

Time & Motion Study

Organization: BINS

Trip 1 Date: 20/5/97

Vehicle No. KAB34IU

Loading Capacity: 6TONS

Researcher's name: L. Kadere

No. of Crew: 5

Estimated Volume: 5.5TONS

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-49	in	30,423	450	12 : 17	1		Convent drive
	out			12 : 18		1	
Loading-50	in		150	12 : 19	1		Amboseli rd
	out			12 : 19		0	
Loading-51	in		50	12 : 20	1		Amboseli rd
	out			12 : 22		2	
Loading-52	in		200	12 : 25	3		off Amboseli rd.
	out			12 : 25		0	Lavington Estate
Loading-53	in		110	12 : 26	1		
	out			12 : 29		3	
Loading-54	in		150	12 : 36	7		Amboseli rd
	out			12 : 38		2	
Loading-55	in		140	12 : 41	3		
	out			12 : 41		0	
Loading-56	in		350	12 : 42	1		Amboseli gardns
	out			12 : 43		1	
Loading-57	in		351	12 : 45	2		Amboseli gardns
	out			12 : 46		1	
Loading-58	in		982	12 : 49	3		James Giochuri rd
	out			12 : 51		2	
Loading-59	in		200	12 : 52	1		
	out			12 : 55		3	
Loading-60	in		310	12 : 56	1		
	out			12 : 57		1	
Loading-61	in		125	12 : 58	1		
	out			12 : 59		1	
Loading-62	in		250	13 : 1	2		
	out			13 : 1		0	
Loading-63	in		300	13 : 2	1		
	out			13 : 3		1	
Loading-64	in		850	13 : 6	3		Kabarsiran Avenue
	out			13 : 10		4	
Loading-65	in	30,427	1,050	13 : 21	11		Kabarsiran Avenue
	out			13 : 22		1	
Loading-66	in	30,428	100	13 : 23	1		
	out			13 : 25		2	
Loading-67	in		250	13 : 27	2		Mt. Camel rd.
	out			13 : 31		4	
Loading-68	in		140	13 : 31	0		Manyani rd. west
	out			13 : 31		0	Ewasongiro park
Loading-69	in		250	13 : 33	2		
	out			13 : 33		0	
Loading-70	in		40	13 : 34	1		
	out			13 : 36		2	
Loading-71	in		400	13 : 38	7		Manyani rd. west
	out			13 : 39		1	
Loading-72	in		240	13 : 39	0		Waiyaki way
	out			13 : 40		1	

Time & Motion Study

Organization: BINS

Trip 1 Date: 20/5/97

Vehicle No. KAE341U

Loading Capacity: 6TONS

Researcher's name: L. Kadere

No. of Crew: 5

Estimated Volume: 5.5TONS

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-73	in		450	13 : 43	3		Shimo la Tewa Lane
	out			13 : 43		0	
Loading-74	in		380	13 : 45	2		Musa Gitau rd.
	out			13 : 46		1	
Loading-75	in		80	13 : 48	2		
	out			13 : 48		0	
Loading-76	in		195	13 : 51	3		off Waiyaki way
	out			13 : 52		1	
Loading-77	in		120	13 : 56	4		Kabisarani Av.
	out			13 : 56		0	
Loading-78	in		450	13 : 57	1		
	out			13 : 59		2	
Loading-79	in		420	14 : 2	3		
	out			14 : 4		2	
Loading-80	in		620	14 : 10	6		Manyani rd. East
	out			14 : 11		1	
Loading-81	in	30,432	200	14 : 12	1		East rd. Tara
	out			14 : 13		1	
Loading-82	in		400	14 : 21	8		Manyani rd. East
	out			14 : 22		1	
Loading-83	in		350	14 : 23	1		
	out			14 : 24		1	
Loading-84	in		650	14 : 32	8		Kanjata rd. Crescent
	out			14 : 34		2	
Loading-85	in		200	14 : 35	1		Kanjata rd.
	out			14 : 36		1	
Loading-86	in		50	14 : 36	0		
	out			14 : 38		2	
Loading-87	in		1,200	14 : 44	6		Muthangari drive
	out			14 : 45		1	
Loading-88	in		200	14 : 47	2		
	out			14 : 51		4	
Loading-89	in	30,434	150	14 : 54	3		Mahiga Mairu Av.
	out			14 : 56		2	
Loading-90	in		1,052	15 : 4	8		Waiyaki way
	out			15 : 16		12	Mava park estate
Dumping site	in			:			
Start dumping				:	0		
Finish dumping				:		0	No dumping done
Dumping site	out			:	0		due to lateness
Reach to workshop	in	30,450	16,000	17 : 10	114		Kampala rd.
Total			59,079		399	128	Total min.:527 min.
Collection			41,079		260	128	
Transportation			18,000		139	0	
Inside the dumping site			0		0	0	Dumping time
Idling					10	10	for fueling

Time & Motion Study

Vehicle No. KAB441W

No. of Crew: 6

Organization: bins

Loading Capacity: 6.5 tons

Estimated Volume: 7 tons

Trip 1 Date: 20/5/97

Researcher's name: M. Gonda

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop			8 : 38			
Loading-1		1,000	8 : 58	20		to Enterprise rd
			9 : 8		10	
Loading-2		40	9 : 9	1		Kusaka rd into Gong rd
			9 : 16		7	
Loading-3		400	9 : 24	8		
			9 : 27		3	
Loading-4		100	9 : 30	3		Argwings Kodhek rd
			9 : 34		4	
Loading-5		600	9 : 41	7		Milimani rd
			9 : 47		6	
Loading-6		800	9 : 54	7		Laikipia rd
			9 : 55		1	
Loading-7		300	9 : 57	2		Githunguri rd.
			9 : 59		2	
Loading-8		80	9 : 59	0		
			10 : 0		1	off Kieri rd
Loading-9		40	10 : 1	1		
			10 : 2		1	
Loading-10		30	10 : 2	0		
			10 : 3		1	
Loading-11		50	10 : 4	1		
			10 : 5		1	
Loading-12		100	10 : 6	1		
			10 : 9		3	
Loading-13		300	10 : 12	3		
			10 : 14		2	
Loading-14		250	10 : 17	3		
			10 : 19		2	
Loading-15		50	10 : 19	0		
			10 : 21		2	
Loading-16		30	10 : 21	0		
			10 : 24		3	
Loading-17		50	10 : 26	2		
			10 : 27		1	
Loading-18		200	10 : 30	3		
			10 : 32		2	Kandara rd
Loading-19		150	10 : 33	1		
			10 : 34		1	
Loading-20		100	10 : 34	0		Gem lane
			10 : 35		1	
Loading-21		40	10 : 35	0		
			10 : 36		1	
Loading-22		80	10 : 36	0		
			10 : 37		1	19 min. break
Loading-23		150	10 : 37	0		
			10 : 38		1	

