Table 2-2: Calculated Volumes of Recovery of Source Separated Materials

Main Town	Sub-area	Participating Waste (t/a)	PAPER/ CARD (t/a)	PLASTICS (t/a)	GLASS (t/a)	METAL (t/a)
Betty's Bay	-	204.85	8.60	1.60	5.41	0.82
Betty's Bay	Klipkop	58.10	2.44	0.45	1.53	0.23
Betty's Bay	Sunny Seas Estates	91.82	3.86	0.72	2.42	0.37
Danger Point	Birkenhead	23.06	0.97	0.18	0.61	0.09
Eluxolweni	-	14.66	0.62	0.11	0.39	0.06
Fisherhaven	Lake Marina	440.48	18.50	3.44	11.63	1.76
Franskraalstrand	-	766.57	32.20	5.98	20.24	3.07
Gansbaai	-	461.17	19.37	3.60	12.17	1.84
Gansbaai	Blompark	300.01	12.60	2.34	7.92	1.20
Gansbaai	Die Kelders	890.28	37.39	6.94	23.50	3.56
Gansbaai	Gansbaai	42.33	1.78	0.33	1.12	0.17
Gansbaai	Groenewaldskema	99.88	4.19	0.78	2.64	0.40
Gansbaai	Perlemoenbaai	236.96	9.95	1.85	6.26	0.95
Hawston	-	1931.16	81.11	15.06	50.98	7.72
Hermanus	-	2585.87	108.61	20.17	68.27	10.34
Hermanus	Mount Pleasant	1253.48	52.65	9.78	33.09	5.01
Hermanus	Voelklip	1059.39	44.49	8.26	27.97	4.24
Highlands State Forest	-	4.79	0.20	0.04	0.13	0.02
Kleinbaai	-	141.51	5.94	1.10	3.74	0.57
Kleinmond	-	3565.22	149.74	27.81	94.12	14.26
Kleinmond	Protea	4.56	0.19	0.04	0.12	0.02
Kogelberg State Forest	-	20.25	0.85	0.16	0.53	0.08
Masakhane	-	101.99	4.28	0.80	2.69	0.41
Onrusrivier	-	2131.48	89.52	16.63	56.27	8.53
Onrusrivier	Vermont	1357.03	57.00	10.58	35.83	5.43
Pearly Beach	-	307.17	12.90	2.40	8.11	1.23
Pringle Bay	-	534.16	22.43	4.17	14.10	2.14
Rooi Els	-	51.46	2.16	0.40	1.36	0.21
Sandbaai	-	1868.31	78.47	14.57	49.32	7.47
Silver Sands	-	324.15	13.61	2.53	8.56	1.30
Stanford	-	1123.19	47.17	8.76	29.65	4.49
Van Dyksbaai	-	193.96	8.15	1.51	5.12	0.78
Zwelihle	-	790.86	33.22	6.17	20.88	3.16
Total		**22980.18**	**965.17**	**179.25**	**606.68**	**91.92**

Assumptions for Source Separation: *85% participation*
(Based on actual data from WastePlan) *21% recovery of available Paper and Cardboard*
6% recovery of available Plastics
44% recovery of available Glass
10% recovery of available Metals

The above “realistic” volumes can be increased when additional facilities such as buy-back centres are commissioned in low and very low income group communities.

With the current source separation activities in the Overstrand and the salvaging at the Hermanus and Gansbaai Transfer Stations, the following materials are currently recovered. These quantities include the “buy-back” quantities salvaged by Walker Bay Recycling:

Table 2-3: Current Actual Volumes of Recovery

Recovery Activity	PAPER/CARD (t/a)	PLASTICS (t/a)	GLASS (t/a)	METAL (t/a)
Gansbaai MRF	23.41	12.45	12.97	26.88
Hermanus MRF	573.55	158.43	421.51	88.71
Walker Bay Recycling	226.48	199.68	47.36	952.39
TOTALS	**823.44**	**370.55**	**481.84**	**1067.98**

From Table 2-3 it is clear that the current recovery activities achieve close to the achievable volumes as in Table 2-2. What boosts the plastic and metal recovery volumes is the fact that Walker Bay Recycling buys back recyclables for recovery from the public and do not only sort waste from the collected municipal waste stream.

2.1.3.1 Paper and Cardboard

Paper and Cardboard form the foundation for any recovery venture, due to the relative stable demand and numerous recycled products made from recovered paper.

Waste paper is transformed from one type to another during the recycling process. The supply and demand for waste paper, although stable, is cyclical in nature, and therefore marketing patterns have to be adapted accordingly.

Some of the factors that contribute to this cyclical demand for recovered paper are:

- difficulty for mills to carry large stock
- periodic mill shut-downs result in fluctuations in demand
- paper stock is considered perishable and thus hazardous to store
- space for storage of stock is limited and costly

Some materials produced with recycled paper pulp include: newspapers, packaging, bags, tissue and towels, corrugated boxes, shoe boxes and files, egg cartons and fruit packing layers.

If paper and cardboard products are clean and separated into different types, significantly higher prices are fetched for the recovered materials.

2.1.3.2 Glass

Glass recovery for recycling has had a very erratic history, due to only one recycler having a monopoly in the market. When the capacity of the kilns is full, the price used to drop dramatically due to an over-supply and no demand. Fortunately this situation has stabilized and a constant market for recovered glass is currently prevailing.

The separation of glass is very successful in separation at source activities since it is easy to identify by the home owners. Recent experience in the City of Cape Town has shown that most home owners whom participate in separation at source also wash their glass products before putting it in the recyclables bag.

2.1.3.3 Plastic

Several types of plastics are typically recycled, i.e. PET (transparent plastic bottles e.g. 2 litre cool drink bottles), HDPE (milk containers), LDPE and mixed plastics. Recycled PET is used in the manufacture of small moulded products, such as handles, sporting goods and furniture. Recycled HDPE is used for producing flowerpots, dustbins and a variety of other containers. Mixed plastics are normally used for the manufacture of outdoor furniture, pallets, and plastic timber.

The recent introduction of a levy on shopping bags has caused the amounts arriving at the landfill to reduce dramatically. Less plastic bags are disposed of, as they are recovered and are now manufactured of better quality and thicker plastic.

In order to recycle plastics using current traditional methodology, it has to be sorted into the various categories, and washed if contaminated by the other wastes. Alternative technologies are currently being evaluated (also in South Africa) that could eliminate the need for sorting of plastics.

2.1.3.4 Metal

Metals are the single most recoverable item in the waste stream. Very little degradation takes place during collection. It follows that a relatively small amount ends up in the waste stream, as all types of metal are removed for re-sale at various stages of the waste handling process.

One of the major components of ferrous wastes is the steel can (95% of all cans in the Metropolitan Areas). Non-ferrous metals such as Aluminium and Copper are very scarce in our waste streams, due to its extremely high salvaging value. These are usually removed at source. This is evident from the above Table 2-3 which shows the small average amount of metals in the collected waste stream (Hermanus ans Gansbaai MRFs) and the high volume which is sold to Walker Bay Recycling.

2.1.3.5 Economic Sustainability of Waste Recovery

Although the recovery of materials of value from the waste stream for recycling or re-use is one of the basic operations in future integrated waste management, the question regarding its financial and economical sustainability should always be asked and answered.

Local experience over the last decade has shown that the South African recycling market, or rather the recycled product market, is very small and very susceptible to unforeseen activities, e.g. if one paper mill burns down, the effect on the waste paper market, and the prices, is significant. The South African “market” is simply too small to absorb these types of set-backs.

For this reason it is commendable that DEA&DP had a study conducted into sustaining the local recycling industry.

But one must consider the economical sustainability and not only the financial sustainability. Economic sustainability considers the whole life-cycle cost and not only the rands and cents of a specific financial year and taking into consideration the avoided costs of airspace saving and also the cost on the environment for the resultant smaller utilisation of virgin resources. An interesting stipulation in the Waste Act, Section 17 (1) (a), is that one may not recover materials from waste if it costs more environmental resources to recover, than it would to dispose of that material – a good example of the total or life-cycle costing principle.

Prices for recovered materials vary greatly from city to city and province to province, from baled to unbaled, from dirty to clean and from material type. External factors also play a significant role such as the oil price, e.g. due to a previous low crude oil price of approximately US$43 per barrel had caused new plastic to be cheaper than recycled plastic – cheaper, not necessarily more economical. The result was that recyclers could at that moment (January 2009) not even give their LDPE plastic away where only a month before it was sold for R1500/tonne.

