million. It is possible that there are some definitional differences – for example, some Metro's may include the purchase of refuse removal vehicles as capital investment whereas the model regards them as operational expenditure, which will affect this comparison. In addition, some expenditure may be being made on addressing historical requirements, such as permitting non-compliant sites. Nevertheless, there does not appear to be significant under-investment.

B1 Municipalities

The modelled service delivery targets for B1s are shown in the graph below.

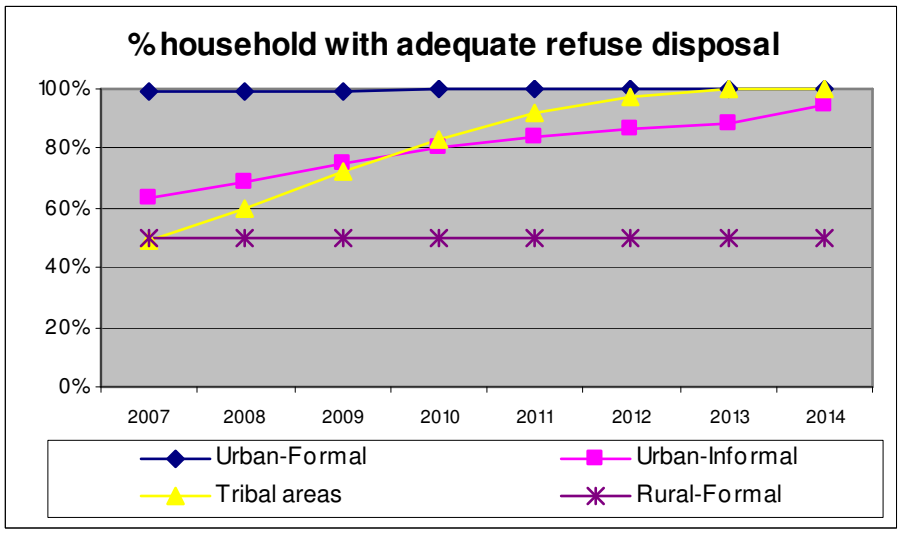

Figure 31: Residential service targets to address the backlogs in B1s

The capital expenditure associated with these targets is shown in the figure below.

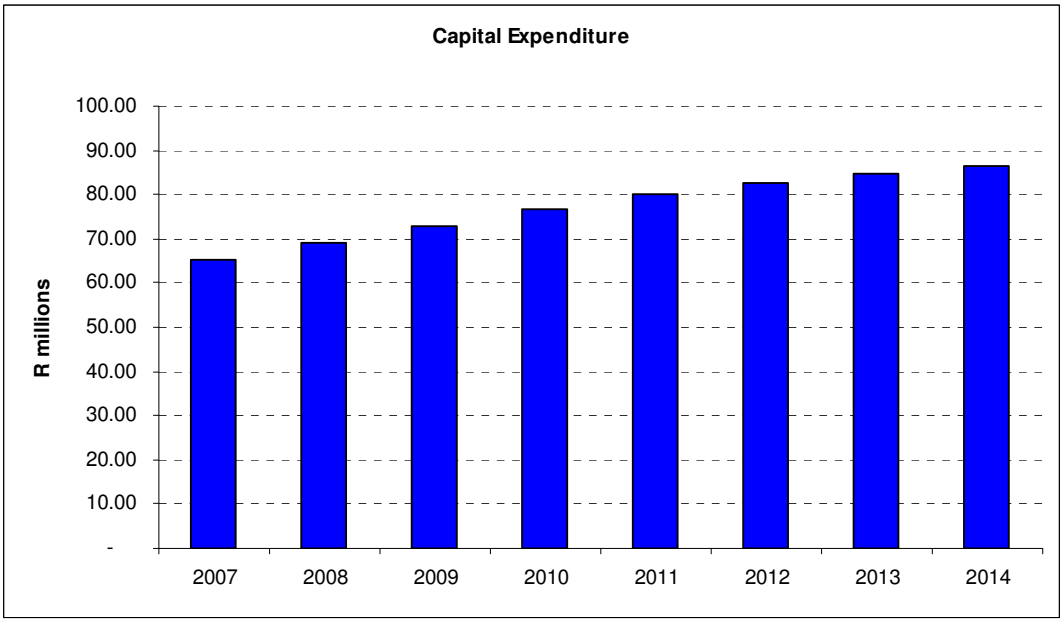

Figure 32: Capital expenditure required to address the backlogs in B1s

The modelled required expenditure is of the order of R77 million per year on average. This compares with an estimated R56 million of investment currently occurring annually by this category of municipality. Unlike the Metro's the actual investment appears to be below the required levels – although under-investment does not appear to be severe. As with the Metro's the bulk of the investment appears to be funded from own revenue sources.

B2 Municipalities

The modelled service delivery targets for B2s are shown in the graph below.

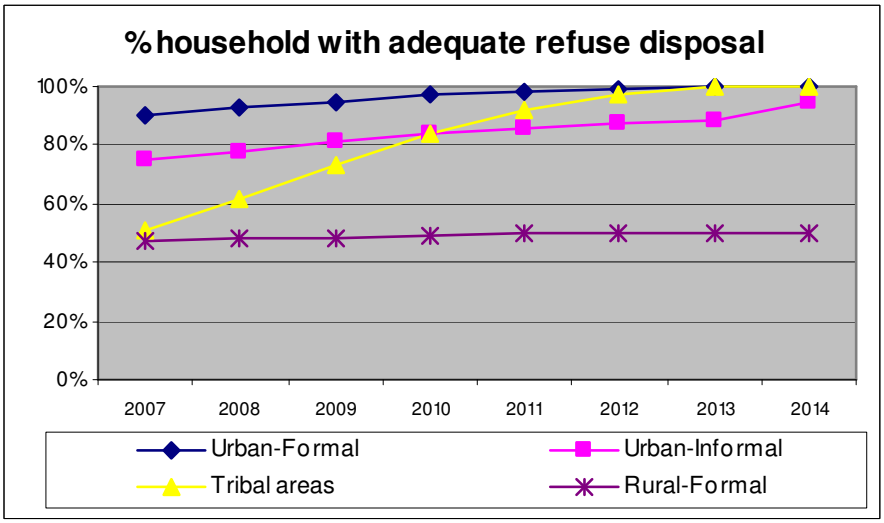

Figure 33: Residential service targets to address the backlogs in B2s

The capital expenditure associated with these targets is shown in the figure below.