Time & Motion Study

Organization: bins

Trip 1 Date:20/5/97

Vehicle No. KAE441W

Loading Capacity: 6.5tons

Researcher's name: M. Gonda

No. of Crew: 6

Estimated Volume: 7tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24	in		100	10 : 38	0		
	out			10 : 39		1	
Loading-25	in		100	10 : 40	1		
	out			10 : 40		0	
Loading-26	in		80	10 : 41	1		
	out			10 : 42		1	
Loading-27	in		40	10 : 42	0		Mandera rd
	out			10 : 45		3	
Loading-28	in		80	10 : 47	2		
	out			10 : 47		0	
Loading-29	in		150	10 : 49	2		
	out			10 : 49		0	
Loading-30	in		100	10 : 50	1		
	out			10 : 52		2	
Loading-31	in		150	11 : 17	25		19 min. break(10:57-11:16)
	out			11 : 17		0	
Loading-32	in		100	11 : 19	2		
	out			11 : 20		1	
Loading-33	in		200	11 : 21	1		Dik dik rd
	out			11 : 22		1	
Loading-34	in		500	11 : 23	1		Collections on individual
	out			11 : 27		4	houses
Loading-35	in		100	11 : 29	2		
	out			11 : 30		1	
Loading-36	in		40	11 : 30	0		
	out			11 : 31		1	
Loading-37	in		80	11 : 32	1		
	out			11 : 34		2	
Loading-38	in		100	11 : 34	0		
	out			11 : 35		1	
Loading-39	in		80	11 : 35	0		
	out			11 : 36		1	
Loading-40	in		150	11 : 38	2		
	out			11 : 39		1	
Loading-41	in		40	11 : 40	1		
	out			11 : 41		1	
Loading-42	in		50	11 : 41	0		
	out			11 : 42		1	
Loading-43	in		80	11 : 43	1		
	out			11 : 44		1	
Loading-44	in		500	11 : 46	2		
	out			11 : 51		5	
Loading-45	in		200	11 : 52	1		
	out			11 : 53		1	
Loading-46	in		60	11 : 54	1		
	out			11 : 55		1	

Time & Motion Study

Organization: bins

Trip 1 Date:20/5/97

Vehicle No. KAE441W

Loading Capacity: 6.5tons

Researcher's name: M. Gonda

No. of Crew: 6

Estimated Volume: 7tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-47	in		50	11 : 55	0		
	out			11 : 56		1	
Loading-48	in		100	11 : 57	1		
	out			11 : 59		2	
Loading-49	in		100	12 : 1	2		Makueni rd.
	out			12 : 3		2	
Loading-50	in		50	12 : 4	1		
	out			12 : 6		2	
Loading-51	in		40	12 : 7	1		Nyanda rd
	out			12 : 10		3	
Loading-52	in		50	12 : 11	1		
	out			12 : 12		1	Vihiga rd
Loading-53	in		30	12 : 12	0		
	out			12 : 13		1	
Loading-54	in		100	12 : 14	1		
	out			12 : 15		1	Kikambala rd
Loading-55	in		50	12 : 16	1		
	out			12 : 17		1	
Loading-56	in		200	12 : 18	1		Othaya rd
	out			12 : 20		2	
Loading-57	in		50	12 : 20	0		
	out			12 : 21		1	Mugoiri rd
Loading-58	in		200	12 : 23	2		
	out			12 : 24		1	
Loading-59	in		80	12 : 25	1		
	out			12 : 25		0	
Loading-60	in		100	12 : 27	2		
	out			12 : 29		2	
Loading-61	in		150	12 : 30	1		
	out			12 : 33		3	
Loading-62	in		200	12 : 34	1		
	out			12 : 36		2	
Loading-63	in		100	12 : 37	1		
	out			12 : 41		4	
Loading-64	in		200	12 : 43	2		
	out			12 : 44		1	
Loading-65	in		100	12 : 46	2		Kaputei rd.
	out			12 : 48		2	
Loading-66	in		40	12 : 52	4		Othaya rd
	out			12 : 54		2	
Loading-67	in		150	12 : 58	4		Loitokitok rd
	out			12 : 59		1	
Loading-68	in		80	13 : 4	5		Mazeras rd
	out			13 : 6		2	
Loading-69	in		60	13 : 15	9		Muthangari rd
	out			13 : 17		2	

Time & Motion Study

Organization: bins

Trip 1 Date:20/5/97

Vehicle No. KAE441W

Loading Capacity: 6.5tons

Researcher's name: M. Gonda

No. of Crew: 6

Estimated Volume: 7tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-70	in	180	13 : 19	2		Koloh rd
	out		13 : 22		3	
Loading-71	in	140	13 : 26	4		Mugumo rd
	out		13 : 28		2	
Loading-72	in	120	13 : 28	0		Mijikenda rd
	out		13 : 36		8	
Loading-73	in	40	13 : 38	2		Ndoto rd
	out		13 : 42		4	
Loading-74	in	50	13 : 44	2		
	out		13 : 44		0	
Loading-75	in	60	13 : 49	5		
	out		13 : 54		5	
Loading-76	in	120	13 : 58	4		
	out		14 : 2		4	
Loading-77	in	100	14 : 2	0		
	out		14 : 4		2	
Loading-78	in	60	14 : 8	4		
	out		14 : 9		1	
Loading-79	in	80	14 : 12	3		
	out		14 : 16		4	
Loading-80	in	50	14 : 17	1		
	out		14 : 18		1	
Loading-81	in	50	14 : 20	2		Mageta rd
	out		14 : 24		4	
Loading-82	in	100	14 : 24	0		Jacaranda rd
	out		14 : 28		4	
Loading-83	in	20	14 : 29	1		
	out		14 : 34		5	Ramisi rd
Loading-84	in	40	14 : 36	2		
	out		14 : 40		4	
Loading-85	in	80	14 : 42	2		Mbaazi rd
	out		14 : 44		2	
Loading-86	in	100	14 : 46	2		
	out		14 : 46		0	Hendred rd
Loading-87	in	100	14 : 49	3		
	out		15 : 4		15	
Loading-88	in	40	15 : 6	2		
	out		15 : 8		2	
Loading-89	in	30	15 : 9	1		
	out		15 : 12		3	
Loading-90	in	50	15 : 14	2		
	out		15 : 18		4	
Loading-91	in	120	15 : 19	1		
	out		15 : 22		3	
Loading-92	in	160	15 : 26	4		
	out		15 : 28		2	

