

Chapter 2
GMC SWM System –
Additional Details

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Chapter 2 GMC SWM System – Additional Details

This section provides supplementary information to that in the main report concerning different aspects of GMC's SWM system. The majority of this data was collected during July-August 2002, with essential items having been updated since then, as stated in the text.

2.1 Waste Management Equipment – Detailed Data

Table 2-1: Waste Management Vehicle Fleet and Supporting Equipment

Vehicles/ equipment	No	Use (Capacity)	Regis- tration	Regis- tration date	Cost	Approx. Life (yrs)
Handcarts (0.39-0.54m ³)	4	3 - SWM collection, road and drain cleaning 1 – standby	Not applicable	Not applicable	1999: 10,500	3yrs
Two wheel tractor (2WT) (2.8-3.3m ³)	6	5 – SWM 1 – out of service	73-2947 73-7144 73-7145 74-4969 77-8733 75-3817	11/1/1989 26/3/1991 26/3/1991 1/4/1993 21/3/1998 1994	93,050 101,800 101,800 143,000 120,000 75,000	15-20yrs
Four wheel tractors (4WT)	5	4 - SWM 1 – gully bowser	25-9190 49-2722 49-8156 49-9178 49-9561	4/3/1970 30/9/1994 12/5/1997 10/12/1997 21/3/1998	20,000 630,000 837,000 300,000 430,000	15-20yrs
4WT Trailers (5.3-6.3m ³)	6	4 – SWM 2 – out of service	No data	No data	85,500 92,000 2 x 40,000 2 x 80,000	8-10yrs
Gully bowser	1	Septic tank/public toilets emptying (4m ³)	No data	No data	97,500	10-12yrs

Notes:

Most of GMC's existing handcarts were purchased from Matale in 1999 at a cost of Rs10,500. The current cost of new handcarts from Matale is Rs14,500.

Vehicles tend to be "repaired and used", rather than replaced after a specified number of years. Hence, tractor lifetime is based on the age of actual tractors still in service and experience from other local authorities, the oldest 2WT and 4WT being 13 and 32 years old respectively. Tractors should be able to be used for at least 10 years, if maintained well. Trailers require repairs after two years, but can last up to 8-10years, if maintained well.

Some of the 4WTs were purchased second hand, which explains some of the capital costs being low.

A backhoe is hired approximately monthly at a cost of 925Rs/m.h for digging trenches for the disposal of garbage at the final disposal site.

2.2 Waste Collection/Disposal Fees

Gully sucker charges are summarized below, while corresponding income over the period January-December 2001 is summarised in the second table.

Table 2-2: Gully sucker collection charges

Location	Residential	Business	Religious Places
Within GMA	1 st load: 1,000 2 nd load: 500	1 st load: 1,500 2 nd load: 750	Free
Outside GMA	1 st load: 1,500 2 nd load: 750	1 st load: 2,000 2 nd load: 1,000	Free

Note: Rates are for septic tanks/latrines and exclude tax. An additional Rs25/km transport charge is levied for services provided outside of GMA. A charge of 600Rs/load has been proposed for religious places, but has yet to be approved.

Table 2-3: GMC SWM and Gully Sucker Income

Month	No of trips	Gully sucker income (Rs.)
January 2001	5	5,500
February	5	7,100
March	5	5,600
April	6	6,500
May	7	14,000
June	2	2,500
July	0	0
August	6	11,250
September	3	3,100
October	4	4,700
November	10	21,000
December	4	5,000
Total	57	86,250

2.3 SWM Discharge/Collection – Additional Information

2.3.1 GMC Discharge and Collection Details

Important characteristics of Gampaha's SWM collection zones are summarised below.

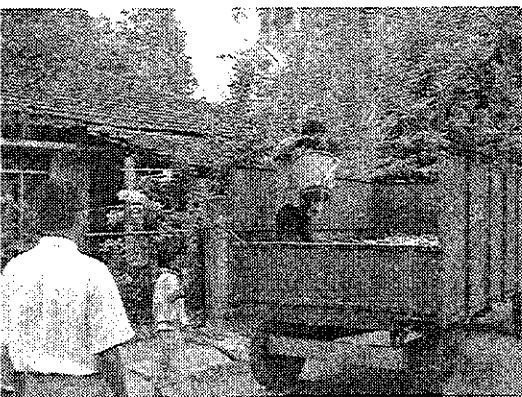
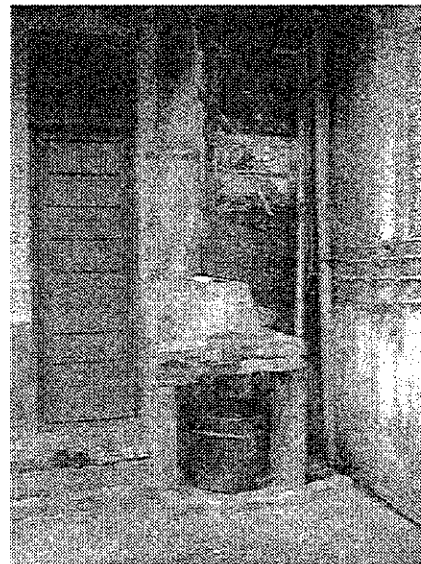
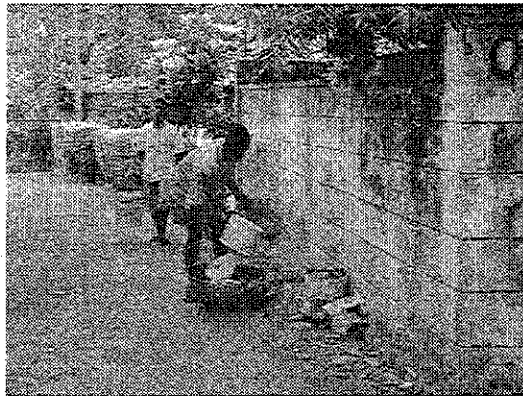
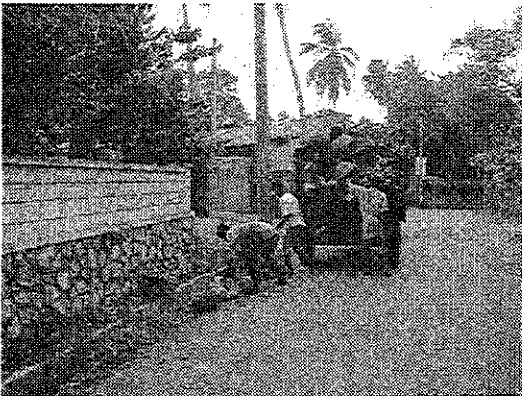
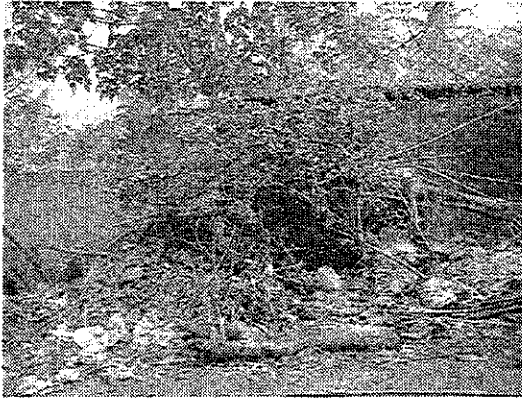
Table 2-4: GMC Garbage Discharge and Collection System