The above does not imply or insinuate that recovery should not be supported, but that both recovery AND the establishment of a recycled goods market should be supported. A fine example is the fact that Overstrand Municipality bought street litter bins produced from recycled plastic, thereby supporting the recycled goods market.

Benefits must also be shared. For example, if a municipality saves airspace due to recovery, portion of that saving (avoided costs) should be passed on to the recovery effort to ensure that it is sustainable. If not, as was proven in SA previously, the recovery effort closes down and the municipality loses its avoided cost saving.

The June 2011 prices for recovered materials delivered in Cape Town are displayed in Table 2-4

Table 2-4: **June 2011 Prices of Recovered Materials in Waste Stream**

MATERIAL	PRICE IN RAND/TON FOR BALED MATERIAL
Card board	750
White Paper	1200
Newsprint	600
Glossy Paper	450
Mixed Paper	500
Metals (Mainly cans)	1600
Glass (All colours, Crushed)	400
Plastic (PET, No 1)	2200
Plastic (HDPE, No 2)	2200
Plastic (LDPE, No 4)	1800
Plastic (Polypropylene, No 5)	2000
Plastic (Polystyrene, No 6)	1300

2.1.3.6 Special Waste Streams

2.1.3.6.1 Tyres

In accordance with the recently published Tyre Regulations the disposal of tyres to landfill in its current format is only allowed up to June 2011, where after all tyres that are landfilled, must be quartered. After June 2014 no tyres, quartered or otherwise, may be landfilled. The municipality will have to develop an action plan in accordance with the Tyre Regulations to manage tyres generated within the municipal area.

2.1.3.6.2 Waste Oils

Two service stations in Hermanus are accepting used oils for recovery.

2.1.3.6.3 Household Hazardous Waste

At the Kleinmond and Hermanus Transfer Stations special bins are available for the disposal of household hazardous wastes. The transport contractor that transports the waste to the Landfill, Enviroserv, empties these containers when full and transports these hazardous wastes to the licensed hazardous waste landfill near Vissershok, Cape Town, called the Vissershok Waste Management Facility.

Experience has shown that household hazardous wastes comprises up to 2% of the total General Waste stream, i.e. up to some 20 tonnes per week for the whole of Overstrand Municipality. Most of that is currently going to landfill.

2.1.3.6.4 E-Waste

No accurate data of the generation of E-waste (electronic waste) exists, but surveys in other metropolitan municipalities have shown that E-waste makes up 2% to 4% of the total waste stream. Currently this waste type is disposed with the general waste. E-waste generation in Overstrand Municipality, as a rural municipality, could therefore be anticipated to be up to a maximum of 2% or 20 tonnes per week.

2.1.3.6.5 Household Health Care Waste

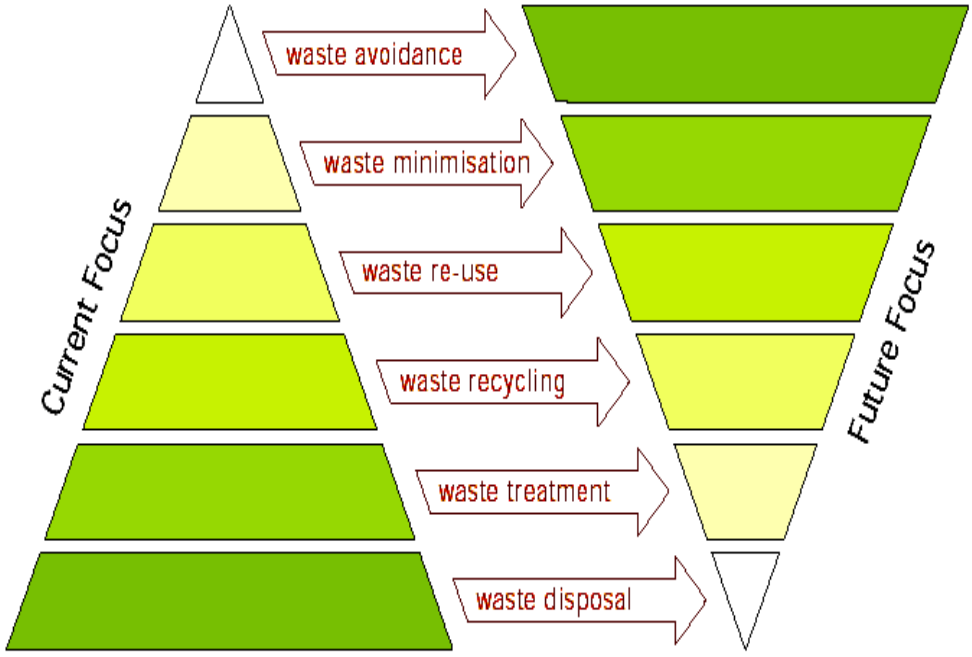
No accurate data exists on the volume of Household Health Care Wastes, as these wastes are currently collected and disposed with the general waste.

2.2 WASTE AVOIDANCE

2.2.1 Waste Avoidance Background

Various waste reduction efforts are being practised in Overstrand as referred to elsewhere in this Plan, but the ideal is to avoid the generation of waste in the first place.

The following diagram illustrates a simplified version of the well-known waste hierarchy with Avoidance being the most favourable and Disposal the least favourable:



Waste avoidance refers to a pro-active approach by industrial as well as domestic waste producers to minimize the volume of waste, by not creating the waste in the first place.

Waste avoidance is a “beginning of the pipe” action that can only work when people understand the full process depicted above.

At the moment waste minimisation through recovery is considered a priority in South Africa. Once that can be successfully implemented and the people are educated of the importance of waste reduction, can recovery at source be implemented with a reasonable chance of success. Overstrand Municipality has already embarked on the route of source separation and the communities within the municipality are continually being educated with respect to waste reduction.

Waste avoidance will be the ultimate and final step in this education process.

On a governmental / legislative level, the introduction of a levy on plastic shopping bags has spurred the production of alternative types of bags, which are re-useable and therefore avoiding the cheap and nasty waste bag that ends up littering our surroundings.

In the home, waste avoidance can be practiced by similar efforts where items are used for different purposes that the original intent, possibly suggesting that one purchases alternative products to the norm. Home composting is also considered waste avoidance, as the waste material is converted into a useful gardening resource whilst avoiding the raw product entering the waste stream.

In South Africa, resource and disposal costs are relatively low, providing no or little financial incentive to reduce consumption or waste in industry. It follows that regulatory instruments are required for implementation on a Municipal level to govern the avoidance of industrial waste in Overstrand.

European governments often offer incentives / penalties to force the implementation of waste avoidance, and it is suggested that similar economic instruments be implemented in due course in Overstrand ("pay-as-you-throw" principle).

Regular audits should be conducted by an independent entity on the avoidance practices, to form a basis for applying incentives / penalties.

An important tool for monitoring purposes is a proper Waste Information System (WIS). The DEA&DP is in the final stages of the development of the Integrated Pollution and Waste Information System (IPWIS) and once deployed, the Municipality should make use of this system.

Without a doubt, waste avoidance will become a real and encouraged issue in South Africa in the near future, and must be addressed in any Municipal Waste Strategy.

2.3 COLLECTION SYSTEMS

2.3.1 Municipal Waste Collection Systems

Overstrand Municipality has been partitioned into various service areas, i.e. Greater Kleinmond (Kleinmond to Rooi-Els), Greater Hermanus (Voëlklip to Fishershaven), Stanford and surrounding area and Greater Gansbaai (De Kelders to Pearly Beach). Each of these service areas has its own resources for waste collection and waste management.

A summary of the current fleet of collection vehicles in Overstrand is listed in Table 2-5, Table 2-6, Table 2-7 and Table 2-8. A complete list with details of each vehicle is included as **Annexure A**.

Collection vehicles should ideally not be operated beyond 7 to 8 years in age since the maintenance costs increase dramatically with age. From the above-listed tables it is clear that the average age of Overstrand's collection vehicles are 7 years for the Stanford area, 13 years for the Greater Hermanus area, 8.3 years for the Greater Kleinmond area and 8.2 years for the Greater Gansbaai area, indicating the need for fleet replacement in all areas except Stanford.