Time & Motion Study

Organization: bins
 Trip 1 Date: 20/5/97
 Vehicle No. KAE441W Loading Capacity: 6.5 tons Researcher's name: M. Gonda
 No. of Crew: 6 Estimated Volume: 7 tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-93 in		40	15 : 32	4		to D/site throu' Lusaka rd.
out			:			-Ring rd-Ngara-
						to Thika rd-Outer Ring rd.
Dumping site in		12,000	16 : 16	44		
Start dumping		400	16 : 24	8		
Finish dumping		0	16 : 56		32	
Dumping site out		400	17 : 8	12		
Reach to workshop in		18,000	17 : 39	31		
Total		43,030		301	240	Total min.: 541 min.
Collection		11,230		167	208	
Transportation		31,000		95	0	
Inside the dumping site		800		20	32	Dumping time
Idling time				19		break

Time & Motion Study

Organization: bins

Trip 1 Date: 20/5/97

Vehicle No. KAE593R

Loading Capacity: 3ton

Researcher's name: K. Mvakatema

No. of Crew: 5

Estimated Volume: 4.5 tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	60,680		9 : 11			Kampala, Dandora, Woundasa
Loading-1	in	60,711	31,000	10 : 15	64		rd. Enterprise rd.
	out			10 : 45		30	
Loading-2	in	60,715	4,000	10 : 58	13		Enterprise to Kitui
	out			11 : 5		7	
Loading-3	in	60,717	2,000	11 : 10	5		Kitui to Lampala
	out			11 : 11		1	
Loading-4	in		400	11 : 13	2		Kampala to w/shop
	out			11 : 14		1	
Loading-5	in	60,718	600	11 : 16	2		w/shop to Enterprise rd.
	out			11 : 17		1	
Loading-6	in	60,719	1,000	11 : 21	4		Enterprise rd. Dundori rd.
	out			11 : 28		7	
Loading-7	in	60,720	1,000	11 : 35	7		Dundori rd. Bondo rd
	out			11 : 38		3	
Loading-8	in		900	11 : 42	4		Bondo rd Chogoria rd.
	out			11 : 50		8	
Loading-9	in	60,723	2,100	12 : 14	24		Chogoria rd. Lower hill
	out			12 : 52		38	
Loading-10	in	60,726	3,000	13 : 0	8		Lower hill to Masaba Hospita
	out			13 : 2		2	
Loading-11	in	60,728	2000	13 : 10	8		Masaba to Factory
	out			13 : 16		6	
Loading-12	in	60,733	5000	13 : 30	14		Factory to Kijabe rd.
	out			13 : 42		12	
Loading-13	in	60,737	4000	13 : 52	10		Kijabe rd. to Witu rd.
	out			14 : 30		38	
Loading-14	in		300	14 : 35	5		Witu rd.
	out			14 : 42		7	
Loading-15	in	60,741	3700	14 : 58	16		Witu rd. to Lusaka rd.
	out			15 : 2		4	20 min. lunch break
Loading-16	in	60,742	1000	15 : 6	4		Lusaka rd. Addis Abbaba rd.
	out			15 : 21		15	Addis Abbaba rd. To D/site
Dumping site	in	60,756	14,000	16 : 15	54		
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	60,757	1,000	16 : 45	30		
Reach to workshop	in	60,770	13,000	17 : 15	30		
Total			90,000		304	180	Total min.: 484 min.
Collection			31,000		146	170	
Transportation			58,000		128		
Inside the dumping site			1,000		30	0	Dumping time
Idling					20	10	lunch break

Time & Motion Study

Organization: bins

Trip 1 Date:20/5/97

Vehicle No. KAE683R

Loading Capacity: 6ton

Researcher's name: E. Charo

No. of Crew: 4

Estimated Volume: 6.5 ton

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	35,567		8 : 17			
Loading-1	in	35,572	5,000	8 : 58	41		Nevo Bakeries
	out			9 : 21		23	Shimo la Tewa rd
Loading-2	in	35,584	12,000	9 : 46	25		
	out			11 : 0		74	
Loading-3	in	35,595	11,000	11 : 28	28		Hurlingham on Ngong rd
	out			12 : 26		58	
Loading-4	in	35,598	3,000	12 : 38	12		White rose
	out			13 : 20		42	
Loading-5	in	35,600	2,000	13 : 37	17		Kenyatta Av.
	out			13 : 42		5	
Loading-6	in	30,602	2,000	13 : 58	16		Moi Ave.
	out			14 : 15		17	
Loading-7	in	35,606	4,000	14 : 55	40		
	out			15 : 2		7	
Loading-8	in	35,622	16,000	15 : 6	4		Ngara
	out			16 : 43		97	to D/site
Dumping site	in	35,626	4,000	16 : 59	16		Dandora
Start dumping				17 : 8	9		Dumping site
Finish dumping				17 : 48		40	then back to work shop
Dumping site	out			17 : 56	8		
Reach to workshop	in	35,637	11,000	18 : 45	49		
Total			70,000		265	363	Total min.: 628 min.
Collection			50,000		142	323	
Transportation			20,000		106		
Inside the dumping site			0		17	40	Dumping time
Idling time							

Time & Motion Study

Organization: bins

Trip 1

Date:20/5/97

Vehicle No. KAE761R

Loading Capacity: 2.690ton

Researcher's name: L. Mumbo

No. of Crew: 5

Estimated Volume: 3.7ton

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	22,809		9 : 48			first 2hrs to D/site back
Loading-1	in	22,809		9 : 49	1		to W/shop
	out			11 : 56		127	Kitui rd.
Loading-2	in	22,817	8,000	12 : 49	53		15min lunch break
	out			13 : 47		58	to Nairobi hosp
							29 min idle
Dumping site	in	22,830	13,000	14 : 52	65		
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	22,832	2,000	16 : 27	95		
Reach to workshop	in	22,842	10,000	17 : 5	38		
Total			33,000		252	185	Total min.:437min.
Collection			8,000		53	141	
Transportation			23,000		104		
Inside the dumping site			2,000		95	0	Dumping time
Idling time						44	lunch break