Area	Discharge and Collection System
Zone 1 (4WT: 49-9561 2 HC)	<ul style="list-style-type: none"> Area bounded by Colombo Rd, Holy Cross/Saranankara, Rest House and Orutota rds, including Colombo Rd bus stand + four places in Zone 3 (Police Quarters, Courts, Yasodara Devi BV, Gothami College). Mainly commercial. Large waste producers: Public market, Police Quarters (0.125 4WT/d), Court Complex (0.25 barrels/d), Gothami College and Yasodara Devi BV (0.125 4WT/d). Twice daily collection (day and night shifts). No permanent or temporary bins. However, 350 half barrels were distributed in Zone 1 in 1999-2000, most of which were stolen.
Zone 2 (2WT)	<ul style="list-style-type: none"> Minuwangoda Rd (part), Ja Ela Rd (part), Pahalagama Rd, Kumarathunga Mw (major roads) and some small by-roads; Ja Ela bus stand. Approx. 70% residential, 30% commercial. Large waste producers: CWE (0.33 2WT/d). Daily collection in most of area except along part of Kumaratunga Mw with some small roads being collected on other days, excluding Wed. Pahalagama Rd (new area) is collected on Wed only, following a request from residents in this area. No permanent or temporary collection points.
Zone 3 (2WT)	<ul style="list-style-type: none"> Area bounded by Vishaka Rd, Vijaya Rd, Colombo/Ranatunga Rds, Orutota rds. Approx 60-70% residential, 30-40% commercial (including Telecom, Post Office), some institutions (Gothami College, Yasodara Devi BV, Court Complex) and Police Quarters housing scheme. Large waste producers: Garment factory (3-4 polysacks/d), Post Office and surrounds (6 big baskets/d). Daily collection in 95% of area. The Zone 1 tractor collects garbage from the Police Quarters, Court Complex, Gothami College and Yasodara Devi BV. Police Quarters has a "garbage chute" which residents use for discharging their waste. Sometimes, waste gets stuck in the chute and is difficult to dislodge.
Zone 4 (4WT, 49-8156)	<ul style="list-style-type: none"> Area bounded by Colombo, Holy Cross/Sangamitta, Queen Marys and Yakkala rds. Approx 40% residential, 60% commercial. Large waste producers: Base Hospital, Cooperative Hospital (2/3 barrel/d) Daily collection throughout area.
Zone 5 (2WT)	<ul style="list-style-type: none"> Area bounded by Colombo Rd, Vijaya Rd and Asoka Garden. Mainly residential. Large waste producers: Sagatha Madura Hotel (5 polysacks/d), Deewoon Lanka (garment factory), carpentry workshop (1.5-2 polysacks/d) Childrens' Home (3 dustbins/d), Arogya Hospital (2.5 barrels/d). Daily collection in most areas.