Another interesting statistic that can be calculated from the above-listed tables is the average increase in seasonal waste volumes. At first glance, these percentages do not seem correlate with the waste data from the weighbridges and reflect a much larger seasonal increase. The reason for this is that the increase shown by the vehicles is based on the increase of the number of trips necessary per day, which directly relates to volume. The weighbridge data is based on actual received weight. Holidaymakers' waste mainly consists of bulky materials like packaging and plastic bottles which are also highly recoverable.

A waste collection service is provided by the municipality for all residents in urban areas. **All formal residential erven are receiving a weekly door-to-door collection service**. The municipality also collects source separated materials in all service areas.

One aspect of waste collection in Overstrand that deserves special mention, although not unique, is the fact that certain collection areas have a high susceptibility to baboon attacks. In these areas, property owners must purchase baboon-proof domestic waste containers from the municipality. The domestic waste containers consist of green 240l wheelie bins with a spring loaded baboon proof clip. Approximately 80% of the properties in these areas use these containers for domestic use.

Table 2-5: Summary of Collection Vehicles in Greater Hermanus

Registration Number	CEM 6932	CEM 11377	CEM 31896	CEM 23618	CEM 17262	CEM 26262	CEM 13034	CEM 17727
Driver	A SCHUMANE	M NOFEMELE	D PLAATJIES	E SEPTEMBER	N HENDRIKS	L MAJAVU	E BRITS	A HANSEN
No of Labourers	6	6	6	6	5	5	5	0
Model	NISSAN UD 80	NISSAN DIESEL UD 80	NISSAN DIESEL CM 90	NISSAN DIESEL UD80	MASSEY FERGUSON 240	NISSAN DIESEL CABSTAR 3.5	NISSAN DIESEL CABSTAR 3.5	NISSAN HARDBODY 1600
Description	COMPACTOR	COMPACTOR	COMPACTOR	COMPACTOR	TRACTOR TRAILER	CAGED TIPPER	CAGED TIPPER	LDV
Year	1998	1999	-	2003	1994	2004	1995	2000
Odo Reading	188284	127309	174392	101639	7246	60340	202582	107156
Volume Capacity	18	18	18	18	5.6	25	25	0
Payload (t)	8	8	8	8	1	3	3	0.5
Out of season weekly volume	108	207	297	234	140	205.8	737.5	0
In season weekly volume	360	333	396	369	0	662.5	787.5	0
Seasonal increase	233%	61%	33%	58%	-100%	222%	7%	0%

Table 2-6: Summary of Collection Vehicles in Greater Kleinmond

Registration Number	CAM 9879	CAM 20080	CAM 1685	CEM 5372	CAM 8739	CAM 7067	CAM 15874	CEM 14080	CAM 13042	CAM 12125	CAM 15898	CAM 18031	CAM 18046	CAM 10971	CEM 31898	CEM 17431	CEM 26897
Driver	D BAARDMAN	J THEUNISSEN	R APPEL	D HENDRICKS	P GALANT	A HELESI	S MADO	D CRONJE	G VAN NIEKERK	K ADONIS	E AUGUST	C MITCHELL	J REX	JAN MOJAKI	W KARELSE	B BOOYSEN	A FLORIS
No of Labourers	5	6	2	5	2	4	6	5	3	3	2	2	2	4	5	4	2
Model	MERCEDES ATEGO 1517	NISSAN CABSTAR UD 35	TOYOTA HILUX 1800	NISSAN CABSTAR UD 35	HYUNDAI 2.6	MERCEDES ECOLINER 1014	NISSAN CABSTAR UD 35	ISUZU NPR 300	NISSAN HARD BODY 2.7 LWB	NISSAN HARD BODY 2.0	NISSAN 2.0 LWB	LANDINI R 7860	FORD COURIER	NISSAN CABSTAR UD 35	NISSAN UD 40	NISSAN	NISSAN HARD BODY 2.0
Description	COMPACTOR	CAGED TIPPER	LDV	FLATBED	CAGED LDV	CAGED TIPPER	CAGED TIPPER	CAGED TIPPER	LDV	LDV	CAGED LDV	TRACTOR	CAGED LDV	CAGED TIPPER	CAGED TIPPER	COMPACTOR	WITH CANOPY
Year	1999	2004		2012	1999	1998	2003	2006	2002	2007	2003		1994	2002		2011	2012
Odo Reading	183800								247454	184321				122634	36852		
Volume Capacity	15.4	12.27	2.7	12.27	6.6	18.4	12.27	12.77	3.86	3.36	2.76		3	12.43	12.43	15.4	3.86
Payload (t)	5	3	1	3	1.5	5	3	3	1	1	1		1	3	3	5	1
Out of season weekly volume	192.5	66.885	36.72	46.875	23.1	73.6	110.43	31.925	28.88	20.16	16.56	24	15	49.72	49.72		
In season weekly volume	261.8	210.21	156.06	206.25	92.4	386.4	196.32	140.47	115.52	104.16	104.88	129.6	105	323.18	323.18	169.4	30.88
Seasonal increase	36%	214%	325%	340%	300%	425%	78%	340%	300%	417%	533%	440%	600%	550%	550%		

Table 2-7: Summary of Collection Vehicles in Greater Gansbaai

Registration Number	CEM 30749	CEM 23347	CEM 17013	CEM 110	CEM 5748	CEM 26365
Driver	S NDAMBAMBI	B KONDOKTER	M KUTU		KUTU	VARIOUS
No of Labourers	5	5	5	5	5	0
Model	Nissan Diesel UD 90	Nissan Diesel UD 90	Nissan Diesel UD 80	-	MITUBISHI CANTER 3 TON	NISSAN HARDBODY 2.0
Description	COMPACTOR	COMPACTOR	COMPACTOR	BACKUP VEHICLE - REFUTIP LORRY	CAGED TIPPER: COLLECTION OF RECYCLABLES	CAGED LDV
Year	2008	2007	2000	1993	2011	2004
Odo Reading	30798	62119	0	225270	2982	145584
Volume Capacity	15	15	15	10	10	0
Payload (t)	8	8	8	5	3	1
Out of season weekly volume	35	90	150	150	-	-
In season weekly volume	37.5	360	255	500	-	-
Seasonal increase	7%	300%	70%	233%	-	-

Table 2-8: Summary of Collection Vehicles in Stanford and Surrounding Area

Registration Number	CEM 5397	CEM 26264
Driver	Christo Diedericks	Johannes Tobias
No of Labourers	4	4
Model	Nissan Diesel UD 90	Nissan UD 35 Diesel
Description	Compactor	Tipper
Year	2006	2004
Odo Reading	29000	53000
Volume Capacity	15	8
Payload (t)	8	3.5
Out of season weekly volume	37.5	8
In season weekly volume	37.5	8
Seasonal increase	0%	0%

2.3.2 Public Cleansing

Public Cleansing involves the cleansing of streets (kerbs and gutters), public open spaces (other than parks and storm water ditches), beaches and areas of illegal dumping.

In the Greater Hermanus area a Duvelo mechanical street sweeper has been in operation for the past few years. The machine services the Main Road between Voëlklip and Mount Pleasant from Mondays to Fridays. Over weekends, the CBD main roads are swept on Saturdays and Sundays during 2-3 hour shifts. A weekend shift includes 3 full loads per shift which are taken to the Hermanus Transfer Station for transfer to landfill.

Manual street sweeping takes place daily in the CBD area. There are 8 manual sweepers, each with a mobile trailer. The collected waste is placed in black bags which are manually taken to the close-by depot and placed in 240m^3 containers.

2.4 WASTE REDUCTION

The Polokwane Declaration was formulated in 2001 by members of Government, whereby a commitment to waste reduction, re-use and recycling was made towards achieving the following goals:

- 50% reduction in waste generation and 25% reduction in waste disposal by 2012
- A plan for zero waste by 2022

Waste reduction can be divided into three main categories, i.e.
1) Separation at source
2) Recovery for recycling from post-collected waste, and
3) Composting of post collected garden waste.

The efficiency of waste minimisation can only be determined through the implementation of a proper WIS as mentioned in Paragraph 2.2.1 above.