Time & Motion Study

Organization: bins

Trip 1 Date: 20/5/97

Vehicle No. KQY636

Loading Capacity: 12tons

Researcher's name: J. Atieno

No. of Crew: 6

Estimated Volume: 10tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			7 : 51			
Loading-1	in			8 : 3	12		Beta health Care
	out			10 : 30		147	(Dar-es-salaam rd.)
Loading-2	in			10 : 53	23		Tibbett & Brittel
	out			12 : 30		97	(Nanyuki rd.)
				:			
				:			Dar-es-salaam rd. Beta health care.
				:			
				:			Dar-es-salaam rd. Lukoni rd.
				:			Lunger, Lunger rd. Outering rd. Kariobangi South to the dumping site; Dandora
				:			
Dumping site	in			14 : 15	105		D/site Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			15 : 36	81		
Reach to workshop	in			16 : 55	79		closed down
Total			0		300	244	Total min.:544 min.
Collection			0		23	244	
Transportation			0		196		
Inside the dumping site			0		81	0	Dumping time
Idling							

Time & Motion Study

Organization: bins

Trip 1 Date:20/5/97

Vehicle No. KST976

Loading Capacity: 2.5tons

Researcher's name: A. Wangu

No. of Crew: 4

Estimated Volume: 7.875m³

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop			7 : 50			odometer not working
Loading-1			8 : 20	30		Canadian h/Commission
			9 : 0		40	on Kimathi street
Loading-2			9 : 7	7		Netherlands Embassy
			9 : 25		18	Lukes ltd.
Loading-3			9 : 32	7		
			9 : 38		6	back to w/shop
Loading-4			10 : 10	32		Rick shaw Chinese Rest Steer
			11 : 0		50	(Tom Mboya) on Kaunda str.
Loading-5			11 : 15	15		
			11 : 30		15	
Loading-6			11 : 53	23		
			11 : 55		2	
Loading-7			12 : 3	8		Lonhro hse
			12 : 17		14	
Loading-8			13 : 0	43		
			13 : 5		5	Norfolk hotel
Loading-9			13 : 14	9		
			13 : 20		6	Steers on Jevanjee gards
Loading-10			13 : 34	14		ABN AMRO Bank
			13 : 50		16	
Loading-11			14 : 0	10		Misono
			14 : 0		0	
Loading-12			14 : 10	10		Seol Garden Rest.- Orna's coff
			14 : 11		1	ABC Place- Craft Market
Loading-13			14 : 30	19		(West Lands)
			14 : 40		10	
Loading-14			14 : 40	0		
			14 : 41		1	
Loading-15			14 : 43	2		Project Assessment service
			14 : 45		2	Ghaahat rest. (West Lands)
Loading-16			14 : 55	10		Park Lands rd.- Forest rd.-
			14 : 57		2	Hathela rd.- Murange rd.- Air
Loading-17			15 : 5	8		rd.- of Kic rd.- Komorock rd.
			15 : 15		10	
Dumping site			16 : 5	50		Dandora
Start dumping			:			
Finish dumping			:		0	
Dumping site			16 : 30	25		
Reach to workshop			17 : 0	30		
Total			0	239	188	Total min.:427 min.
Collection			0	104	188	
Transportation			0	110	0	
Inside the dumping site			0	25	0	Dumping time
Idling						

Time & Motion Study

Organization: bins

Trip 1 Date: 20/5/97

Vehicle No. KXF820

Loading Capacity: 7tons

Researcher's name: P. Wanjiru

No. of Crew: 5

Estimated Volume: 6.5tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			7 : 54			Meter no working
Loading-1	in			8 : 56	62		Enterprise rd
	out			9 : 35		39	to petrol stn. for 5min
Loading-2	in			9 : 36	1		along Jogoo rd-
	out			9 : 42		6	Jomo Kenyatta Airport
Loading-3	in			10 : 19	37		to Mombasa (Msa) rd
	out			10 : 23		4	Enterprise rd to
Loading-4	in			10 : 25	2		Mwigari rd to
	out			10 : 35		10	Likoni rd-Kampala rd-
Loading-5	in			10 : 40	5		Kitui rd-Butere rd-
	out			11 : 28		48	Changamwe rd-
Loading-6	in			11 : 36	8		15 min. lunch break
	out			11 : 56		20	to D/site
Loading-7	in			12 : 32	36		
	out			12 : 55		23	
Loading-8	in			12 : 58	3		
	out			13 : 15		17	
Loading-9	in			13 : 36	21		
	out			13 : 39		3	
Loading-10	in			13 : 49	10		
	out			14 : 2		13	
Loading-11	in			14 : 8	6		
	out			15 : 1		53	
Loading-12	in			15 : 6	5		
	out			15 : 11		5	
Dumping site	in			16 : 30	79		
Start dumping				16 : 33	3		
Finish dumping				17 : 45		72	
Dumping site	out			17 : 56	11		
Reach to workshop	in			18 : 20			
Total			0		289	313	Total min.:602 min.
Collection			0		119	221	
Transportation			0		136	0	
Inside the dumping site			0		14	72	Dumping time
Idling time					20	20	lunch break/fuel