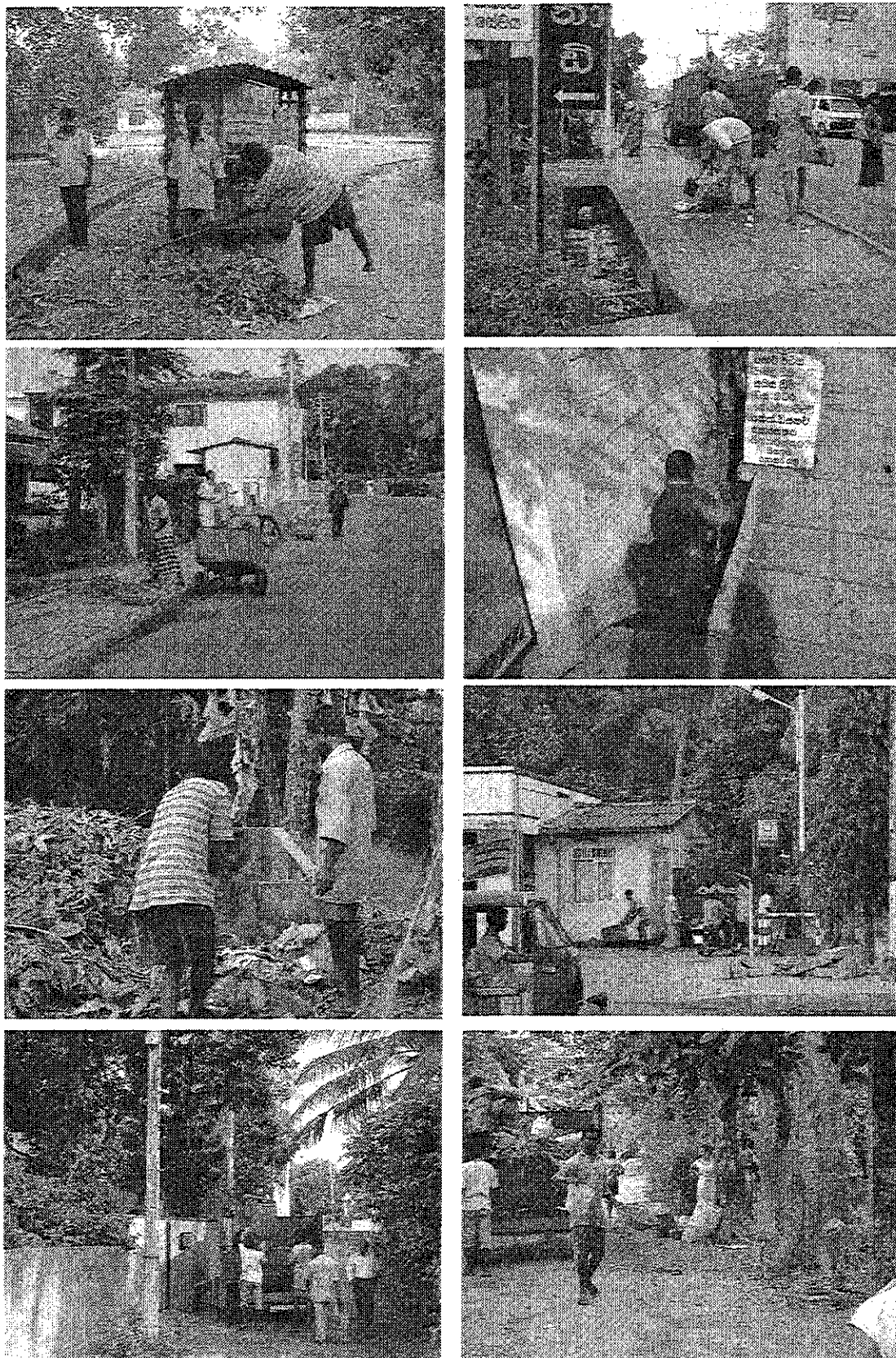
	<ul style="list-style-type: none"> • Difficult to collect garment factory waste, which comprises mainly cardboard and textiles and is discharged at the roadside. • Some residents in this area have requested free garbage storage barrels from GMC. • About 15 households use bins and give their waste directly to the tractor. • Arogya hospital waste sometimes includes syringes with needles and clinical waste.
Zone 6 (2WT)	<ul style="list-style-type: none"> • Area bounded by Colombo, Kaiyani, Yakkala and Sri Bodhi Rds. • Mainly residential. • Large waste producers: Bandaranayake MV (1 2WT/d). • Daily collection along main roads, alternate days collection in other areas. • Good public cooperation in this area, with most residents using sili bags and giving their waste directly to the tractor.
Night shift (4WT)	<ul style="list-style-type: none"> • Zone 1 and commercial areas of zones 2, 3 and 4. • Commercial.
Yakkala (4WT: 49-9178 2WT: 75-3817, HC)	<ul style="list-style-type: none"> • Mixed residential and commercial. • Large waste producers: Sunday Pola, some industries. • Daily collection along the main roads (Kandy/Colombo, Gampaha/Yakkala, Gampaha/Mirriswatta roads); 1-2 times/wk collection in limited other areas; many unserved areas. • Most businesses in Yakkala town now have their own dustbin with lid, paid for by themselves, following the Yakkala PHI requesting them to do so.

Note: Temporary collection points identified by GMC supervisors are located in zones 3 (7 places), 5 (13 places) and 6 (4 places) in Gampaha/Bandiyamulla and Yakkala (2 places). No temporary collection points were identified for zones 1, 2 and 4 in Gampaha/Bandiyamulla.