This WIS should provide information on an on-going basis regarding the following:

- The quantity, type, quality and sources of materials recovered
- The quantity and quality of compost produced and garden waste processed
- Industrial waste types and volumes, and possible opportunities for waste exchange
- Public education initiatives and data on available literature at public facilities (e.g. libraries, waste minimisation clubs and projects)
- Household awareness campaigns on recycling opportunities
- Waste education (schools level) and training programmes available for the general public, waste workers and officials

2.4.1 Recovery for Recycling

The average volumes of recoverable materials available for recycling in the Overstrand waste stream is shown in Table 2-1 and the realistic volumes that can be recovered from that stream through source separation and a “clean” material recovery facility is shown in Table 2-2.

From these two tables it is clear that, given the current state of public awareness and education, only 10% of the available recoverable materials can realistically be recovered by source separation for recycling. That represents only 4% of the total waste stream. The Walker Bay Recycling figures, which include bought recyclables, along with the actual recovered MRF volumes boost these two percentages to 14% and 6%.

The current actual recovery volumes are given in Table 2-3 and relates to only 6% of the total waste stream for Overstrand Municipality.

2.4.1.1 Waste Recovery Facilities in Overstrand

Overstrand Municipality has been associated with waste recovery for many years. Waste recovery is achieved by private companies, e.g. Walker Bay Recycling, who collects recyclable materials from businesses and industry. In the recent years, since source separation has been introduced by the municipality, Walker Bay Recycling also sorts the source separated materials.

The current volumes of materials recovered at the Hermanus Transfer Station and Gansbaai MRF from source separated materials are shown in Table 2-3 and amounts to 5.07 tonnes per day (5 day week) compared to 1.73 tonnes per day as indicated in the previous edition IWMP before Gansbaai MRF was operational. With the Walker Bay quantities included, the daily recovered volumes are 10.55 tonnes on average.

2.4.2 Composting

2.4.2.1 Composting Facilities in Overstrand

Household garden waste generated in the Overstrand municipal area amounts to approximately 11,000 tonnes per annum on average. In order to operate a central composting facility economically a minimum garden waste volume of 4,200 tonnes per annum is required.

Since sufficient quantities of garden waste are being generated in Overstrand, a central composting facility has been established at the Karwyderskraal Landfill. No other composting activities are undertaken in the Overstrand municipal area.

However, the garden wastes generated in the eastern portion of Overstrand, i.e. in the Stanford and Greater Gansbaai areas, are being used as cover material. Due to anaerobic digestion and the subsequent release of methane gas, it would be more beneficial to simply chip the garden waste and use it as mulch.

2.5 WASTE DISPOSAL

2.5.1 Operating Landfills

Overstrand Municipality currently utilises one licensed landfill for general waste, i.e. the Gansbaai Landfill. The existing cells at the regional Karwyderskraal Landfill have reached full capacity, but is used to receive garden waste and builder's rubble. The Karwyderskraal Landfill will become operational again after adequate airspace has been established in the form of a new cell.

Gansbaai Landfill (S34 35 16.26 E19 21 52.13)

The Gansbaai landfill is located on Part of Portion 210 of Gansbaai and obtained an operating permit in accordance with the Environment Conservation Act on 30 March 1999 and is classified as a G:M:B- landfill.

The operating permit (no 16/2/7/G400/D24/Z1) limits the site to a maximum height above natural ground level of 15m. With the Medium classification, the rate of waste disposal is limited to 500 tonnes per day of only general waste, as defined in the Minimum Requirements documents. A buffer of 800m around the site is stipulated in the permit.

Operation of the site is currently being done by Enviroserv Waste Management. They commenced operation on 1 December 2010 on an 8 year contract after the completion of a Section 78 investigation (MSA) and a Section 33 process (MFMA). The operational quality is considered to be good. External auditing is conducted on this facility. The site therefore complies with most of its permit conditions. The weighbridge is also operational since December 2010 and makes accurate waste data collection possible. The permitted area's remaining airspace is estimated at 919 700m^3.

It is calculated that this site currently receives approximately 150 tonnes of waste per day, which is a significant increase over the daily volume the site received prior to the Karwyderskraal Landfill reaching capacity.

Informal salvaging does not take place at this site since the start of the new operational contract.

Karwyderskraal Regional Landfill (S34 19 53.11 E19 09 40.67)

The Karwyderskraal landfill is located on Portion 1 of the Farm Afdaksrivier 575 in the District of Bredasdorp and is under jurisdiction of the Overberg District Municipality since it received waste from both Overstrand and Theewaterskloof Municipalities. The existing cells have since reached capacity, but still receive garden waste and builder's rubble. The site will be open to receive general waste after cell 3 has been established.

This landfill obtained an operating permit in accordance with the Environment Conservation Act on 30 March 2000 and is classified as a G:M:B+ landfill.

This operating permit (no 16/2/7/G501/D3/Z3/P374) limits the site to a maximum height 85m above msl. With the Medium classification, the rate of waste disposal is limited to 500 tonnes per day of only general waste, as defined in the Minimum Requirements documents.

The exact distance of a buffer zone has not been stipulated in the permit, but it is a condition that "*The Permit Holder shall take all reasonable steps, such as suitable zoning and/or written agreements with adjacent landowners, to prevent the development of further residential and/or light industrial areas closer to the Site than any existing residential areas during the operational life of the Site*". This permit condition should be clarified by DEAT and as the current owner of the site, the Overberg District Municipality, should request such a clarification.

2.5.2 Closed Landfills

Overstrand has six closed landfills of which two have been rehabilitated.

The old waste disposal sites near Betty's Bay and Kleinmond have been closed and rehabilitated. Both these two sites are being externally audited and monitored.

The old sites near Hawston, Onrus, Hermanus, Stanford, Pearly Beach and Voëlklip have been closed, but still require rehabilitation. Rehabilitation of these sites is scheduled for the next five financial years after Closure Waste Licenses have been obtained.

2.5.3 Builder's Rubble Sites

Overstrand has no dedicated builder's rubble sites.

2.5.4 Waste Transfer Stations

Overstrand has two large waste transfer stations located at Hermanus (S34 25 28.2 E19 13 04.1) and Kleinmond. (S34 20 10.9 E19 00 16.9) Waste from both these two transfer stations are transported and disposed at the Karwyderskraal Regional Landfill. Both these facilities are externally audited and comply with their relevant permit conditions.

2.5.5 Public Drop-off Facilities

Public Drop-off facilities have to date been provided in Hawston/Fishershaven (S34 22 38.36 E19 07 41.00), Voëlklip (S34 24 44.9 E19 18 20.7), Stanford (S34 26 50.41 E 19 27 23.59), Pearly Beach (S34 39 53.20 E19 30 12.84) and Kleinmond (S 34 20 11.96 E19 00 16.31). All these facilities are equipped with $30m^3$ skips. These facilities provide the residents the convenient opportunity to dispose waste that they have not put out for collection, into containers for later removal by the municipality or its agent.

At Rooi-Els (S34 18 06.8 E18 49 10.3), Pringle Bay (S34 20 33.6 E18 50 38.5) and Betty's Bay (S34 21 20.7 E18 51 44.5) Public Drop-off facilities are provided in the form of caged trailers.

2.5.6 Disposal Facilities used outside the Overstrand Boundaries

There are a few private disposal and/or treatment facilities used by Overstrand Industries and Health Care Waste Generators. The facilities are discussed in greater detail below:

- Hazardous Waste:

  The Vissershok Waste Management Facility (VWMF), owned by an Enviroserv/Wasteman partnership and operated by Enviroserv, has a H:H operating permit from DWAF. The site is situated some 800m west of the N7 at Vissershok and is operated and audited in terms of its permit conditions. All hazardous wastes generated in the municipal area of Overstrand are disposed at this facility.

- Oil Disposal/Recycling

  Used Oil is collected mainly by Oilkol and brought to the Fuel Firing Systems (FFS) oil recovery plant adjacent to the N7 at Vissershok. The facility is supported by the Rose Foundation and operates as a scheduled process under the Air Pollution Control Act (Act 45 of 1965) and has ISO 14001 accreditation. All waste lubrication oils collected by Oilkol is initially transported to the specialised Rose Foundation depot in Brackenfell. The oil is sold to Fuel Firing System Refiners for reprocessing.