Time & Motion Study

Organization: bins

Trip I Date:20/5/97

Vehicle No. KZV006

Loading Capacity: 3ton

Researcher's name: m. Mwangi

No. of Crew: 4

Estimated Volume: 4ton

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	146,695	0	7 : 50			To Hurlingham
Loading-1	in	146,704	9,000	8 : 25	35		Charterd Properties
	out			8 : 33		8	
Loading-2	in	146,707	3,000	8 : 50	17		Misono Restuarant
	out			8 : 53		3	
Loading-3	in	146,709	2,000	8 : 59	6		Layale house
	out			9 : 3		4	
Loading-4	in	146,711	2,000	9 : 10	7		Swedish school
	out			9 : 12		2	
Loading-5	in	146,712	1,000	9 : 15	3		Makindi house
	out			9 : 17		2	
Loading-6	in	146,713	1,000	9 : 19	2		Murno court
	out			9 : 21		2	
Loading-7	in	146,714	1,000	9 : 24	3		Cavina school
	out			9 : 28		4	
Loading-8	in	146,715	1,000	9 : 32	4		Methodist house
	out			9 : 48		16	
Loading-9	in	146,716	1,000	9 : 55	7		Fedha management
	out			10 : 3		8	
Loading-10	in	146,718	2,000	10 : 11	8		GTZ
	out			10 : 53		42	
Loading-11	in	146,729	11000	12 : 8	75		Lijter Petter
	out			12 : 17		9	
Loading-12	in	146,737	8000	12 : 33	16		Jazira agencies
	out			12 : 42		9	
Loading-13	in	146,740	3000	12 : 46	4		Elys chanteals
	out			13 : 6		20	
Loading-14	in	146,759	19000	13 : 52	46		Nakumat Ukay
	out			14 : 19		27	
	in	146,774	15000	15 : 2	43		20 min lunch break
	out			15 : 22			
Dumping site	in	146,775	1,000	15 : 27	25		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	146,778	3,000	16 : 40	73		
Reach to workshop	in	146,779	1,000	17 : 43	63		
Total			84,000		437	156	Total min.:593 min.
Collection			70,000		198	136	
Transportation			11,000		166		
Inside the dumping site			3,000		73	0	Dumping time
Idling						20	lunch break

Time & Motion Study

Organization: bins

Trip 1 Date: 21/05/97

Vehicle No. KAD794Y

Loading Capacity: 5ton

Researcher's name: J. Kioko

No. of Crew: 5

Estimated Volume: 6.8m³

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	48,339		10 : 0			to Karen area
Loading-1	in	48,351	12,000	10 : 30	30		
	out			10 : 32		2	
Loading-2	in	48,352	1,000	10 : 35	3		Langata rd.
	out			10 : 37		2	
Loading-3	in	48,353	700	10 : 40	3		Individual Houses
	out			10 : 43		3	
Loading-4	in		150	10 : 45	2		
	out			10 : 47		2	
Loading-5	in	48,354	1,300	10 : 50	3		
	out			10 : 52		2	
Loading-6	in	48,355	800	10 : 55	3		
	out			10 : 58		3	
Loading-7	in	48,356	1,200	10 : 58	0		
	out			10 : 59		1	
Loading-8	in	48,358	2,000	11 : 1	2		
	out			11 : 2		1	
Loading-9	in	48,359	1,000	11 : 5	3		
	out			11 : 7		2	
Loading-10	in	48,360	1,000	11 : 10	3		
	out			11 : 11		1	
Loading-11	in	48,362	2000	11 : 14	3		Society of African mission
	out			11 : 20		6	Individual Houses
Loading-12	in		200	11 : 21	1		
	out			11 : 22		1	
Loading-13	in	48,364	2000	11 : 25	3		
	out			11 : 26		1	
Loading-14	in	48,365	1000	11 : 27	1		
	out			11 : 29		2	
Loading-15	in	48,368	3000	11 : 35	6		Hill crest school
	out			11 : 42		7	
Loading-16	in	48,369	700	11 : 44	2		
	out			11 : 45		1	
Loading-17	in	48,370	300	11 : 50	5		
	out			11 : 51		1	break 25 min.
Loading-18	in	48,371	1,000	11 : 57	6		
	out			12 : 0		3	
Loading-19	in	48,373	2,000	12 : 4	4		
	out			12 : 5		1	
Loading-20	in	48,379	6,000	12 : 32	27		Ndege lane
	out			12 : 35		3	from gate to gate
Loading-21	in	48,380	500	12 : 36	1		
	out			12 : 36		0	
Loading-22	in	48,380	100	12 : 36	0		Individual Houses
	out			12 : 37		1	
Loading-23	in	48,380	100	12 : 38	1		
	out			12 : 39		1	
Loading-24	in	48,381	300	12 : 41	6		Kwarara rd. off Ndege rd.
	out			12 : 42		1	

Time & Motion Study

Organization: bins

Trip 1 Date:21/05/97

Vehicle No. KAD794Y

Loading Capacity: 5ton

Researcher's name: J. Kioko

No. of Crew: 5

Estimated Volume: 6.8m³

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-25	in	48,381	200	12 : 44	2		
	out			12 : 45		1	
Loading-26	in	48,382	800	12 : 46	1		
	out			12 : 47		1	
Loading-27	in	48,383	1000	12 : 49	2		
	out			12 : 50		1	
Loading-28	in	48,383	200	12 : 51	1		
	out			12 : 52		1	
Loading-29	in	48,384	800	12 : 53	1		
	out			12 : 54		1	
Loading-30	in		80	12 : 55	1		
	out			12 : 56		1	
Loading-31	in		720	12 : 57	1		Mwangaza Jesuits
	out			12 : 58		1	Retreat centre
Loading-32	in	48,386	2000	13 : 6	8		
	out			13 : 7		1	
Loading-33	in	48,387	1,000	13 : 7	0		
	out			13 : 8		1	individual houses
Loading-34	in	48,388	1,000	13 : 11	3		
	out			13 : 13		2	
Loading-35	in	48,390	2,000	13 : 15	2		
	out			13 : 17		2	
Loading-36	in	48,392	2,000	13 : 20	3		
	out			13 : 20		0	
Loading-37	in		15	:			
	out			:		0	
Loading-38	in		30	:	0		
	out			:		0	
Loading-39	in		25	:			
	out			:			
Loading-40	in		100	13 : 23			
	out			13 : 24		1	
Loading-41	in	48,393	1,000	13 : 25	1		G/workshop
	out			13 : 28		3	
Loading-42	in	48,395	2,000	13 : 30	2		
	out			13 : 32		2	
Loading-43	in	48,396	1000	13 : 35	3		T/club
	out			13 : 40		5	
Loading-44	in	48,397	1000	14 : 8	28		individual hses.
	out			14 : 9		1	
Loading-45	in	48,398	1000	14 : 11	2		
	out			14 : 12		1	
Loading-46	in	48,399	1000	14 : 15	3		Mutty court
	out			14 : 17		2	
Loading-47	in	48,400	1000	14 : 20	3		Morey brown
	out			14 : 22		2	
Loading-48	in	48,401	1000	14 : 24	13		
	out			14 : 26		2	