2.3.2 Sample Photos



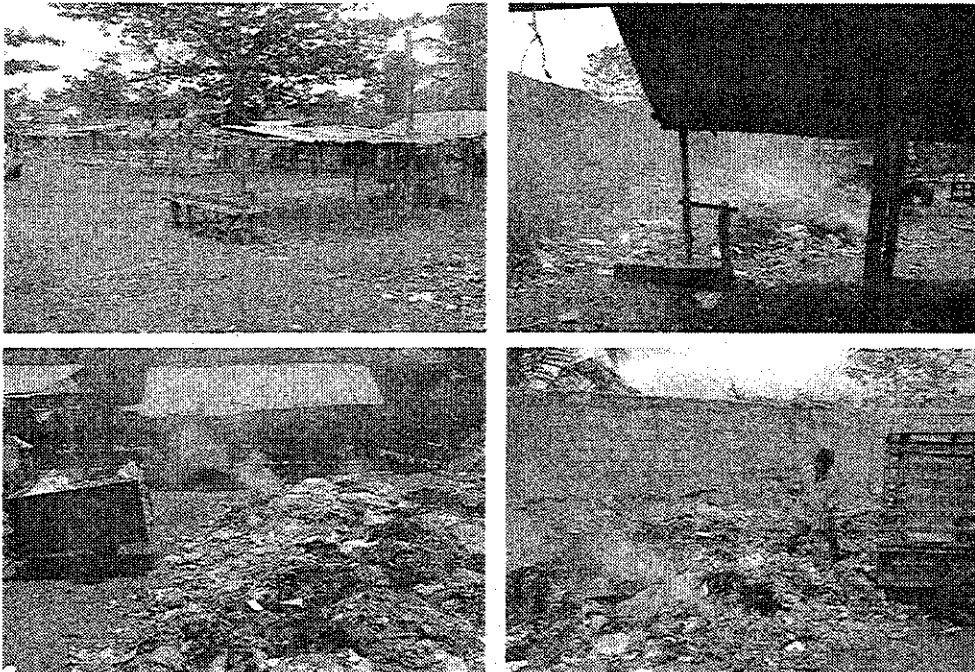
GMC garbage discharge system: Top - large piles of garden waste, which are often burnt on-site (Yakkala area); upper middle: garbage discharged in plastic bags (left) or buckets (right) for collection; lower middle left - small piles of garbage discharged at the roadside/into drains; bottom: left - boy bringing household garbage to trailer for direct discharge; right - garbage discharge chute at Police Quarters housing scheme.



GMC garbage collection system: Top: labourers loading one of many small piles of garbage onto a polysack (left; Yakkala) or into a basket (right; Gampaha) for loading into the tractor; upper middle: handcart labourers and drain cleaner at work; lower middle: left – unloading concrete bin in Yakkala; right – direct collection from commercial premises in Gampaha; lower bottom – labourers loading barrels/buckets into collection vehicle.



GMC Transfer Station near GMC Office. Note the extremely poor condition of the large trailer.



Yakkala Pola Transfer Station: Top left –View of Pola stalls from transfer station; top right – smouldering garbage; bottom left – handcart about to be unloaded; bottom right – labourer unloading garbage from two wheel tractor.

2.3.3 Garbage Collection Daily Routine

Day shift working hours are from 7:30am-3:30pm, Monday-Friday, on Saturday until 12:30pm (half day), while on Sunday, one four wheel tractor and one handcart operate and temporary labourers work for ~8hrs.

Night shift working hours are from 8pm-4am, seven days/week. One four wheel tractor is used during the night-shift, currently driven by a temporary driver, while labourers are permanently assigned to the night shift. Supervisors are rostered onto the night shift, one month at a time. According to the SPHI, night shift operation is effective, it being easier to clean the commercial area during this time. However, the streets are still often dirty in the morning, due to poor public cooperation, with people discharging their waste at the roadside after the night tractor has passed.

Each morning, a muster is taken by the SPHI and Supervisors at the GMC Office and Yakkala sub-office at 7:30am, with another muster at 1pm. There is no muster for the night shift.

All garbage collection vehicles and trailers are parked near the GMC office or Yakkala sub-office overnight, while handcarts are generally parked near their working areas.

All supervisors are required to use their own transport (normally bicycles) for supervising their collection areas.

No collection vehicle trips or tonnage records are kept, although trip information can be obtained from vehicle running chart data, which generally records the number of trips undertaken daily by each vehicle.

Diesel is stored at the GMC Workshop Stores. Drivers must order diesel using a standard form, while all vehicles must complete a "running chart" record book, including a written description, start and finish odometer readings, trip distance (km), time in/out and fuel orders. These records must be signed by the Supervisors daily and are sometimes checked by the CPHI.

2.3.4 Time and Motion Data

JICA time and motion study results for two tractors in August 2002 are summarized below.

Table 2-5: Time and Motion Study Summary

Item	Tractor	Compactor
Zone	Yakkala (Kiridiwela Rd & Siriderana Watta area)	Zone 4, Gampaha
Start Time	7:57	8:20
Time for 1 st collection round (travel and loading)	107 min	143min 20s
Travel to transfer point/landfill	7 min	37min 40s
Unloading at transfer point/landfill	18 min	3min 50s
Return from transfer point/landfill	0 min	37min 40s (estimated)
Time at end of 1 st round	10:09	12:02:30
Total 1 st round loading time	72min 25s	109min 59s
Total 1 st round time	132 min	222min 30s
1 st round loading time (% of total time)	55%	49%

Notes:

Yakkala 2WT labourers normally have tea before or during the first collection round but did not do this on the day of the survey.

Gampaha MC labourers had a 13min 55s tea-break during round one, which is included in the 1st round collection time.

Yakkala area specific notes:

- Very high garden waste generation.
- In some areas, labourers walk behind the 2WT, collecting waste as it goes ("moving collection").
- 2WT takes its load to the temporary transfer station at the Yakkala Pola.
- 2WT unloading time is approximately 18min.

Gampaha specific notes:

- Moving collection system used in some areas.
- In one street, a bell collection style system was used.
- Tractor travel time to and from the landfill is approximately 75min.
- Tractor unloading time at the landfill is approximately 4min.

2.3.5 GMC Collection Vehicle Unit Costs

GMC collection vehicle unit costs were calculated for handcarts and tractors using actual cost data supplied by GMC, supplemented by information from other sources where necessary. These costs are tabulated below.