- Silver and photographic heavy metal solution

  Cape Precious Metals (CPM) is based in Cape Town and recovers silver as well as other precious heavy metals from photo labs in the printing industry, private photo labs in the area and spent radiology fluids from the Health Care Industry. The recovery of silver is by electrolytic methods for photographic fixers and developers while passive recovery is used for radiology effluents.

2.6 COSTS OF EXISTING WASTE MANAGEMENT SYSTEM

2.6.1 Financial Summary of Waste Management Services of Overstrand Municipality

2.6.1.1 Income

Income for the Municipality is derived from service charges related to collection from domestic and business refuse removal and sales of baboon proof refuse bins.

For the 2010/2011 financial year the total income was R 37,234,513. For the 2011/2012 financial year the total income is estimated at R 40,454,000.

2.6.1.2 Expenses

Expenses incurred are salaries, repairs and maintenance, general expenses and capital charges.

Waste management is labour intensive and salaries make up some 35% of the total expenses.

Total expenses for the 2010/2011 financial year were R 36,728,654. Total expenses for the 2011/2012 financial year were budgeted at R 39,528,427.

2.6.2 Refuse Collection Tariff

Due to the amalgamation of various municipalities into the Overstrand Municipality, various refuse collection standards and tariffs exist in Overstrand. For example, the town of Hermanus receives a twice a week collection service whereas all the other towns receive a weekly service at a lesser tariff. Group housing and business parks are being serviced on a basis of 4 units to a service point. All middle and high income areas receive a weekly source separated collection service.

From the 1st of July 2012 all residential dwellings will receive a weekly collection service at a uniform tariff. From 2013 all group housing and business parks will be considered as one unit or lettable space to a one service point.

2.7 STAFF COMPLIMENT OF EXISTING WASTE MANAGEMENT SYSTEM

Overstrand Municipality's waste management resorts under two directorates. The operational portion resorts under Community Services whilst the planning portion resorts under Infrastructure and Planning.

On the planning side there is one position, that of a Manager: Solid Waste, which is currently filled by Mr Johan van Taak who reports to the Director: Infrastructure and Planning, Mr Steven Muller.

On the operational side each of the four service areas has an Operational Manager who reports to the Area Manager, Mr Deon van Vuuren, who in turn reports to the Director: Community Services, Mr Roderick Williams. The Operational Managers are:

Greater Hermanus	Mr Peter Burger	(Operational Manager)
Greater Kleinmond	Mr Mike Bartman	(Operational Manager)
Greater Gansbaai	Mr Dirk Crafford	(Operational Manager)
Stanford	Mr Francois Brand	(Assistant Operational Manager)

Each of the above managers has various teams reporting to them, as indicated in Table 2-10 (Greater Hermanus), Table 2-11 (Greater Kleinmond), Table 2-12 (Greater Gansbaai) and Table 2-13 (Stanford).

Waste management is labour intensive with low levels of skill required. The staff compliment is mainly labourers and only one vacancy exists.
Table 2-9 indicates the current staff compliment.

The above Operational Managers are responsible for preparing the operational budget for their various service areas and the 1st Technician: Planning is responsible for preparing the capital budget for Solid Waste Management for the whole of Overstrand Municipality.

The only shortcoming in these organograms is the lack of a dedicated waste minimisation officer.

Table 2-9: Summary of Cleaning Services Personnel

	Kleinmond	Hermanus	Stanford	Gansbaai	Total
Superintendent	1	1			2
Snr Foreman	1		1		2
Foreman	1		1	1	3
Snr Supervisor		1			1
Clerk Grade 11			1		1
Operator Grade 1	1	2		1	4
Operator Grade 11	4	1	1	2	8
Truck Driver		3	1	1	5
Snr Tractor Driver		1			1
Tractor Driver	2		3		5
Special Workman			1		1
Machine Handler	6				6
Team Leader	5			1	6
Handyman	2				2
Leader Worker	1				1
Helper			1		1
Senior Worker		2	12		14
General Worker		3			3
Worker	36	57	11	27	131
Total	60	71	33	33	197

Table 2-10: Organogram of Operational Staff in Greater Hermanus

Greater Hermanus											
Operational Manager											
Superintendent											
Hawston Transfer	Senior Supervisor	Voëlklip Drop-off	Sweepers Hermanus	Vermont, Hawston, Fishershaven	Onrus, Sandbaai	Northcliff, Westcliff	Voëlklip, Hermanus Heights	Hermanus	Hermanus CBD	Zwelihle	Drop-off Zwelihle
Worker	General Worker	Worker	Worker	Truck Driver	Truck Driver	Operator Grade 1	Truck Driver	Operator Grade 11	Operator Grade 1	Senior Tractor Driver	Worker
	General Worker		Worker	Worker	Worker	Worker	Senior Worker	Worker	Worker	Worker	
	General Worker		Worker	Worker	Worker	Worker	Senior Worker	Worker	Worker	Worker	
	Worker		Worker	Worker	Worker	Worker	Worker	Worker	Worker	Worker	
	Worker		Worker	Worker	Worker	Worker	Worker	Worker	Worker	Worker	
	Worker		Worker	Worker	Worker	Worker	Worker	Worker	Worker	Worker	
	Worker		Worker	Worker	Worker	Worker	Worker				
	Worker		Worker								
	Worker										
	Worker										
	Worker										
	Worker										
	Worker										

Table 2-11: Organogram of Operational Staff in Greater Kleinmond

Greater Kleinmond												
Operational Manager												
Superintendent: Streets & Storm water												
Snr Foreman: Roads, Storm water and Solid Waste (Vacant)								Foreman: Roads				
Kerbs	Road Signs	Tar Patch	Transfer Station	Solid Waste	Storm water			Storm water Hangklip			Roads Hangklip	Solid Waste Hangklip
Handyman	Handyman	Team Leader	Machine Handler	Operator Grade 1	Operator Grade 11			Team Leader	Tractor Driver	Operator Grade 11	Team Leader	Team Leader
Worker	Worker	Worker	Machine Handler	Worker Streets and Storm water	Operator Grade 11 Road Roller	Tractor Driver	Operator Grade 11	Machine Handler			Machine Handler	Worker
Worker		Worker	Machine Handler	Worker	Team Leader	Worker	Machine Handler	Worker			Worker	Worker
		Worker		Worker		Worker	Worker	Worker			Worker	Worker
		Worker		Worker				Worker			Worker	Worker
		Worker		Worker							Worker	Worker
				Worker							Worker	Worker
				Worker							Worker	
											Worker	
											Worker	

Table 2-12: Organogram of Operational Staff in Stanford

Stanford							
Assistant Operational Manager							
Senior Foreman							Clerk Grade 11
Foreman: Roads, Storm water, Refuse		Special Workman: Water	Sewerage Tankers		Sewerage Plant	Amenities	Informal Settlement
Refuse	Tar & Sewer Network		Truck driver	Tractor Driver	Senior Worker	Senior Worker	Worker
Tractor Driver	Operator Grade 11		Helper		Senior Worker	Senior Worker	
Senior Worker	Tractor Driver				Senior Worker	Senior Worker	
Senior Worker	Senior Worker				Worker	Worker	
Senior Worker	Senior Worker				Worker	Worker	
Worker	Senior Worker						
Worker	Worker						
Worker							
Worker							
Worker							

Table 2-13: Organogram of Operational Staff in Greater Gansbaai

Greater Gansbaai						
Operational Manager						
Foreman						
Team Leader	Operator Grade 11	Operator Grade 11	Sanitary Workers	Operator Grade 1	Truck Driver	Transfer Station
Worker	Worker	Worker	Worker	Worker	Worker	Worker
Worker	Worker	Worker	Worker	Worker	Worker	
Worker	Worker	Worker	Worker	Worker	Worker	
	Worker	Worker	Worker	Worker	Worker	
			Worker			
			Worker			
			Worker			

2.8 CURRENT WASTE MANAGEMENT CONCLUSION

Waste management in the Overstrand appears to be well managed with respect to General Waste.

Since the weighbridge at Gansbaai Landfill has become operational, it has been possible to accurately measure the Overstrand waste stream. This gathered data will contribute greatly towards being able to measure successes in waste recovery and identifying problem areas.

Achieving sustainable integrated waste management requires that the Municipality must establish and maintain sufficient waste management facilities, such as Disposal Sites, Transfer Stations, Material Recovery Facilities, Collection Infrastructure, Buy-back centres, Composting facilities, Public Drop-offs, etc.