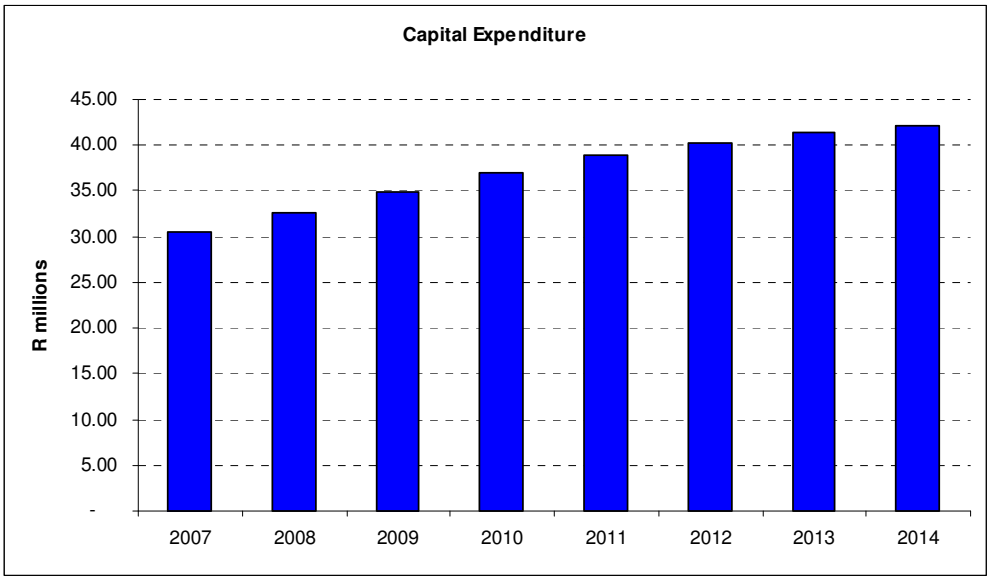

Figure 34: Capital expenditure required to address the backlogs in B2s

The modelled required expenditure is of the order of R37 million per year on average. This compares with an estimated R24 million of investment currently occurring annually by this category of municipality. There, therefore, appears to be a greater degree of under-investment in infrastructure in B2s, about 35%, than in the B1s, about 27%. The absolute size of the investment gap is, however, relatively small.

Unlike the previous two categories it appears as if the vast majority, over 95%, of investment in B2s is being funded from the MIG. It is not clear why there is this significant difference between the municipal categories.

B3 Municipalities

The modelled service delivery targets for B3s are shown in the graph below.

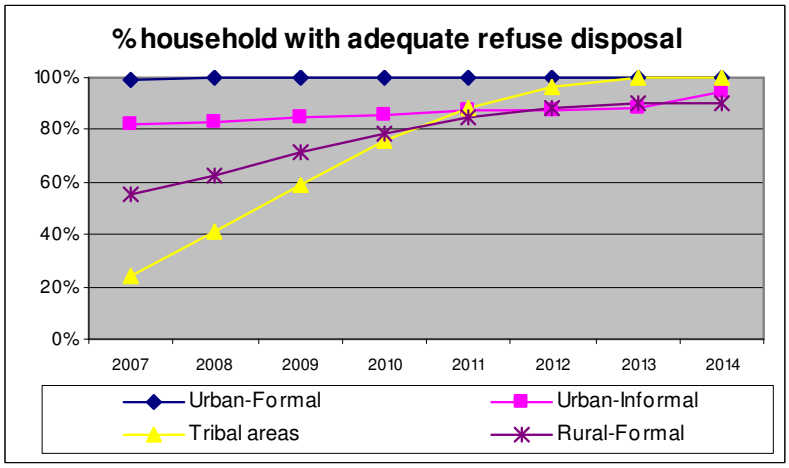

Figure 35: Residential service targets to address the backlogs in B3s

The capital expenditure associated with these targets is shown in the figure below.

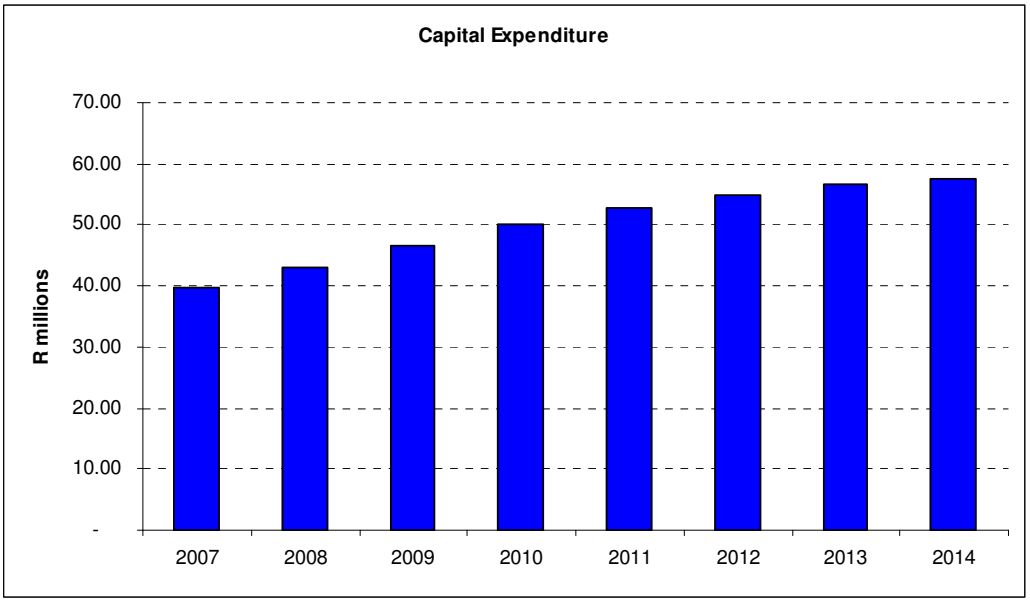

Figure 36: Capital expenditure required to address the backlogs in B3s

The required expenditure for all B3s, based on the model results, is about R50 million per year on average. This compares with an estimated R17 million currently invested annually by B3 municipalities in solid waste infrastructure. It appears that there is significant under-investment of about 66% by this category of municipality.