Table 2-6: GMC Collection Vehicle Unit Costs

Item	Handcart		2WT	4WT
	2	3	2	4
No of labourers				
Driver	0	0	72,000	72,000
Labourers	134,400	201,600	134,400	268,800
Staff equipment	1,952	2,225	3006	8954
Diesel	0	0	18,370	75,510
Oil	0	0	1,190	2,420
Vehicle maintenance	2,440	2,440	20,983	31,623
Trailer maintenance	0	0	0	26,000
Insurance	0	0	1,584	6,639
Licence/ registration	0	0	150	150
Depreciation	3,500	3,500	6,044	33,069
Total (Rs/yr)	142,292	209,765	257,727	525,164
Average trips/d	3	3	1.8	1.6
Collection (T/yr)	96	96	338	658
Unit cost (Rs/T)	1,482	2,185	764	799
Kandy MC (Aug 2002)	1,342	1,983	N/a	496 (4Lr)
Matale MC (Aug 2002)	501	N/a	N/a	403 (4Lr)
Negombo MC (Aug 2002)	N/a	1,320-792 (3-5tr/d)	N/a	418 (3Lr)
Chilaw UC (Aug 2002)	689-391 (2.8-5tr/d)	1,322-749 (2.8-5tr/d)	698	629 (3Lr)
Nuwara Eliya NC (Sep 02)	N/a	1,858-1,115 (tr/d)	N/a	517 (3Lr)
Badulla MC (Sep 02)	N/a	1,865-1,119 (3-5 tr/d)	822 (2Lr)	268-254 (3Lr)

Notes:

Lr = labourer, tr = trips, 2WT = two wheel tractor, 4WT = four wheel tractor, tr = trips

Vehicle garbage collection trips data based on GMC Supervisor estimates of three trips per day for handcarts and 1.8 trips/d for two wheel tractors, while 1.6trips/d for four wheel tractors is based on JICA survey results (Aug 8-14, 2002).

Average collection (T/yr) based on average vehicle tonnages (capacity x fill factor x density) and 26 working days per month.

Maintenance costs include tyres and tubes.

Straight line depreciation has been included, based on the following capital costs and lifetimes: handcart = 10,500Rs, 3yrs; 2WT = 105,775Rs, 17.5yrs (average capital cost of all six GMC 2WTs); 4WT = 443,400Rs, 17.5yrs (average capital cost of all five GMC 4WTs), trailer = 69,583Rs, 9yrs (average capital cost of all six GMC trailers).

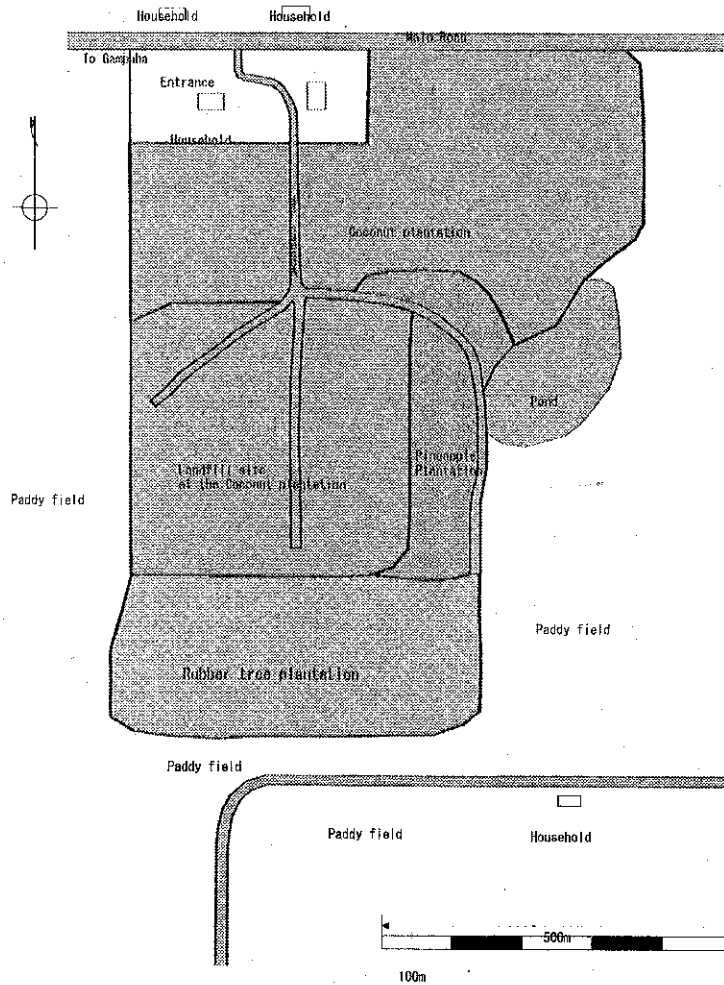
2.4 Final Disposal

2.4.1 Assessment of Current Landfill site

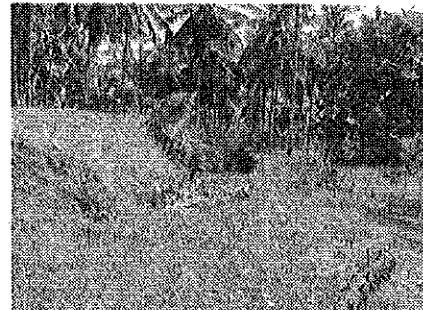
Results of an assessment of the current landfill site in GMA are given in the table below.