Time & Motion Study

Organization: bins
 Vehicle No. KAD794Y
 No. of Crew: 5

Trip 1 Date: 21/05/97
 Loading Capacity: 5ton
 Estimated Volume: 6.8m3

Researcher's name: J. Kioko

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-49	in	48,402	1,000	14 : 28		2	Kitaru lane
	out			14 : 30		2	
Loading-50	in	48,403	1,000	14 : 33		3	22 min. lunch break
	out			14 : 34		1	
Loading-51	in	48,406	3,000	14 : 58		24	Koitobos rd.
	out			15 : 2		4	
Loading-52	in	48,409	3,000	15 : 9		7	individual hses
	out			15 : 10		1	
Loading-53	in	48,409	200	15 : 11		1	
	out			15 : 12		1	
Loading-54	in	48,410	800	15 : 13		1	
	out			15 : 14		1	
Loading-55	in	48,411	500	15 : 15		1	
	out			15 : 16		1	
Loading-56	in	48,411	500	15 : 18		2	
	out			15 : 19		1	
Loading-57	in	48,412	800	15 : 20		1	
	out			15 : 21		1	
Loading-58	in	48,412	200	15 : 22		1	Kaiser Simba hill rd
	out			15 : 23		1	
Loading-59	in	48,414	2000	15 : 25		2	
	out			15 : 26		1	
Loading-60	in	48,415	1000	15 : 28		2	
	out			15 : 29		1	
Loading-61	in	48,416	1000	15 : 30		1	Bogani Estate Road
	out			15 : 31		1	
Loading-62	in	48,420	4000	15 : 40		9	Utamaduni c. centre
	out			15 : 42		2	
Loading-63	in	48,420	100	15 : 43		1	Divine World missionaries
	out			15 : 44		1	
Loading-64	in	48,421	900	15 : 45		1	
	out			15 : 50		5	
Loading-65	in	48,426	5,000	16 : 0		10	
	out			16 : 5		5	
Loading-66	in	48,426	100	16 : 6		1	Mutamaiyu rd.
	out			16 : 7		1	
Loading-67	in	48,427	900	16 : 10		3	Munderendu rd.
	out			16 : 12		2	
Loading-68	in	48,428	1,000	16 : 15		3	
	out			16 : 16		1	
Loading-69	in	48,430	2,000	16 : 17		1	Kikeni close
	out			16 : 20		3	
Loading-70	in	48,431	900	16 : 22		2	J.B. Low
	out			16 : 23		1	
Loading-71	in	48,432	1,100	16 : 25		2	
	out			16 : 26		1	
Loading-72	in	48,432	100	16 : 27		10	
	out			16 : 28		1	

Time & Motion Study

Organization: bins

Trip 1 Date:21/05/97

Vehicle No. KAD794Y

Loading Capacity: 5ton

Researcher's name: J. Kioko

No. of Crew: 5

Estimated Volume: 6.8m3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-73	in	48,433	900	16 : 30	2		
	out			16 : 31		1	
Loading-74	in	48,434	1,000	16 : 33	2		Banda School
	out			16 : 34		1	
Loading-75	in	48,437	3000	17 : 0	26		Ongata Rongai rd.
	out			17 : 5		5	
Dumping site	in			:			No dumping done
Start dumping				:	0		
Finish dumping				:		0	
Dumping site	out			:	0		
Reach to workshop	in	48,460	23,000	17 : 30	25		
Total			120,320		344	127	Total min.: 471min.
Collection			85,320		243	46	
Transportation			35,000		55	81	
Inside the dumping site			0		0	0	Dumping time
Idling time					46		lunch break

Time & Motion Study

Organization: bins Trip 1 Date: 21/5/97
 Vehicle No. KAE341U Loading Capacity: 6ton Researcher's name: L. Kadere
 No. of Crew: 5 Estimated Volume: 5.5ton

Location		Mileage (km)	Distance (m)	Time	Moving time (min)	Loading time (min.)	Remarks (route)
Start from workshop	out	30,450		8 : 10			Kampala rd. to D/site
Loading-1	in			:			
	out			:		0	
				:			
Dumping site	in			:	0		
Start dumping		30,463	13,000	8 : 50	40		15min. tea break
Finish dumping				:			
Dumping site	out	30,463		9 : 52	62		
Reach to workshop	in			:			
Total			13,000		102	0	Total min.: 102 min.
Collection			0		0	0	
Transportation			0		25		
Inside the dumping site			13,000		62	0	Dumping time
Idling					15		tea break

Time & Motion Study

Organization: bins

Trip 2 Date:21/5/97

Vehicle No. KAE341U

Loading Capacity: 6ton

Researcher's name: L. Kadere

No. of Crew: 5

Estimated Volume: 6.5tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	30,463		9 : 52			From D/site to
Loading-1	in	30,477	14,000	10 : 27	35		Kitui rd.
	out			10 : 56		29	
Loading-2	in	30,478	1,000	11 : 0	4		Changamwe rd.
	out			12 : 2		62	
Loading-3	in	30,478	0	12 : 8	6		Funzi rd.
	out			12 : 38		30	
Loading-4	in	30,479	1,000	12 : 41	3		Isiolo rd.
	out			12 : 59		18	
Loading-5	in	30,479	0	13 : 2	3		Enterprise rd.
	out			13 : 30		28	
Loading-6	in	30,481	2,000	13 : 44	14		Lusaka rd.
	out			14 : 20		36	
Loading-7	in	30,483	2,000	14 : 30	10		Jogoo rd.
	out			15 : 1		31	
Loading-8	in	30,483	0	15 : 2	1		Likoni rd.
	out			15 : 45		43	
				:			
				:			
Dumping site	in	30,497	14,000	16 : 22	37		James Osgo rd.
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	30,497	0	16 : 55	33		
Reach to workshop	in	30,508	11,000	17 : 45	50		
Total			45,000		196	277	Total min.: 473 min.
Collection			6,000		41	277	
Transportation			39,000		122		
Inside the dumping site			0		33	0	Dumping time
Idling							