There is also a concern that a very small percentage, about 3% percent, of the investment currently occurring is MIG funded. It is unclear why the MIG funding in respect of solid waste appears to be bypassing B3 municipalities despite the fact that there is a need for investment in solid waste services in these areas and despite the fact that B3 municipalities are investing, albeit inadequately, in capital assets for solid waste management.

B4 Municipalities

The modelled service delivery targets for B4s are shown in the graph below.

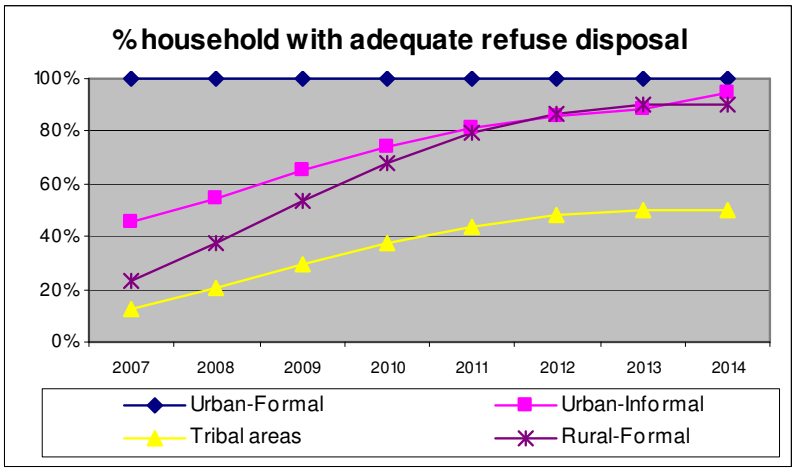

Figure 37: Residential service targets to address the backlogs in B4s

The capital expenditure associated with these targets is shown in the figure below.

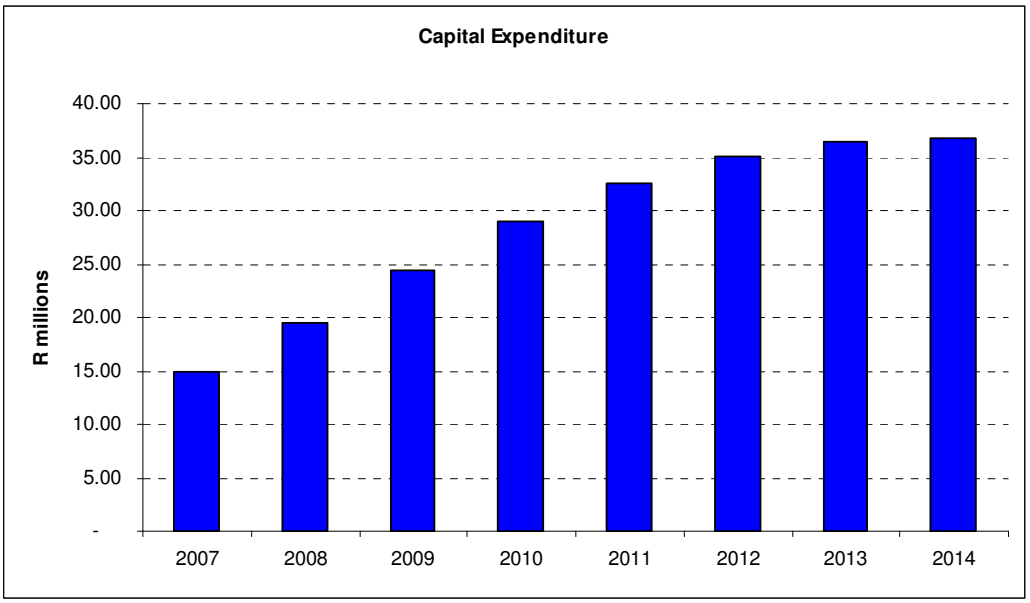

Figure 38: Capital expenditure required to address the backlogs in B4s

The required expenditure for all B4s, based on the model results, is about R29 million per year on average. This compares with an estimated R18 million currently being invested annually by B4 municipalities in solid waste infrastructure. There is somewhat of a lesser degree of confidence in this figure due to the lower (47%) response rate from this category of municipality.

It appears that there is under-investment of about 38% by this category of municipality. The degree of under-investment is smaller than that for B3s and, in part, is likely to be due to the fact that service delivery is expanding relatively slowly in these predominantly rural municipalities.

As with the B3s it appears that only a small proportion, about 16%, of capital expenditure is MIG funded in the B4s. Again, it is not clear why MIG funds are not being utilised by this municipal category. In particular, it is not clear whether the MIG funds are insufficient or too narrowly defined or whether the B4 municipalities are not accessing available grant funds for other reasons.

6 Obstacles to service delivery

In order to gain further understanding of the obstacles to service delivery a set of 'one on one' interviews were done. This process is documented in this section.