Table 2-7: Assessment of Current Landfill Site in GMA

Item		Description
1. Name		Henegama Plantation
2. Location		Henegama, Waliweriya, Gampaha. GS Division: Henegama Mahara Pradeshiya Saba (Mahara Local Authority) Approximately 15km from the centre of Gampaha town
3. Start of Landfilling		January 2000
4. Ownership		Mr. Rajapaksha (private land)
5. General Site Description		Landfilling is taking place along a small ridge within a coconut plantation, approximately 10m higher than the surrounding area. There is main road to the north, paddy fields to the south and west of the coconut plantation, and another coconut plantation and pond to the east.
6. Surrounding land use		Residential, cemetery, coconut plantation and paddy field
7. Area	Current landfill site	Approximately 16 ha
8. Disposal details	Method	During 2000-02: trenches were dug periodically by JCB, filled in with garbage and then manually covered with soil. Current: Open dumping on previously filled trenches.
	Reserve volume	None
9. Waste discharge	Municipal waste	MSW collected by GMC. Daily average: 8.6 tonnes/day (256 tonnes/month).
	Healthcare waste	Only about 0.31T/d of healthcare waste, comprising mainly normal MSW is collected by GMC and taken to the disposal site.
	Industrial waste	Only about 0.49T/d of industrial waste, comprising normal MSW, is collected by GMC and taken to the disposal site.
	Gully sucker waste	A small amount of gully sucker waste is discharged to the Henegama site (main disposal site is to north of Gampaha). Monthly average = 20 trips (40m ³ /month) Gully sucker: Tractor mounted tank + suction pump; capacity: 2m ³
10. Environmental impact	Odour	2000-02: none Current: some
	Flies & crows	Present but not many.
	Fire & smoke	Fires are sometimes lit deliberately to control odour and flies
	Leachate	Soaks into ground.
	Gully sucker waste	Very useful as a fertilizer according to coconut plantation owner.
11. Facilities	Control house	None
	Gate	Present
	Boundary fence	Present
	Weighbridge	None
	Leachate treatment	None
	Buffer zone	Coconut and other trees function as buffer zone.
	Electricity	None
	Water supply	None
Telephone line	None	
12. Operation and Maintenance (O&M)	Responsible organisation	GMC
	Equipment	Backhoe loader: 1 unit, rented to GMC. O&M cost, including operator's salary, fuel and maintenance: 1 st year: 842 manhours @ 950Rs/ m.hr = 800,000Rs 2 nd year: 631 m. hrs = 600,000Rs 3 rd year: 230 m. hrs = 213,000Rs Current: not used
	Staff allocation	2000-2002: Two labourers to cover waste with soil after discharge. Current: none
13. Surrounding village	Henegama	Refer following text



Unloading of the waste from the trailer



Unloaded waste at the coconut plantation



Covering soil to the unloaded waste

Figure 2-1: Gampaha Final Disposal Site

2.4.2 Landfill Site Issues

GMC disposed waste at the coconut plantation from January 2000 – July 2002, at which date the plantation owner requested GMC to stop disposal, as the coconut plantation had received enough waste as fertilizer for the coconuts. GMC subsequently shifted to another site, but only discharged their waste here for a short period before the landowner requested them to stop filling, due to the associated nuisance (flies, odour, etc.). They have now moved back to the Henegama coconut plantation but are currently simply discharging waste on to the ground in areas which have previously been filled without applying soil cover.

2.4.2.1 Remaining Lifetime

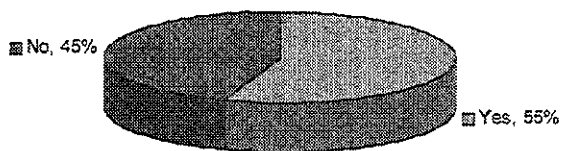
The area currently being used for disposal at the Henegama coconut plantation is already full and can only continue to be used, if trenches previously filled with waste are excavated and filled again, or another part of the coconut plantation is used.

2.4.2.2 Odour, Pests, Crows, and Smoke

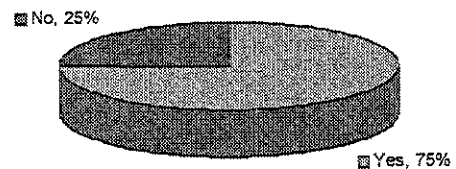
According to an interview survey of 40 residents in the Henegama village close to the Gampaha landfill site in August 2002, odour, pests, crows, and smoke were having an impact on them.

This was mainly due to the late application of soil cover at the landfill site. Although two labourers manually covered the waste with soil daily, there was some time delay between when waste was discharged and when it was covered, resulting in negative impacts on the village people. Furthermore, labourers often burnt the waste in order to mitigate odour, pests, and crows, resulting in smoke.

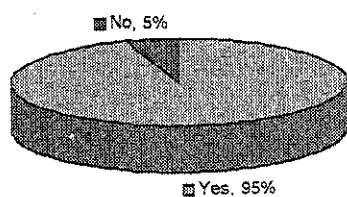
IS smoke landfill site a problem ?



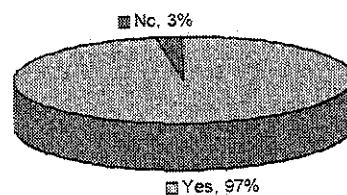
Is offensive odour from the landfill a problem ?



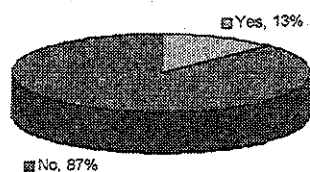
Has the landfill caused problem due to mosquitoes ?



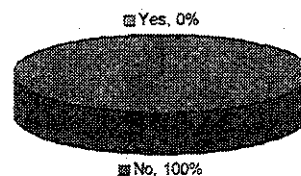
Has the landfill caused problem due to flies ?



Is dust caused by landfill a problem ?



Are you happy with the existing landfill operation conditions ?



The nuisance impacts are now likely to be much worse than in 2002, due to the current open dumping method being followed and no soil cover being applied at all. Several plantation labourers and one nearby resident complained to the Study team about this during a visit to the landfill in August 2003.

2.4.2.3 Leachate

As the amount of disposed waste is relatively small, leachate generation is likely to be low, with the leachate soaking into the ground.