Time & Motion Study

Organization: bins

Trip 1 Date:21/5/97

Vehicle No. KAE386R

Loading Capacity: 6tons

Researcher's name: E. Charo

No. of Crew: 4

Estimated Volume: 7tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	35,637		9 : 35			
Loading-1	in	35,644	7,000	10 : 15	40		
	out			10 : 17		2	
Loading-2	in	35,648	4,000	10 : 26	9		Lenana rd
	out			10 : 31		5	Misono Rest.
Loading-3	in	35,650	2,000	10 : 37	6		Dioitokgok closs
	out			10 : 40		3	to
Loading-4	in	35,651	1,000	10 : 52	12		Kawamu House
	out			11 : 4		12	Korosho rd.
Loading-5	in	35,658	7,000	11 : 15	11		
	out			11 : 22		7	to
Loading-6	in	35,662	4,000	11 : 33	11		hurches of Kenya
	out			11 : 38		5	
Loading-7	in	35,663	1,000	11 : 41	3		Kalamu hse
	out			11 : 49		8	
Loading-8	in	35,666	3,000	12 : 22	33		
	out			12 : 27		5	
Loading-9	in	35,669	3,000	12 : 30	3		O.F.C of Kenya
	out			12 : 45		15	
Loading-10	in	35,673	4,000	12 : 57	12		W/lands rd
	out			13 : 22		25	Shimmers plaza
Loading-11	in	35,673		13 : 24	2		
	out			13 : 26		2	
Loading-12	in	35,673		13 : 29	3		Shimmers
	out			13 : 33		4	
Loading-13	in	35,673		13 : 37	4		Cihinese corner
	out			13 : 39		2	Westlands
Loading-14	in	35,674	1000	13 : 44	5		
	out			13 : 49		9	Rank xerox
Loading-15	in	35,675	1000	13 : 53	12		
	out			14 : 5		4	Westmark ltd.
Loading-16	in	35,675		14 : 9	10		EPIC centre
	out			14 : 19			
Loading-17	in	35,675	0	14 : 20	1		Fedha Management
	out			14 : 27		7	
Loading-18	in	35,676	1,000	14 : 29	2		
	out			14 : 35		6	
Loading-19	in			14 : 39	4		
	out			14 : 45		6	
Loading-20	in	35,677	1,000	14 : 51	6		
	out			14 : 54		3	
Loading-21	in	35,679	2,000	15 : 2	8		
	out			15 : 4		2	

Time & Motion Study

Organization: bins

Trip 1 Date:21/5/97

Vehicle No. KAE386R

Loading Capacity: 6tons

Researcher's name: E. Charo

No. of Crew: 4

Estimated Volume: 7tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Dumping site in	35,680	1,000	15 : 38	34		Dandora Dumping site
Start dumping	35,680	0	15 : 39	1		back to work shop
Finish dumping	35,680	0	16 : 41	62	62	
Dumping site out	35,680	0	16 : 43	2		
Reach to workshop in	35,701	21,000	17 : 58	75		
Total		64,000		371	194	Total min.:565 min.
Collection		35,000		157	132	
Transportation		29,000		149	0	
Inside the dumping site		0		65	62	Dumping time
Idling time						

Time & Motion Study

Organization: bins

Trip 1 Date: 21/5/97

Vehicle No. KAE441W

Loading Capacity: 6.5 tons

Researcher's name: M. Gonda

No. of Crew: 5

Estimated Volume: 7 tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop			10 : 2			
Loading-1		3,000	10 : 35	33		to Kampala rd
			10 : 37		2	
Loading-2		200	10 : 40	3		to Enterprise rd to
			10 : 44		4	Dar-es-salaam rd Mukonia
Loading-3		400	10 : 49	5		-Lusaka rd-
			10 : 50		1	to p/station to fuel
Loading-4		50	10 : 50	0		for 7min.
			10 : 50		0	
Loading-5		100	10 : 52	2		to
			10 : 54		2	Ngara rd
Loading-6		30	10 : 55	1		
			10 : 56		1	to Ladhies rd
Loading-7		50	10 : 57	1		to Gautama rd to
			10 : 59		2	Chambers rd to
Loading-8		40	10 : 59	0		Ngara rd
			11 : 4		5	to Pokot rd to
Loading-9		150	11 : 6	2		Mushembi rd
			11 : 9		3	back to Pokot rd to
Loading-10		50	11 : 12	3		Forest lane
			11 : 12		0	
Loading-11		20	11 : 15	3		
			11 : 37		22	
Loading-12		60	11 : 39	2		
			11 : 42		3	
Loading-13		30	11 : 43	1		
			11 : 47		4	
Loading-14		50	11 : 49	2		
			11 : 53		4	
Loading-15		150	11 : 57	4		
			12 : 2		5	
Loading-16		50	12 : 3	1		
			12 : 6		3	
Loading-17		200	12 : 11	5		Desai rd
			12 : 12		1	
Loading-18		200	12 : 15	3		Murang'a rd
			12 : 17		2	
Loading-19		80	12 : 18	1		Ngara rd
			12 : 19		1	Irungu Rijkad
Loading-20		100	12 : 22	3		
			12 : 27		5	off Park rd Ngara
Loading-21		300	12 : 37	10		
			12 : 40		3	off Juja rd
Loading-22		450	12 : 48	8		
			12 : 49		1	
Loading-23		500	12 : 55	6		
			12 : 57		2	Fairview rd

Time & Motion Study

Organization: bins Trip 1 Date:21/5/97
 Vehicle No. KAE441W Loading Capacity: 6.5tons Researcher's name: M. Gonda
 No. of Crew: 5 Estimated Volume: 7tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min)	Loading time (min.)	Remarks (route)
Loading-24		50	12 : 58	1		
			12 : 59		1	
Loading-25		40	13 : 1	2		
			13 : 14		13	
Loading-26		150	13 : 15	1		
			13 : 16		1	
Loading-27		50	13 : 19	3		Eastleigh section II
			13 : 24		5	
Loading-28		1200	13 : 35	11		7th street in Eastleigh
			13 : 37		2	
Loading-29		800	13 : 47	10		
			15 : 3		76	
Loading-30		600	15 : 21	18		Athumani Kipanga rd
			15 : 24		3	
Loading-31		800	15 : 33	9		off Jogoo rd into
			15 : 36		3	Buru buru phase I
Loading-32			:			
			:			
Dumping site		500	15 : 38	2		
Start dumping		50	15 : 46	8		
Finish dumping		0	16 : 18		32	
Dumping site		50	16 : 21	3		
Reach to workshop						
Total		10,550		174	205	Total min.: 379 min.
Collection		6,950		121	173	
Transportation		3,500		35	0	
Inside the dumping site		100		11	32	Dumping time
Idling time				7		Fuel