6.1 Methodology

Detailed interviews were held with solid waste managers from a representative sample of municipalities across South Africa. This sample included all metropolitan municipalities, four district and nine local municipalities (one from each province). An interview instrument was prepared to guide and standardise the interview process (Appendix A). Secondary information sources, such as Integrated Development Plans (IDP's), Integrated Waste Management Plans (IWMP's) and Waste Bylaws were reviewed so as to verify information. The following municipalities were interviewed (Table 57):

Table 57: List of municipalities interviewed

Province	***Municipality***	***Contact Person***	***Designation***
METROPOLITAN MUNICIPALITIES			
Gauteng	City of Tshwane	Mr Chris Theron	Manager: Waste Management
Gauteng	City of Johannesburg	Mr Les Venter and Mr Danie Toeke Ms Flora Matlegang	Managers: Pikitup Johannesburg Senior Specialist: Waste Policy Planning and Strategy Department
Gauteng	Ekurhuleni	Mr Mxolisi Dube	Director: Waste Management (Municipal Infrastructure Department)
KwaZulu-Natal	Ethekwini	Mr Augustine Makheta	Co-ordinator: Education (Durban Solid Waste Service Unit
Western Cape	City of Cape Town	Mr Berry Coetzee	Manager: Solid Waste Management Department
Eastern Cape	Nelson Mandela	Miss Nozuko Zamxaka	Manager: Waste Management Department
DISTRICT MUNICIPALITIES			
Western Cape	Eden	Mr Morton Hubbe	General Manager: Waste Management Department
Free State	Motheo	Mr Lebohang Lekhu	Disaster Manager: Social Development Department
Eastern Cape	O R Tambo	Mr Loyiso Nyoka	Chief Environmental Officer: Environmental Management Department
Eastern Cape	Amathole	Mr Sabelo Ngaka	Assistant Manager: Solid Waste
LOCAL MUNICIPALITIES			
Gauteng	Emfuleni	Mrs Alma Ludidi	Manager: Waste and Cemeteries Management Department
Limpopo	Elias Motsoaledi	Mrs J. Prinsloo	Environmental Health Officer: Social Development Department
Mpumalanga	Lekwa	Mr J. G. Van Wyk	Chief Environmental Health Officer: Community

Province	*Municipality*	*Contact Person*	*Designation*
			Services and Safety
KwaZuku-Natal	Ulundi	Mr Z. G. Dlamini Mr Bezedenhout	Deputy Director: Community Services Director: Engineering Department
Western Cape	George	Mr Giel Goosen	Manger: Solid Waste Department
North West	Mafikeng	Mr Kitso. Komani	Manager: Solid Waste (Community Services Directorate)
LOCAL MUNICIPALITIES			
Northern Cape	Sol Plaatjie	Mr Marius Steyn	HOD: Cleansing Services
Free State	Mangaung	Mr Thomas Tshukudu	Manager: Solid Waste Management Department
Eastern Cape	Buffalo City Municipality	Mr Zonwabele Plata	Manager: Solid Waste Management Services

6.2 Outcomes

This section documents the results and discussion of the survey process that was undertaken for the sample municipalities and aims to highlight the common trends and initiatives that are undertaken as well as to highlight the obstacles that are faced by local government in achieving service delivery for waste.

The chapter explores three different elements of capacity:

- Financial Capacity;
- Institutional Capacity; and
- Technical Capacity

6.2.1 Financial capacity

Revenue Arrangements and Operational Budgets

Most municipalities operate through the standard financial model where all collected revenue from the ratepayers is paid into a central municipal fund, which is managed by the Finance Department. Waste Departments typically access operational funding through annual budget requests through the IDP process.

Certain municipalities (e.g. George) manage waste as a separate entity and use their collections directly to manage their operations.

Key obstacles with regards to Revenue Arrangements and Budgets include:

- Tariff systems are centralised for all services and there is often little relationship between revenue collected for waste versus expenditure;
- Waste is not recognised as a priority service and typically gets allocated the left over budget after electricity, water, roads etc.;
- Waste management is not recognised as a priority service by Municipal Councils who are responsible for budget allocations;
- Top-up funding for unplanned events are unaccounted for as budgets are only reviewed annually through the IDP process;

- Budget increases do not mirror waste volumes handled. For example, the City of Johannesburg reported a 12% increase in waste volumes generated, which was well above the growth rate of the city. As such their service costs have escalated at a rate that is higher than predicted and allocated budgets are not representative of actual costs;
- Budgets are focused on the "end of pipe" waste management (collection and disposal) and little on waste minimisation and recycling;
- Not only have waste volumes increased, but as a result of changing consumer behaviour, waste streams have changed. New waste types have therefore not been budgeted for (excess packaging etc);
- The unplanned development of informal settlements adds to collection areas and waste volumes, which consume extra budgets.
- Transportation is recognised as the most expensive activity in waste management. As existing landfills are filled, new ones are constructed relatively far from urban centres and as such the extra transportation costs contribute significantly to expenditure.
- Training budgets are typically controlled by Human Resource Departments with the result that there is a focus on municipal systems and little training on technical issues.

The implications of the above factors for sustainable waste service delivery are:

- The separation of revenue from budget allocation is a standard principle of public finance and in and of itself should not be a problem with regards to waste services as long as tariffs are set appropriately to ensure cost recovery (see below). Ring-fencing of waste services is not necessarily the solution to the sustainable financing of waste services – particularly since waste management includes a number of "public good" functions. Waste management departments should be able to motivate successfully for adequate funds. The constraints related to funding may relate to the skills and capacity for waste management departments to adequately budget. The prioritisation of other services over waste services is a concern that needs to be addressed through improved awareness at the political level (Councillors) of the importance of effective solid waste management to health, safety and the environment.
- It appears that a number of structural factors that are increasing the costs of solid waste service delivery above normal inflationary costs. These include the increasing shortage of landfill space and the associated increasing transport distances for waste disposal (this will be an ongoing upward pressure on costs); changing waste streams as society gets more affluent which increases average waste volumes per households; waste growth rates greater than municipal size growth rates due to the effects of underlying economic growth; and informal settlements with high unit costs of collection. Municipalities need to be aware of these structural factors and budget accordingly as well as putting in suitable mitigation strategies – for example, as waste transport costs increase the relative economic merits of recycling also increases.
- Awareness should be created of the financial merits of waste minimisation and waste reduction as opposed to end-of-pipe solutions. Some of the waste minimisation initiatives may need to be developed at a national level (such as packaging standards).

Capex Funding

In general, municipalities fund their capital expenditure (CAPEX) through the following:

- Municipal Infrastructure Grant (MIG);
- The Department of Environmental Affairs and Tourism (DEAT) through initiatives such as the Poverty Relief Fund;
- The Development Bank of South Africa (DBSA).

Capital expenditure in terms of waste management can include the development of landfill facilities; transfer stations; vehicles; plant; IT etc.