It also requires that the Municipality be pro-active with regards to public awareness and public education because waste minimisation needs to be practiced by the waste generator. Once waste is waste, the municipality can only reduce it and dispose of the non-recoverable fraction. The required infrastructure and resources to collect waste and dispose of it, are in place. The municipality has also embarked on reducing the volume of waste that requires disposal through its source separation initiatives. The volumes however show that participation rates are low.

Source separation is currently also only practised in higher income areas. Although the general perception is that the waste stream from lower income areas contains significantly less recoverable materials, it has been proven not to be so. It is only the waste stream from areas serviced by communal skips that has low recoverable volumes. It appears that the residents of lower income areas recognise their recoverable waste as a potential income and therefore prefer not to give it to the municipality for free. In these areas Buy-back centres should be established since purchasing it from the residents will still be less expensive than collecting it. A great example is the Swopshop in Gansbaai (White Shark Projects) which allows children to collect recyclables, trade it in for points and "buy" certain items like stationary, toiletries or even clothes with the points they accumulate. This encourages the public to recycle from a young age and educates the public toward waste minimisation.

2.9 WASTE MANAGEMENT STRATEGIC OBJECTIVES

With the Status Quo of waste management as listed in the previous chapters, the way forward is to state the strategic objectives of the Municipality and then to develop action plans or implementation instruments how to achieve the strategic objectives.

Overstrand Municipality is committed to a system of waste management that will see the least possible amount of waste going to modern engineered landfills. This will be achieved through the use of education, law enforcement and material recovery and treatment plants. New and emerging technologies, where applicable and affordable, will also play a part in overall waste management.

The Waste Management Strategic Objectives for Overstrand Municipality on which this Plan is based, commits the municipality to:

- Create an atmosphere in which the environment and natural resources of the region are conserved and protected.

- Develop a communication/information/education strategy to help ensure acceptance of 'ownership' of the strategic objectives among members of the public and industry throughout the municipality and to promote co-operative community action.

- Provide a framework to address the municipality's growing problem of waste management in accordance with best prevailing norms, financial capacity and best environmental practice.

- Provide solutions for the three main objectives:
  - The avoidance of waste generation
  - The reduction of waste volumes
  - The safe disposal of waste

2.9.1 Strategic Objectives

2.9.1.1 General

To ensure that Waste Management in the Overstrand Municipal Area complies with South African and International environmental standards so that it is beneficial to industrial and agricultural growth and the public's right to a clean and healthy environment.

2.9.1.2 Waste Avoidance

To promote the minimisation of the generation of waste.

2.9.1.3 Waste Reduction

To promote the reduction of all waste so that nothing of value nor anything that can decompose, gets disposed.

2.9.1.4 Waste Disposal

To store, dispose or treat all waste that cannot be avoided nor reduced at licensed facilities with regular operational and environmental monitoring and in accordance with regulatory requirements.

2.9.1.5 General Waste Management

To ensure that through waste collection and cleansing, every resident of and every visitor to Overstrand Municipality enjoys an environment that is not detrimental to his/her well-being. Also to ensure that all waste is measured, whether it is avoided, minimised, re-used, reduced, treated or disposed.

2.9.2 Definitions

WASTE AVOIDANCE is to avoid material entering the waste stream, e.g. when the generator of the material either re-uses it or gives the material to somebody else as product or raw material. Composting at home is regarded as waste avoidance.

WASTE REDUCTION is to reduce the quantity of waste that has been discarded by its generator, e.g. when recyclable materials are recovered at the sidewalk or at a transfer station, materials recovery facility or landfill. Composting of garden waste at a composting facility is regarded as reduction.

WASTE DISPOSAL is defined in the Waste Act as the burial, deposit, discharge, abandoning, dumping, placing or release of any waste into, or onto, any land.

2.10 ROLE OF OVERSTRAND MUNICIPALITY

The role of the local authority in waste management is of vital importance. Overstrand Municipality needs to provide a safe, robust, and secure system for the management of wastes generated in its administrative area.

It is essential that this system can respond to changes in socio-economic situation, to changing waste composition and quantities, and to alterations in the public's perception of waste management issues. Overstrand Municipality must adopt, therefore, a combination of options for handling waste, tailored to meet the needs and prevailing circumstances of its particular administrative area. The combinations utilised will undoubtedly vary over time - reflecting the changing needs of local residents and the environment.

The plans formulated by Overstrand Municipality are specific to the area and its resources. They reflect the availability of suitable waste management facilities in the region, as well as local market demand for recovered materials. Special care must be taken to cater for the volatility of markets for recovered materials by ensuring that there are other suitable options to fall back on, if required. It is, therefore, highly desirable to be able to switch between waste management methods - further emphasising the hazards of relying too heavily on a single policy option instead of a combination of policies.

Overstrand Municipality has therefore initiated an Integrated Waste Management Plan, founded on South Africa's National Environment Management Act and the National Waste Management Strategy and takes into account the Municipality's legal obligations regarding waste avoidance, recovery, disposal and general management. Due to the fact that the Waste Act has come into effect after this Plan has been compiled, certain of the conditions of the Waste Act will not yet be reflected in this Plan, but will be implemented by the Municipality and be reflected as such in the next revision of this Plan.

The implementation instruments or action plans listed in the following section are laid out in a manner which reflects the waste management hierarchy, putting the emphasis on waste avoidance and minimisation, with specific waste streams looked at in detail. These actions plans form the strategic framework of how Overstrand Municipality wants to move away from the traditional method of waste management towards a more sustainable management system.

3. OVERSTRAND MUNICIPALITY'S IMPLEMENTATION INSTRUMENTS

3.1 IMPLEMENTATION INSTRUMENTS FOR WASTE AVOIDANCE

Waste Avoidance is the primary focus of the National Waste Management Strategy and as such must be the priority of any Integrated Waste Management Plan. Waste Avoidance is defined as the action that avoids the entry of material into the waste stream that is when the generator of the potentially waste material exercises the decision to do something else with that material rather than to put it out for waste collection. The following are typical examples of waste avoidance:

- Composting of the organic/green waste at home,
- Self-delivery of glass/cardboard/newspaper/PET to recycling bins or school recycling projects
- Re-use of empty jars as storage containers at home,
- Reclamation of drum containers
- Recovery of fruit and food solid waste component as animal feed,
- Recovery of chemicals from industries
- Recovery of electronic equipment
- Changing raw materials of industrial processes to produce recoverable industrial waste

From the above it is clear that waste avoidance will result not only in less material to be disposed but also in less material to be collected by the waste collection system.

The following are Overstrand Municipality's plans for the promotion of waste avoidance in its area:

Action	General	Why?	When?
Public Awareness and Education	Overstrand Municipality will develop a public awareness and education campaign, putting special emphasis on waste avoidance through separation at source. The campaign will endeavour to highlight ways in which the public can avoid or prevent waste generation, and to suggest alternatives to high waste producing products/activities. In addition, more proactive measures to reach the public, particularly on a local level, will be explored. The aim will be to increase the participation rate of source separation in more affluent communities and to investigate and establish facilities within the less affluent communities that will maximise the volume of recoverable materials that do not enter the waste stream.	There are three principles listed in NEMA section 2 that are of particular importance when we discuss Integrated Waste Management in conjunction with public awareness and education. These principles are the following: ▪ Public participation in environmental decision-making must be promoted. The participation of vulnerable and disadvantaged groups must be ensured. ▪ Decisions must be taken in an open and transparent manner and access to information provided in accordance with the law. ▪ The polluter must pay for the cost of remedying pollution, environmental degradation and adverse health impacts. NEMA says that pollution can be many different things and to be called pollution it must change the environment now or in the future in a way that will affect your health and well-being, or harm the environment. Activities that could cause significant pollution are the storage, treatment and disposal of waste. The Constitution provides everyone in South Africa the right to information that is held by the government and that is needed by someone to protect their rights. The NEMA tells us in section 31 that amongst other information that you have the right to information about emissions to water, air and soil and also information about how Hazardous Wastes are made, stored and disposed of. The government in turn can get information about the environment, emissions to air, soil and water and the handling of Hazardous Waste from any private person and then one can obtain this information from the government. A person cannot refuse information about emission levels and waste products. Local authorities regulate many different issues and it is often not easy for an official to decide on the best course of action to take when faced with difficult environmental problem. Effective environmental management training will help officials to identify, predict and evaluate environmental, social or economic impacts and then to develop solutions to such environmental threats and integrate and co-ordinate the solutions into a total management plan for their area of jurisdiction. Training will contribute to the reduction of environmental degradation and its resultant negative impacts and greatly improve the quality of life for communities within their boundaries. It will also help to optimize the resources that are at a local authority's disposal. Chapter 5 of NEMA has provisions for Integrated Environmental Management and if these provisions are not followed correctly, a member of the public could take them to court if they violated the NEMA.	The public awareness campaign for both the generators of waste as well as the service providers should start once the IWMP has been approved by Council. The action however does not have an end date due to the continuous nature thereof.