2.4.2.4 Operation and Maintenance (O&M)

Current O&M issues include:

- Open dumping of waste on the ground in a haphazard fashion is unacceptable.
- No soil cover is being provided at all, resulting in nuisance problems (flies, odour, pests and crows).
- The labourers sometimes burn the waste in order to mitigate these nuisance impacts, producing smoke which may also annoy nearby residents.

2.4.3 New Landfill Site

2.4.3.1 Necessity

The existing amount of waste to disposal is relatively small – 8.6T/d. However, the final disposal amount is expected to increase in the future, due to population growth and particularly if garbage collection services are provided to the many new areas added to GMA not previously provided with such a service.

The trench filling (periodic JCB excavation + manual soil cover application) system followed at the disposal site from 2000-2002 is satisfactory when the amount of waste to disposal is relatively low (say up to 10-15T/d). However, for waste amounts in excess of this, small sites such as coconut plantations will fill up very quickly, while a more mechanised system is required for filling. Hence, filling up coconut plantations becomes impractical.

These factors, combined with the lack of space at the current disposal site, means that GMC needs to find a new sanitary landfill site urgently, in order to dispose of Gampaha's waste in a proper manner.

Furthermore, any new landfill site should be of sufficient capacity to last 10-20 years, due to the high development, construction and O&M costs involved with sanitary landfilling.

2.4.3.2 Site Selection and Acquisition Procedure

The main tasks required for selection and acquisition of a new landfill site are:

- Selection of candidate landfill sites.
- Basic surveys (topography, geology, climate, etc.).
- Evaluation of the candidate sites, leading to the selection of a preferred site.
- Basic design of the landfill site.
- Environmental Impact Assessment (EIA)
- Consultation with residents in the area and other stakeholders to obtain their approval
- Acquisition of the land for the landfill site.
- Detailed design of the landfill site.
- Construction of the landfill site.

This process can take between 3-10 years depending on the proposed scale of landfill and local conditions. In particular, it takes a long time to get approval from all stakeholders. However, this is vital, as it is quite impossible to implement the project without getting the approval of these people.

Chapter 3

Gampaha Field Surveys

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Chapter 3 Field Survey

3.1 Public Opinion Survey for Household in Gampaha

Findings from Public Opinion Survey for Household in Gampaha

A questionnaire survey was conducted among 150 households in Gampaha Municipal Areas, to gather:

- Basic socio-economic profiles of inhabitants of Gampaha.
- An appreciation of public attitude to the provision of solid waste collection services.
- An appreciation of desired improvement in solid waste management services.
- An indication of willingness to pay for improved solid waste collection services.

Period of survey: The third and fourth weeks of August and the first week of September, 2002

Sample size: 150 (50 each from high, middle and low income areas)

Sampling areas: *High income areas are Werellawatta, Gajaba Rd and Kalagedihena.

*Middle income areas are

Keenagahalanda watta and Pahalagama.

*Low income areas are Suhada

mawatha and Indigolla.

1. General Questions

Q1-1 Ethnicity

	Low		Middle		High		Total	
	Number	%	Number	%	Number	%	Number	%
1 Sinhala	44	88%	50	100%	50	100%	144	96%
2 Muslim	0	0%	0	0%	0	0%	0	0%
3 Tamil	6	12%	0	0%	0	0%	6	4%
4 Other	0	0%	0	0%	0	0%	0	0%
Total	50	100%	50	100%	50	100%	150	100%

Q1-2 Religion

	Low		Middle		High		Total	
	Number	%	Number	%	Number	%	Number	%
1 Buddhist	43	86%	50	100%	45	90%	138	92%
2 Islam	0	0%	0	0%	0	0%	0	0%
3 Hindu	5	10%	0	0%	0	0%	5	3%
4 Christian	2	4%	0	0%	5	10%	7	5%
5 Other	0	0%	0	0%	0	0%	0	0%
Total	50	100%	50	100%	50	100%	150	100%

Q1-3 Household information

(person)	Low	Middle	High	Total
Avg. number of household members	4.6	4.2	4.4	4.4
(Rs.)	Low	Middle	High	Total
Avg. household income	5,484	10,114	21,334	12,311

(Rs.)	Low	Middle	High	Total
Income per person	1,182	2,385	4,871	2,785

Q1-4 How much is the total expenditure of your household per month on average?

(Rs.)	Low	Middle	High	Total
Avg. household expenditure	4,780	8,370	15,830	9,660

(Rs.)	Low	Middle	High	Total
Expenditure per person	1,030	1,974	3,614	2,186

Q1-5 Please specify the priority for your daily life regarding the improvement of the following aspects? (Fill all three priorities)

	Low	Middle	High	Total
1 First	Storm water drainage	Garbage collection	Garbage collection	Garbage collection
2 Second	Waste water collection	Water supply	Water supply	Water supply
3 Third	Water supply	Waste water collection	Storm water drainage	Storm water drainage

2. Questions on Garbage Collection Services in Your Area

Q2-1 Are there garbage collection services in your area?

	Low		Middle		High		Total	
	Number	%	Number	%	Number	%	Number	%
1 Yes	22	44%	45	90%	31	62%	98	65%
2 No	28	56%	5	10%	19	38%	52	35%
Total	50	100%	50	100%	50	100%	150	100%

Q2-2 Do you use these services?

	Low		Middle		High		Total	
	Number	%	Number	%	Number	%	Number	%
1 Yes	21	42%	24	48%	9	18%	54	36%
2 No	1	2%	21	42%	22	44%	44	29%
99 Irrelevant	28	56%	5	10%	19	38%	52	35%
Total	50	100%	50	100%	50	100%	150	100%

Q2-3(a) How is your garbage collected?