International funding agencies such as the Swedish International Development Cooperation Agency (SIDA) and the Danish International Development Agency (DANIDA) also fund and give technical support to the municipalities for their infrastructure projects.

Key obstacles with regards to Capex funding include:

- Only a minor portion of a municipality's allocated MIG funding can be spent on waste management. Other services such as housing, electricity and water get proportionally much larger allocations.
- MIG funding cannot be spent on certain assets, such as refuse removal vehicles, that municipalities regard as capital assets. This constrains access to national funding for capital equipment for waste services.
- Capital investment in landfill sites and transfer stations is typically very "lumpy" which implies that it is difficult to finance on annual capex allocations via MIG or other facilities. Capex funding approaches for waste services therefore may require some allowance for lumpy investments and alterations in the MIG approaches to become more effective and sustainable.
- Where there is capital funding for large facilities there tends to be funding for infrastructure itself but little funding for operations of facilities.
- MIG applications require intensive administration and reporting of which the skills capacity is often lacking. As such this is typically outsourced to consultants and the application/ reporting process is divorced from the municipalities themselves.
- Donor agencies often have strict requirements in terms of the projects that they will fund. For example Buyisa-e-Bag will only fund recycling initiatives where the recycling of plastics is the focus.

Tariffs / Rates Collection

Most municipalities collect revenue for waste by means of rates. Tarrifs are usually set per household or business where there is individual title or ownership. Revenue can also be collected at disposal sites where people pay for disposal of their waste as well as through revenue generated through the selling of recyclables that have been separated out of the waste stream.

Key obstacles with regards to Tarrifs and Rates Collection include:

- Rate payment is poor, with little effective enforcement.

- There is no direct relationship between revenue collected versus expenditure for waste. (Collection tariffs are not necessarily reflective of collection and disposal costs).
- Collection tariffs are standardised and are seldom linked to waste volumes produced. The Tshwane Metropolitan Municipality has a successful system where tariffs are linked to waste volumes produced through the number of collection containers collected by the municipality, but generally in other municipalities, tariffs are not structured in such a way as to favour those who recycle and minimise their waste.
- There is no direct financial recovery of certain waste services such as, litter picking and removal of illegal dumping remains. At the City of Johannesburg, the funding for non-income generating waste services comes from the grant for social services managed by the office of the Mayor. At the eThekwini Metropolitan Municipality the costs for non-income generating services is recovered from the rates payers via the property assessment rate.
- Where District Municipalities operate Regional Waste Disposal Sites, there is no funding through rate collections as rates are typically collected by the affected Local Municipalities who are managing waste collection and transportation.
- Better tariff modelling is needed and the tools are available (PDG has done these for DEAT)
- Tariff collection is hard because it is harder to cut people off from waste services than for electricity or water – enforcement is difficult.
- Best practice is linking tariffs to volumes – for both financial and environmental reasons – but explain why hard to do – but also there are examples of best practice.
- Regional landfill sites should be self funding as far as possible from disposal tariffs – these will be passed to consumers via collection tariffs at the local municipality level. There are some arguments for capex on landfill sites to be funded from the fiscus.

Tshwane Metro has an innovation tariff system whereby tariffs are linked to waste volumes produced by the households. The municipality charges ratepayers only for the amount of waste that is collected by the municipality. The result of this has been that ratepayers are encouraged to recycle and thereby reduce the amount of waste generated.

Free Basic Services

In terms of service requirements, municipalities are obliged to collect waste from all urban households. Traditionally waste was only collected from formal households and commercial areas. People living in informal settlements have the right to basic services including waste collection. Informal settlements are typically serviced at the expense of ratepayers. All municipalities have pro-poor or indigent policies that cater for the poor people who cannot afford to pay for the municipal services.

Key obstacles with regards to financing free basic services include:

- There is no financial recovery for the waste service in informal settlements in the form of rates;

- No billing system can be established for informal settlements as there is no title or ownership structure for individual houses;
- In order to meet the basic needs for all the residents in the municipalities, the municipalities must ensure that indigent residents have access to free lifeline basic services. The indigent and pro poor policies force the municipalities to render free basic services to the people who cannot afford to pay for such services.

6.2.2 Institutional capacity

Different institutional models are adopted by municipalities with various degrees of outsourcing displayed. Outsourcing is used to augment institutional capacity where there are skills shortages, or simply resource shortages. The Nelson Mandela Metropolitan Municipality and the City of Tshwane perform the waste management function (operations) themselves and there is no outsourcing. At the City of Johannesburg the entire waste management function is outsourced to Pikitup, which is registered as a separate company.

Typically where technical skills are lacking, there is a large degree of outsourcing. This includes landfill operations, transfer station operations etc. Most municipalities simply manage the cleansing, collection, transportation and disposal of waste and the outsourcing contracts for the contractors.

In the more rural municipalities, staff compliments for waste management are very low and the management function is often shared amongst other functions such as parks and recreation management.

Here the effort is on waste collection and street cleansing, rather than other softer elements such as awareness, enforcement and waste minimisation.

Institutional Structure

In terms of institutional structure waste management is not standardised due to the multi-disciplinary nature of the science (engineering, social; transport; environmental etc.) and is often situated under various internal departments e.g.:

• Engineering	eThekweni
• Community services	Tshwane Metro, Nelson Mandela Metro, Buffalo City, Lekwa
• Infrastructure Department	Ekurhuleni
• Under two departments	City of Johannesburg and Ulundi LM

Some municipalities have separate Waste Management Departments. In some municipalities, there is a recent trend to centralise waste management under an "umbrella department" known as Environmental Management e.g. Motheo, O R Tambo

This restructuring has been initiated to accommodate the multidisciplinary nature of the science and the fact that the environmental impacts of waste management are receiving more priority.

Integrated Waste Management Planning

All of the surveyed municipalities had prepared their IWMP's and reported that they were in the implementation stage.