Action	General	Why?	When?
		The above sections highlights the importance of complying with the various pieces of legislation concerning waste management, since one of our fundamental rights in the Constitution is the right to a clean and healthy environment that is not harmful to health and well-being. However, many of the Municipal employees are either not aware of all the requirements of the relevant legislation or they are simply not aware of the legislation itself. Since the Constitution provides the public with a fundamental right to the environment and NEMA provides them with the right to access to information surrounding waste management and in particular Hazardous Waste it is imperative that Municipalities ensure that they are doing everything right. If a member of public suspects that something is done in the wrong way, it is possible for them to obtain the necessary information to prove that the wrong decisions were taken or the wrong procedures followed. The public is increasingly well informed and takes much interest in environmental issues. This shows the importance of education in Integrated Waste Management at the various Municipalities at all different levels i.e. from the Head of the Waste Management Department to the person involved in collection. We need a well-informed public that is willing and able to take collective responsibility for managing our valuable natural resource base. People should not only be provided with information but also be helped to use this information. This includes the ability to identify environmental problems, analyze their causes and contribute to solutions, whether this is local recycling or car-pooling or contributing meaningfully to public participation processes. Since the root of the problem is not waste itself, but the attitude towards the disposal of waste, the emphasis has been on changing the mindset of the population towards one of environmental care and consideration. Information booklets and/or flyers can be distributed at major shopping malls, clinics and hospitals. Industry and the agricultural sector should similarly receive these booklets and should be provided with the opportunity to receive an industry specific training seminar on Integrated Waste Management.	
Quantifying Prevention	Overstrand Municipality will assess the possibility of using statistics and other data collected to quantify the success of prevention measures employed within the municipality. This could be done by populating a GIS system with relevant	Compiling information on waste management trends may assist in quantifying waste avoidance. It is important to ascertain whether or not waste avoidance targets are being reached and such information will also help in the setting of realistic targets for the future.	The implementation of this action will depend on and follow the implementation of a waste information system.

Action	General	Why?	When?
	data. The Council will co-operate with the Waste Minimisation groups in efforts to quantify waste avoidance through the use of performance indicators and by other means.		

3.2 IMPLEMENTATION INSTRUMENTS FOR WASTE REDUCTION

Waste Reduction is the secondary focus of the National Waste Management Strategy in that all waste that cannot be avoided, must be reduced. In terms of definition it represents the actions required to, once the generator of waste has made the decision that a material(s) is waste and entered it into the waste stream, remove that material from the waste stream for re-use, recycling, treatment/conversion, composting, etc. and by such action prevent the material from being disposed. Typical examples of waste reduction are as follows:

- Separate collection of source separated materials
- Separate collection of spent oils, solvents, print cartridges, x-ray and photographic developers by recovery contractors,
- Kerbside collection of recyclable material by informal salvagers
- Composting of green wastes at composting facility
- Recovery of recyclable material at Material Recovery Facility (MRF)
- Recovery of recyclable material at waste disposal site

The following are Overstrand Municipality's plans for the reduction of waste within its functional area.

Action	General	Why?	When?
Post Collection Recovery	Overstrand Municipality will ensure the continuing operation of the Material Recovery Facility (MRF) at Hermanus Transfer Station and Gansbaai Landfill where source separated recyclable materials are sorted and recovered from the collected wastes so that only material of no value is forwarded for landfilling.	Recyclable material such as paper, cardboard, glass, certain types of plastic and metals have value when transformed or re-used as raw material. In maximising the recovery of these materials the usage of virgin raw material is reduced, thus saving natural resources. The sale of these materials also provides employment opportunities for SMME's. Recovery of the recyclable fraction of the waste stream also reduces the "lighter" fraction of the waste stream resulting in less risk of wind-blown litter at the disposal site. Although the mass of recovered materials is not always significant, the volume of airspace saved is, e.g. a 350 kg bale of PET (2 litre cool drink bottles) requires 16m^3 of bottles. These bottles do not compact in a landfill and huge savings in airspace are achieved through its recovery.	Immediately and on-going.
Post Collection Composting	Overstrand Municipality will continue to chip its garden waste and to support the central composting facility at Karwyderskraal Landfill. The feasibility of establishing and operating a small composting plant at Gansbaai will be	Organic materials decompose in time and when disposed in a landfill, the decomposition occurs anaerobically (without the presence of oxygen). During anaerobic decomposition greenhouse gasses such as methane and carbon dioxide are formed. These gasses have a detrimental effect on the earth's ozone layer and internationally the generation of these gasses is being minimised. Methane is twenty one times more effective as a greenhouse gas than carbon dioxide. Composting involves the aerobic (in the presence of oxygen) decomposition of organic matter and	This action, if the investigation prove that sufficient quantities do exist, require the establishment of infrastructure of capital investment and for that reason require financial budgeting. A

Action	General	Why?	When?
	investigated.	although carbon dioxide is also produce during this decomposition process, no methane is produced. Composting of organic material is therefore environmentally more beneficial than to landfill it, even if the compost is afterwards landfilled. Compost produced from green waste (garden clippings, etc.) is more "acceptable" to the public for usage in residential gardens since it is perceived to be cleaner than compost that has been produced from the total organic waste fraction. On average approximately 35-50% of the total domestic waste stream is made up of organic materials that are compostable. Composting can therefore significantly reduce the volume of waste to be landfilled, however a mass of approximately 350 tonnes of garden waste is required per month for the financial sustainability of such a facility.	timeframe of one to two years would be realistic.

3.3 IMPLEMENTATION INSTRUMENTS FOR WASTE DISPOSAL

The disposal of waste by landfill is considered to be the least desirable option in the Waste Management Hierarchy. The volume of waste to be disposed is a measurement of the success achieved with waste avoidance and waste reduction.

Municipal waste disposal takes place at the municipality's licensed and engineered landfill near Gansbaai, at the District's licensed and engineered landfill at Karwyderskraal.

The following are the Municipality's plans for the disposal of residual wastes within its functional area:

Action	General	Why?	When?
Engineered Waste Disposal Facilities	The disposal of non-recoverable waste will only be allowed at properly engineered waste disposal sites that are licensed by the relevant statutory authority and that are operated and audited in terms of the relevant permit conditions.	Since the whole of Overstrand is located in a sensitive environment, properly engineered waste disposal facilities that minimise the risk of environmental pollution and the degradation of the surrounding area are a prerequisite for local sustainability. Ground water resources are thus protected. Properly engineered and operated waste disposal facilities are also beneficial to the exporters of industrial and agricultural produce in obtaining their international accreditation.	This action is already partially being adhered to but implementation requires the continuous establishing of sufficient airspace (capacity) at these waste disposal facilities and the rehabilitation of old sites.
Monitoring of Waste Disposal	All waste destined for disposal and disposal facilities shall continue to be monitored for compliance with permit conditions, volumes received and for environmental impact.	Currently monitoring of waste facilities only takes place at the Gansbaai and Karwyderskraal Landfills and the Transfer Stations at Hermanus and Kleinmond. Monitoring will also ensure that the Municipality is aware of the final destination of all waste, general, hazardous and health-care, that are generated within its boundaries.	This action is the correct environmental option to follow and the current external and internal auditing and monitoring will continue.

3.4 IMPLEMENTATION INSTRUMENTS FOR WASTE MANAGEMENT IN GENERAL

Although the National Waste Management Strategy focuses mainly on waste avoidance, reduction and disposal and as such these three activities form the heart of any Integrated Waste Management Plan, certain other waste management activities need also to be addressed in order to achieve proper waste avoidance, reduction and disposal.