	Low		Middle		High		Total	
	Number	%	Number	%	Number	%	Number	%
1 Placing garbage outside the property for collection	13	26%	16	32%	1	2%	30	20%
2 Carrying garbage to a specified collection point	3	6%	6	12%	6	12%	15	10%
3 Carrying garbage to a collection truck directly	5	10%	2	4%	2	4%	9	6%
4 Others	0	0%	0	0%	0	0%	0	0%
99 Irrelevant	29	58%	26	52%	41	82%	96	64%
Total	50	100%	50	100%	50	100%	150	100%

Q2-3(b) ***(Only for those who choose 2 or 3 in question Q2-3)*** How far do you have to walk to reach this point?

	Low		Middle		High		Total	
	Number	%	Number	%	Number	%	Number	%
1 1 - 25m	8	16%	8	16%	8	16%	24	16%
2 26 - 50m	0	0%	0	0%	0	0%	0	0%
3 51 - 100m	0	0%	0	0%	0	0%	0	0%
4 100 - 250m	0	0%	0	0%	0	0%	0	0%
5 Over 250m	0	0%	0	0%	0	0%	0	0%
99 Irrelevant	42	84%	42	84%	42	84%	126	84%
Total	50	100%	50	100%	50	100%	150	100%

Q2-4 How often is your garbage collected?

	Low		Middle		High		Total	
	Number	%	Number	%	Number	%	Number	%
1 Daily	13	26%	0	0%	4	8%	17	11%
2 More than four times per week	4	8%	0	0%	5	10%	9	6%
3 Two to three times per week	2	4%	0	0%	0	0%	2	1%
4 Once a week	1	2%	24	48%	0	0%	25	17%
5 Less than once per week	0	0%	0	0%	0	0%	0	0%
6 Irregular	1	2%	0	0%	0	0%	1	1%
98 Don't know	0	0%	0	0%	0	0%	0	0%
99 Irrelevant	29	58%	26	52%	41	82%	96	64%
Total	50	100%	50	100%	50	100%	150	100%

Q2-5 Is the garbage collection service done at a fixed time on the collection day?

	Low		Middle		High		Total	
	Number	%	Number	%	Number	%	Number	%
1 Yes	17	34%	5	10%	7	14%	29	19%
2 No	4	8%	19	38%	2	4%	25	17%
98 Don't know	0	0%	0	0%	0	0%	0	0%
99 Irrelevant	29	58%	26	52%	41	82%	96	64%
Total	50	100%	50	100%	50	100%	150	100%

Q2-6 Have you ever given small allowance such as New Year's allowance and other seasonal allowance, including the reward to the extra work for you, to garbage collectors?

	Low		Middle		High		Total	
	Number	%	Number	%	Number	%	Number	%
1 Yes	0	0%	6	12%	3	6%	9	6%
2 No	21	42%	18	36%	6	12%	45	30%
99 Irrelevant	29	58%	26	52%	41	82%	96	64%
Total	50	100%	50	100%	50	100%	150	100%

Q2-7 How much is the total amount of (1) small allowance and (2) the reward you gave over the last one year?

(1) Small allowance

(Rs.)	Low	Middle	High	Total
Average annual small allowance	-	43	67	51

Note: No. of effective answers on this question is 9.

(2) Reward

(Rs.)	Low	Middle	High	Total
Average annual reward	-	50	-	50

Note: No. of effective answers on this question is 1.

Q2-8 Are you satisfied with the collection service?

	Low		Middle		High		Total	
	Number	%	Number	%	Number	%	Number	%
1 Very satisfied	15	30%	2	4%	3	6%	20	13%
2 Somewhat satisfied	0	0%	14	28%	6	12%	20	13%
3 Less than satisfied	5	10%	3	6%	0	0%	8	5%
4 Not satisfied at all	1	2%	5	10%	0	0%	6	4%
99 Irrelevant	29	58%	26	52%	41	82%	96	64%
Total	50	100%	50	100%	50	100%	150	100%

Q2-9 If you chose either 2, 3 or 4, what are the reasons? (Choose one or more)

	Low		Middle		High		Total	
	Number	%	Number	%	Number	%	Number	%
1 Garbage collection / sweeping is not properly done	6	9%	10	13%	3	6%	19	10%
2 Garbage collection / sweeping frequency is too low	5	8%	22	29%	3	6%	30	15%
3 Garbage collection / sweeping is irregular	4	6%	9	12%	1	2%	14	7%
4 Garbage collection time is too early or to late or irregular	4	6%	6	8%	0	0%	10	5%
5 Behavior of garbage collection workers is bad	1	2%	0	0%	0	0%	1	1%
6 Garbage collection workers demand small allowance	0	0%	1	1%	0	0%	1	1%
7 Garbage collection small allowance is expensive	0	0%	0	0%	0	0%	0	0%
8 Collection service is not fair	1	2%	0	0%	0	0%	1	1%
9 Garbage collection point is too far	0	0%	1	1%	0	0%	1	1%
10 Other	0	0%	0	0%	1	2%	1	1%
99 Irrelevant	44	68%	28	36%	44	85%	116	60%
Total	65	100%	77	100%	52	100%	194	100%

Note: Other means "not enough modern collection vehicles."

Q2-10 Have you ever complained about the garbage collection service to the authorities in the last three years?

	Low		Middle		High		Total	
	Number	%	Number	%	Number	%	Number	%
1 Yes	6	12%	4	8%	2	4%	12	8%
2 No	15	30%	20	40%	7	14%	42	28%
99 Irrelevant	29	58%	26	52%	41	82%	96	64%
Total	50	100%	50	100%	50	100%	150	100%