Key obstacles with regards to institutional capacity include:

- Where capacity is limiting, the focus of the service is on waste collection with little effort on waste awareness, enforcement and minimisation.
- There appears to be poor communication between internal municipal departments and a general lack of support from related departments.
- The lack of personnel to enforce the waste management bylaws is another challenge and even when legal action is taken against those who transgress the bylaws, the length of time involved in such cases ends renders them non-cost effective for the municipalities. The City of Tshwane however reported that their legal actions against the transgressors of the bylaws are very effective, despite lengthy delays.
- Very few municipalities have qualified waste engineers within their staff compliment. Most municipalities use consulting engineers and municipal engineers form other supporting departments.
- The lack of sufficient budget is making it difficult for most of the municipalities to fill the vacancies in their staff compliments, resulting in the municipalities having insufficient staff to perform the waste function.
- In most municipalities, the deceased personnel are not replaced and the chronically ill and elderly personnel are kept on low workload or permanent light duty.
- There are few formalised waste training programmes. Staff are given training on municipal systems etc., but very little on technical issues.
- Job hopping (where staff move posts once trained) is common practise.
- There is constant competition from the private sector in terms of retaining highly qualified staff in the waste sector.
- Staff performance appraisals are done for senior management and not for the junior and middle management. However, there are monthly action plans that are prepared by the staff and their performance is monitored through these action plans.
- Staff motivation is varied, some staff are well motivated, although there are few real incentives.
- The nature of the service is such that staff is required to work under all kinds of weather conditions which is problematic from a motivation perspective.
- Performance of staff was linked to incentives. Those workers who have the incentive of being released to go home after they finish their duties were reported to perform better than those who do not have this incentive.
- It is too difficult to discipline/dismiss workers and so managers often ignore incompetence/ laziness.

6.2.3 Technical capacity

The collection of waste in densely populated areas is a common challenge in most municipalities and therefore this type of service is usually outsourced to local communities and contractors. It was indicated by the municipalities that there is a general lack of technical expertise, such as the operation of waste handling facilities. In areas where there is lack of capacity, the municipalities outsource these to private companies. Most municipalities have contracts managers who manage the service level agreements with the contractors.

Cleansing

Cleansing includes street sweeping, litter picking and the general cleaning of public areas and clearing of illegal dumps. All municipalities perform this function to varying degrees since it is labour intensive and requires a low level of skill and resources.

Key obstacles with regards to cleansing include:

- Costs of street cleansing are not directly recoverable and are typically billed as a flat rate which is incorporated into rates or collection tariffs;
- The cleansing of illegal dumping and littering has been identified as a challenge requiring significant time and budget in the municipalities,
- Cleansing streets during the day is a challenge due to traffic and congestion. Cleansing teams therefore have to resort to sweeping and cleaning streets after business hours and sometimes until late at night, which jeopardises the safety of workers.

Waste Minimisation

With the change in focus from "end of pipe" waste management (waste disposal and treatment), There has been a national government drive through the National Waste Management Strategy to focus on waste minimisation as displayed in the waste management hierarchy:

Waste Hierarchy		
Cleaner Production	Prevention	
	Minimisation	
Recycling	Re-Use	
	Recovery	
	Composting	
Treatment	Physical	
	Chemical	
	Destruction	
Disposal	Landfill	

The waste hierarchy focuses on ***cleaner production*** as a primary objective, followed by ***recycling, treatment and as a last priority disposal***

Table 58: Steps in Waste Hierarchy "Extract from NWMS Version D 15 October 1999"

Waste minimisation includes re-use, recycling as well as cleaner production. In terms of providing a service municipalities are required to create the environment to promote waste minimisation. This can be achieved by:

- Undertaking waste awareness campaigns;
- Promoting recycling through programmes, incentives etc.; and
- Providing the infrastructure to accommodate recycling/ or waste separation.

There has been a marked increase in informal recycling where informal recyclers are removing recyclables (cardboard, bottles, tins etc) out of collection bags/ containers prioir to collection by municipalities. Pikitup in the City of Joburg reported that up to 40% of the waste stream is reduced by informal recycling.

Key obstacles with regards to waste minimisation include:

- Recycling tends to only be successful in larger urban centres where there are competitive markets for recyclable materials;
- There are no real incentives for communities to participate in recycling initiatives (reduced rates; financial returns etc.). The City of Tshwane that reported that the resident community members are motivated to sort their waste at source, because they are charged for the amount of waste that is collected by the municipality. They therefore separate their recyclables, which are collected independently by the private sector. This method has been shown to work well with the businesses.
- Two-bag systems have failed because:
    - There was poor training for residents in terms of awareness.
    - There was poor success in terms of bag distribution (e.g. theft).
    - Collection rounds were doubled has the same vehicles and collection teams had to collect recyclables on additional trips. The George Municipality had reportedly operated a two-bag collection system with success as they had outsourced the collection of the recyclables to the private sector. Ordinary collection by the municipality was therefore not disrupted.
- There is often limited infrastructure (e.g. buy back centres, drop off centres, receptacles etc.) within municipalities encouraging public recycling.
- Recycling markets are largely volatile and are controlled by dominant industries (e.g. Sappi/ Mondi).
- There is a lack of national subsidies supporting recycling.
- There are no green procurement policies implemented by national government.
- There is a lack of ability to determine the true financial saving through recycling.

In the **Overstrand municipality** recycling at source takes place in: Hermanus, Betty's Bay, Rooiels and Pringle Bay. A clear refuse bag is issued to every household, together with an information pamphlet and fridge magnet, explaining what and how to do. In exchange for a clear bag, a bag full of recycle material should be provided by the home owner. These recycling materials are taken to a private centre in Hermanus, Walker Bay Recycling (WBR), where it is sorted, bound and transported to markets. The recycling at source project enables ±5 people to make a sustainable living. Overstrand Municipality is providing the recyclable material (clear bags) to them at no cost and the waste is sold to WBR by the community.

The Management of transfer stations in Overstrand is done by the Municipality itself after consultation with unions and staff members and more people were provided with sustainable job opportunities by doing informal recycling at the transfer station, in Hermanus in an organized way. All these innovations and programmes in the management of solid waste in Overstrand, are a success because the communities are directly involved and are seen as a partner in the management of solid waste in Overstrand.