The following are the municipality's plans for waste management in general:

Action	General	Why?	When?
Collection Service Review	Overstrand Municipality will continuously review its waste collection operations, in order to make them as efficient as possible, with due regard to value for money in the area of municipal waste collection. The Municipality will examine the quality of their service, resource management and general working arrangements.	The collection of waste is the most expensive activity of the waste management system. The municipality must ensure that every waste generator within its boundaries receives a waste collection service at an acceptable level of service and at an affordable price. The waste collection system must therefore be optimised, in terms of level of service, type of containers, type of collection vehicle, etc., and must be sufficiently flexible to accommodate the long term goal of source-separated waste.	The different levels of collection is currently being investigated and the whole of the Municipality will receive a weekly collection from 1 July 2012.
Data Compilation	Overstrand Municipality will continue to gather accurate data regarding domestic, commercial and industrial waste generation and collection. The Municipality will endeavour to aggregate the data collected from each town for analysis.	Compilation of this data will enable analysis of the performance of the waste collection operations on an annual basis. This in turn allows for improvements to be made in inefficient areas and reveals the more efficient areas of operation.	This action is continuous and already undertaken, as the weighbridge at Gansbaai Landfill is operational since 2010.
Cleansing	The Overstrand Municipality will ensure the general cleansing of the municipal area.	Whilst the Cleansing component of waste management is often dwarfed by the other key elements such as avoidance, recovery, collection, transfer transport and disposal, in essence it involves putting the "cherry on top of the cake" in terms of closing the loop on waste management. Without proper cleansing the success of the other key elements would not be apparent as the environment would be dirty, litter strewn and unkempt. The cleansing functions in a municipality may involve all or most of the following: ▪ Litter picking – picking up of	This action requires public awareness as well as awareness of the service provider. Implementation has already been done partially with certain towns receiving a street sweeping service.

Action	General	Why?	When?
		litter in streets, parks, beaches, sidewalks and public open areas. ▪ Street sweeping and cleaning of storm water catch pits. This may involve the sweeping of all streets either mechanically or manually and removal of debris. Also the cleaning of storm water catch pits and channels. ▪ Street washing / sanitising – washing down and sanitising streets and parking areas which are subjected to pollution, i.e., areas frequented by hawkers or secluded streets where the public urinate or defecate. ▪ Cleaning and sanitising of public ablution facilities ▪ Weed control in roadways It is evident that failure to carry out the above functions will result in a very negative impact on the public and the environment, due to the high visibility thereof as well as the pollution that will result and as such will negatively affect tourism which is one of the major industries in Overstrand Municipality.	

4. OVERSTRAND MUNICIPALITY'S IMPLEMENTATION SCHEDULE

The implementation of the above actions towards Integrated Waste Management must be scheduled in such a way that it is realistic, achievable, financially feasible and publically acceptable.

The Implementation Schedule attached as Figure 4.1 indicates the capital projects to be undertaken during this period. Activities that resort under the Operational budget such as collection enhancements, extension of the source separation initiative, public awareness campaigns and investigations must still be scheduled to fit the available operational budget.

To date all the funding for the above have been achieved through the normal municipal capital and operational budgets.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The Project Team, with the assistance of municipal officials, has undertaken an analysis of the current municipal solid waste management activities within Overstrand Municipality.

The analysis has shown that the Overstrand Municipality has through the years committed themselves to not only the delivery of a collection and disposal service for all its residents, but also to the Best Environmental Practise. Where very few municipalities are currently practising material recovery, Overstrand Municipality is regarded as being on the forefront of waste recovery in South

Africa by means of source separation and separate collection and continues to improve and expand on the current situation.

The chapters of this Integrated Waste Management Plan describe the way in which the municipality is currently conducting solid waste management, which is mainly focussed on collection and disposal, and how to strategically move towards a sustainable waste management system whereby the focus will shift to the avoidance and reduction of waste rather than to the disposal thereof. It also lists the strategies of the municipality in terms of Waste avoidance, waste reduction and waste disposal.

During the process of the implementation of the municipality's Integrated Waste Management Plan, and arising from the public consultation process that is forthcoming, further input and/or corrections to the Plan may come to light that will then be added as a revision to the Plan.

The analysis of the current waste management system has shown the following:

- all formal residential erven are receiving a weekly door-to-door waste collection service
- all collected municipal waste are disposed at the municipality's engineered and licensed waste disposal site near Gansbaai
- all garden waste waste in the Greater Hermanus and Greater Kleinmond service areas are chipped and disposed at the regional engineered and licensed waste disposal site at Karwyderskraal
- waste recovery is done at the Hermanus Transfer Station and Gansbaai MRF
- waste reduction is achieved through source separation
- only the Transfer Stations and Gansbaai Landfill are audited for permit compliance
- some closed but not yet rehabilitated waste disposal sites exist near the smaller towns
- by-laws on waste management exist for Overstrand, but were published in 2007, before the Waste Act (Act No. 59 of 2008) came into effect
- the organogram for the waste management staff has only one vacancy

With the current waste management system focussing on getting the waste into the waste stream and disposing of it in an acceptable manner, and with the future integrated waste management system focussing on waste avoidance and waste reduction, the municipality requires at set of strategic objectives on how to transform from the current management system to the future management system.

The strategic objectives for integrated waste management in Overstrand Municipality can be summarised as follows:

- To ensure that Waste Management in the Overstrand Municipal Area complies with South African and International environmental standards so that it is beneficial to industrial and agricultural growth and the public's right to a clean and healthy environment.
- To minimise the entrance of material of value into the waste stream.
- To reduce all waste so that nothing of value or anything that can decompose, gets disposed.
- To store, dispose or treat all waste that cannot be avoided nor reduced at licensed facilities with regular operational and environmental monitoring and in accordance with regulatory requirements.

For these strategic objectives to be met, a series of implementation instruments (action plans) will need to be implemented. These implementation instruments as well as time framework within which it should be addressed are described in this Plan but need to be fully detailed at a later stage. The instruments are the following:

- Public Awareness and Education
- Quantifying Prevention
- Post Collection Recovery
- Post Collection Composting
- Engineered Waste Disposal Facilities
- Monitoring of Waste Disposal
- Collection Service Review
- Data Compilation
- Cleansing

The above instruments, through implementation via their action plans, will ensure that waste management in Overstrand focuses on avoidance and reduction rather than collection and disposal,

but simultaneously maintaining the practical balance between the various waste management functions.

Since the highest priority for transforming the current management system is undoubtedly depending on public acceptance and ownership, the Public Awareness and Education instrument will receive preference in the implementing framework.

5.2 RECOMMENDATIONS

A comprehensive analysis and assessment of solid waste management in the Overstrand Municipal area has been done and key strategies have been determined to aim the municipality towards sustainable and integrated waste management.

It is therefore recommended that the next stage of the process of implementing the Integrated Waste Management Plan be proceeded with, that entails the consultation process with the public and the development of detail action plans and key performance indicators for future monitoring and evaluation of the municipality's successes in waste management service delivery. It is also recommended that Municipality's by-laws are updated according to the new content of the Waste Act.

Public Awareness

The first step in educating the public about waste is to make them aware of any new waste management procedures and facilities available to them, for example regularly updating the Municipality's website.

Another benefit to focus on educating the public is a greater awareness of waste minimisation. This will reduce waste generation rates which will in turn reduce transport volumes and costs. It is important to also provide feedback to the public of the success of their efforts, for example publishing month to month volumes of waste diverted from being landfilled.

Overstrand Municipality should continue and expand its current successful waste minimisation advertising campaign.

Waste Collection and Transport

The waste collection schedule for Overstrand should be finalised to achieve a uniform collection level of service to all areas.

Waste Disposal

It must be ensured that all waste management facilities are regularly audited as stipulated in each waste permit. Regular audits will ensure that these facilities are operated correctly and efficiently. Ensuring the correct operations will maximise the results of efforts of waste reduction and recovery and therefore the benefits thereof. With the information provided by the audits, the Municipality should continually evaluate the available landfill airspace so as to plan in advance so that sufficient landfill capacity is always ensured.

The Gansbaai Landfill storm water drainage system should be designed and constructed within the next upcoming financial years as the budget allows to conform to permit requirements.

Provision should be made in the budget for closed sites that still require rehabilitation.

ANNEXURE A

Details of Collection Fleet