The **eThekwini Metro** has a community programme called the Clean Community System (CCS). This system involves educating and mobilising the community to address waste issues. The fundamental principle of this programme is that it is community driven. The CCS has been operated by the education section of eThekwini's solid waste department and has recorded a 80 % reduction in litter over the programmes life-span (25 years).

Waste Collection

The long-term objective of the general waste collection component of the NWMS is to provide sustainable, affordable, and environmentally friendly acceptable general waste collection services to all people in South Africa. Waste collection has always been the focus of the waste service provided by municipalities. In terms of the metropolitan municipalities a waste collection service is provided to all urban households including informal settlements. Rural areas are poorly serviced although some municipalities are planning to extend their collection service to rural areas.

> *"The proportion for waste which remains uncollected is increasing and in South Africa it is estimated that in excess of 20 million people, mostly in rural and informal peri-urban and urban communities, do not receive acceptable waste management services,"* NWMS 1999.

Key obstacles with regards to waste collection include:

- Collection systems: Kerbside collection is feasible and practical in established urban townships with infrastructure but is not appropriate in rural and informal settlements.
- Collection in informal settlements is hampered by poor access and lack of roads within the settlements themselves. As such, conventional collection vehicles (compactors) cannot access individual households and therefore providing an individual household service in these areas is impossible. Furthermore the lack of title and ownership of property restricts municipalities' collection budgets, as rates are not collected in these areas.

- Collection in rural areas is constrained by both poor road access and collection distances, which make collection in rural areas difficult due to excessively high transportation costs.
- Although most municipalities supply conventional black bags, they are of poor quality and have problems in terms of compaction on landfill sites as they do not breakdown easily and trap air which takes up airspace.
- There is no standard as to the number of black bags/ collection vessels that are allocated.
- There is a trend for municipalities to use wheelie bins for household collection. This however has its own form of challenges as they requires specialised handling equipment, regular washing and slow collection times.
- Collection in central business districts is constrained by lack of space due to increased pedestrian activity on pavements and informal traders etc. There is therefore a lack of space for conventional collection containers and alternative more expensive options (subsurface storage bins) are being investigated (Pikitup pers. comm.).
- The success of collection frequencies is largely determined by the availability and condition of collection vehicles.

Where access is limited to the municipal waste collection vehicles, such as in informal settlements, the **City of Cape Town** uses closed top, lock up containers in the informal settlements, where the local communities are responsible for disposing their wastes into these containers. These containers are kept locked until the municipality comes to collect the waste.

Waste Transportation

Waste transportation is well recognised as being the most costly component of the waste management function. Waste management is transport intensive with many different types of vehicles required to perform the function successfully.

As new landfills are developed, which are typically distant from collection areas, transportation costs are increased as well as collection times which directly impacts on the quality of the service, if collection vehicles are used for haulage. As such transfer stations are typically required where waste is transferred into more conventional bulk transport carriers.

Key obstacles with regards to waste transportation include:

- The capital outlay for a compactor (conventional collection truck) is high and as a result some rural municipalities collect waste in inefficient collection vehicles such as tractor-trailer combinations.
- Transportation is a volatile industry aggravated by volatile fuel prices.
- Municipalities seldom have back-up or standby vehicles to replace those that are out-of-order.
- Most municipal waste collection vehicles are old (greater than ten years) and as a result they are often out of order. This affects the frequency and consistency of waste collection. Collection vehicles in Tshwane are privately owned and maintained to which the municipality contract on a five year period. As a result the vehicles are generally new and well maintained which makes their collection service more reliable and efficient. =Most of the

municipalities have purchased new vehicles during the last financial year, but they have no active vehicle rotation plan in place.

- Round balancing studies are seldom undertaken to determine optimisation of collection rounds and hence reduction in transportation costs.
- It is also important to flag transport and transport distances as a key structural factor that will affect the future sustainability of waste management services.

Waste Disposal

Waste disposal is where most environmental impacts occur and where there has been much abuse in the past with few landfill sites operating in compliance to the DWAF Minimum Requirements (See section 1.12). The safe disposal of waste requires all elements of capacity including:

- Adequate infrastructure – correctly designed and constructed landfill sites; compaction vehicles etc.
- Adequate personnel – engineering skills, operation skills, management and financial skills etc.
- Adequate financial resources – Operating landfill sites are costly and require sufficient budgets for both capital expenditure and operations.

South Africa has over 2000 waste handling facilities, of which only 530 are permitted, (statistics taken from a list of permits issued by DWAF from 1991 to 2005). This represents a major challenge for government in to ensure that waste is disposed of safely in correctly designed landfill facilities. Most sites within the metropolitan municipalities are permitted.

It is however national governments drive to reduce waste to landfill and hence the Polokwane Declaration was set. Municipalities are therefore required to plan for zero waste to landfill.

Key obstacles with regards to waste disposal include:

- Costs of constructing new landfill sites according to Minimum Requirements are high and are well beyond Capex budgets of some municipalities.
- Rehabilitation and closure of illegal dumpsites is costly and requires complex engineering activities.
- Many rural municipalities are dumping waste in illegal dump sites such as old quarries and borrow pits. This has severe health and environmental implications.
- Available airspace on existing facilities is diminishing due to increased waste volumes. As such, new sites are required and tend to be distant from waste collection areas. This can have a dramatic effect on the costs of the waste service.
- Public access to landfill sites is often difficult due to far distances, restricted operating hours etc., resulting in illegal dumping of waste within suburbs.
- Complex land acquisition procedures make the identification for new sites a lengthy and tedious process.

- The permitting requirements for landfill facilities are stringent and require a high level of engineering skills.
- Few municipalities are planning ahead for new landfill sites in the future.
- Insufficient landfill operating budgets result in inefficient operations and maintenance on sites. Increased crime and vandalism further exacerbates the situation.
- There is no capacity for compliance monitoring and enforcement by the provincial environmental departments.

6.2.4 Support from National and Provincial Government

Both provincial and national government are required to support and capacitate local government to ensure sustainable service delivery. Traditionally, this has been in the form of providing policy and legislation. Recently there has been a shift in focus and provincial and national authorities are providing more active roles in providing funding for waste projects as well as in conducting awareness campaigns and training programmes etc.

Key obstacles in terms of support from national and provincial government include:

- There is an unclear understanding of roles and responsibilities resulting in duplication of effort in certain activities;
- Local municipalities have little interaction with DEAT, interacting only with their respective provincial environmental departments. Some municipality reported that the first interaction with DEAT was through the public participation process for the Waste Management Bill;
- Not all provincial environmental departments have dedicated waste representatives;
- Environmental approvals (permits and EIA's) for waste facilities are often slow and inappropriately planned for, resulting in poor service delivery in terms of infrastructure establishment.
- With the transfer of permitting function from DWAF to DEAT, DEAT are under-capacitated with many of the provincial environmental departments having no capacity at all in order to process permits.

6.2.5 Priority Challenges

The sampled municipalities raised the following priority challenges that require urgent attention to augment capacity to ensure sustainable service delivery:

1. Budget restrictions.
2. Imbalance between income and expenditure.
3. Funding for non-income generating and zero-rated tariff services.
4. Illegal Dumping.
5. Basic services backlogs (unplanned population growth/ influx and changing and increasing waste streams).
6. Insufficient public awareness.
7. Unsatisfactory levels of recycling.
8. Lack of effective/ enforced bylaws.

9. Supply chain management systems and contract management.
10. Insufficient support from internal support departments and poor internal communication within municipalities.
11. Lack of redeployment policy for the chronically ill and elderly personnel (resulting in a number of employees on permanent light duty).
12. Skills development and training.
13. Inconsistency and reliability of waste service due to outdated equipment.

7 Sustainable waste service delivery

The obstacles presented in Section 6 are not unique to South Africa and are common to most developing countries. This chapter presents some of the key focus areas to ensure sustainable waste service delivery.

Traditional municipal service delivery around waste management has not recognised the need to provide proactive programmes and incentives to the public that can satisfy the urgent need to generate less waste. The long term core problem should be recognized and accepted: Too much waste is generated in the first place due to inefficient industrial production, wastefully designed products and over consumption.

The existing municipal waste operation model is historically based on 'end of pipe' waste functions such as collection, transport, disposal and cleansing. With this model it is extremely difficult to budget for waste minimisation programmes. Sustainable waste management should focus at the source of waste rather than this end-of pipe approach. This requires a fundamental change in mind set from all role players including all levels of government, industry and the general public and outlines the long term objective of a sustainable waste service delivery system.

At the same time municipalities will have to also deliver "traditional" waste services for some time to come and there are a range of interventions that could assist in making this service delivery more sustainable in the short and medium term. Recommendations in this regards are raised below.

7.1 Institutional interventions

On an institutional level interventions can be from both a municipal and national level.

7.1.1 At the municipal level

The primary obstacle to a sustainable waste management service at a municipal level is the lack of 'in house' capacity to run the service in an efficient and effective manner as well as the lack of knowledge to move the service from an 'end of pipe' scenario to a waste minimization approach. The primary intervention that is recommended in this vein is the strengthening of municipal capacity. Firstly provide the necessary skills to allow the estimation and analysis of costs to improve efficiency of the solid waste service and increase private investment where appropriate. Secondly the strengthening of monitoring capacity is required to allow municipalities to be in a position to align with international best practice with regards to technical and performance standards. Finally, the training of staff to provide competent management of the solid waste service is essential.

To augment to waste minimization approach cooperation is required between the waste producers and the local municipalities. Bylaws can be established to reinforce this association with emphasis being placed on:

- waste reduction,
- recycling,
- appropriate disposal of waste,
- use of recycled material, and
- paying for waste produced.

7.1.2 At the provincial and national government

The provincial and national government should act in a supportive and complementary role to the local municipalities. This can be achieved by:

- The development of policy guidance on private sector participation and cost recovery, to enable municipal managers to take necessary political steps;
- Developing legal deterrents against illegal dumping of wastes and the use of open dumps, coupled with adequate capacity for enforcement; and
- The development of guidance and standards for segregation, storage, treatment, and disposal of each category of waste.

7.2 Financial interventions

The following focus areas should be targeted to ensure sustainable waste service delivery:

- Implementation of full cost accounting services for all municipalities such that they can account for all costs and expenditures for waste operations and maintenance. This should cover collection, transportation, landfill, street cleansing, fee collection, debt payment and depreciation at a minimum.
- This will enable municipalities to:
    - Plan more accurate budgets;
    - Set realistic tariff charges and rates; and
    - Collect more revenue.
- Reducing operational costs via:
    - Reducing surplus workforce;
    - Reviewing routes for collection, street sweeping;
    - Performing vehicle optimisation studies; and
    - Utilising the private sector through public-private partnerships

7.3 Technical interventions

The technical interventions are directed at moving away from seeing waste as solely a disposal issue but to viewing it as providing opportunities for income generation at a municipal, community and household level. This can be done in a variety of ways. For the householder savings can be realized by producing less waste and recycling if the solid waste tariff is based on the quantity of household waste produced. Recycling at a household level can also be encouraged by providing for the collection of recyclables from the household. On a community level, local community contractors should be encouraged to sort the waste at transfer stations, before it

reaches the landfill, and then selling the waste to companies that will use them. Composting, on a community and household level, should be carried out especially in areas where waste collection is difficult due to geographical location.

7.4 Service delivery

In moving towards a sustainable solid waste service the question of 'level of service' becomes an imperative one. By promoting recycling and composting the need for the weekly kerbside removal of refuse becomes redundant. This is particularly the case for the rural and geographically remote areas where providing a weekly kerbside service would result in exorbitant transport costs. In these cases communal dumpsites, composting and recycling should be encouraged.

In terms of addressing the backlogs so as to provide the majority of the people of South Africa with a sustainable solid waste service it is recommended that the backlogs in the Metros and secondary cities be addressed first as they account for 54 % of the total backlog in the country. The cost of addressing these backlogs will be less than addressing the backlog in other smaller and predominantly rural areas where waste transport costs will be prohibitive resulting in an unsustainable service.

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Appendix A
Questionnaire