Time & Motion Study

Organization: bins

Trip 2 Date: 21/5/97

Vehicle No. KAB441W

Loading Capacity: 6.5 tons

Researcher's name: M. Gonda

No. of Crew: 5

Estimated Volume: 7 tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site			16 : 21			
Loading-1		800	16 : 37	16		From the D/site to Umoja
			16 : 39		2	estate on Outering rd
Loading-2		800	16 : 57	18		estate to Tena estate
			17 : 1		4	
Loading-3		400	17 : 10	9		
			17 : 12		2	
Loading-4		200	17 : 13	1		
			17 : 15		2	
Loading-5		100	17 : 20	5		
			17 : 28		8	
Loading-6		200	17 : 32	4		Donholm estate
			17 : 34		2	
Loading-7		300	17 : 43	9		
			17 : 43		0	Fedha estate
Loading-8		150	17 : 49	6		
			17 : 50		1	Jogoo rd. Likoni rd. Kampala and the w/shop
Dumping site			:			
Start dumping			:	0		
Finish dumping			:		0	
Dumping site			:	0		
Reach to workshop		8,000	18 : 11	21		
Total		10,950		89	21	Total min.: 110 min.
Collection		2,150		52	21	
Transportation		8,800		37	0	
Inside the dumping site		0		0	0	Dumping time
Idling time						

Time & Motion Study

Organization: BINS

Trip 1 Date: 21/5/97

Vehicle No. KAB593R

Loading Capacity: 3TONS

Researcher's name: K. Mwakutema

No. of Crew: 4

Estimated Volume:

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	60,770		10 : 0			Kampala rd. to
Loading-1	in	60,773	3,000	10 : 10	10		Dunga rd
	out			10 : 14		4	5 min. time changing
Loading-2	in	60,787	14,000	10 : 47	33		Dunga rd to Ngong rd
	out			10 : 52		5	
Loading-3	in	60,789	2,000	10 : 57	5		Ngong rd
	out			10 : 58		1	
Loading-4	in	60,790	1,000	11 : 0	2		Karen rd to
	out			11 : 1		1	
Loading-5	in	60,792	2,000	11 : 5	4		off Karen rd
	out			11 : 6		1	
Loading-6	in	60,793	1,000	11 : 10	4		off Karen rd
	out			11 : 15		5	
Loading-7	in	60,794	1,000	11 : 16	1		Karen rd
	out			11 : 17		1	
Loading-8	in	60,795	700	11 : 19	2		
	out			11 : 20		1	
Loading-9	in	60,795	300	11 : 21	1		
	out			11 : 22		1	
Loading-10	in	60,795	300	11 : 24	2		
	out			11 : 49		25	
Loading-11	in	60,795	50	11 : 50	1		
	out			11 : 51		1	
Loading-12	in	60,796	500	11 : 52	1		
	out			11 : 54		2	
Loading-13	in	60,796	150	11 : 56	2		Forest Lane to
	out			11 : 58		2	
Loading-14	in	60,798	2000	12 : 2	4		off Karen rd
	out			12 : 3		1	
Loading-15	in	60,799	1000	12 : 6	3		Mbagathi Ridge
	out			12 : 7		1	
Loading-16	in	60,800	1000	12 : 8	1		
	out			12 : 10		2	
Loading-17	in	60,801	900	12 : 12	2		Mbagathi Ridge
	out			12 : 13		1	
Loading-18	in	60,801	100	12 : 15	2		
	out			12 : 17		2	
Loading-19	in	60,802	1,000	12 : 19	2		Marula lane
	out			12 : 20		1	
Loading-20	in	60,803	1,000	12 : 22	2		
	out			12 : 24		2	
Loading-21	in	60,804	1,000	12 : 27	3		
	out			12 : 28		1	
Loading-22	in	60,806	2,000	12 : 32	4		off Langata rd
	out			12 : 33		1	
Loading-23	in	60,807	1,000	12 : 36	3		Langata rd
	out			12 : 37		1	

Time & Motion Study

Organization: BINS

Trip 1 Date: 21/5/97

Vehicle No. KAE593R

Loading Capacity: 3TONS

Researcher's name: K. Mwakutema

No. of Crew: 4

Estimated Volume:

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24	in	60,808	1,000	12 : 40	3		
	out			12 : 42		2	
Loading-25	in	60,809	900	12 : 44	2		Karen
	out			12 : 48		4	
Loading-26	in	60,810	1,100	12 : 54	6		Tree lane
	out			12 : 55		1	
Loading-27	in	60,811	800	12 : 58	3		Ngong rd.
	out			12 : 59		1	
Loading-28	in	60,814	3200	13 : 3	4		Mwitu rd
	out			13 : 3		0	
Loading-29	in	60,815	1000	13 : 5	2		
	out			13 : 6		1	
Loading-30	in	60,816	900	13 : 7	1		
	out			13 : 7		0	
Loading-31	in	60,816	100	13 : 8	1		Kerarapon rd.
	out			13 : 9		1	
Loading-32	in	60,818	2000	13 : 14	5		
	out			13 : 15		1	
Loading-33	in	60,821	3,000	13 : 21	6		Park grange
	out			13 : 22		1	
Loading-34	in	60,821	400	13 : 23	1		
	out			13 : 24		1	
Loading-35	in	60,822	600	13 : 25	1		
	out			13 : 25		0	
Loading-36	in	60,822	400	13 : 26	1		
	out			13 : 26		0	
Loading-37	in	60,823	400	13 : 27	1		
	out			13 : 28		1	
Loading-38	in	60,823	200	13 : 29	1		Ololua rd
	out			13 : 30		1	
Loading-39	in	60,828	5,000	13 : 38	8		
	out			13 : 39		1	
Loading-40	in	60,829	1,000	13 : 41	2		
	out			13 : 42		1	
Loading-41	in	60,833	4,000	13 : 50	8		West woods
	out			13 : 51		1	
Loading-42	in	60,834	1,000	13 : 54	3		Windy ridge
	out			13 : 55		1	
Loading-43	in	60,835	1000	13 : 57	2		Link rd.
	out			13 : 58		1	
Loading-44	in	60,836	1000	14 : 0	2		Windy ridge
	out			14 : 1		1	
Loading-45	in	60,838	2000	14 : 6	5		
	out			14 : 7		1	
Loading-46	in	60,839	1000	14 : 11	4		
	out			14 : 12		1	

Time & Motion Study

Organization: BINS

Trip 1 Date: 21/5/97

Vehicle No. KAB593R

Loading Capacity: 3TONS

Researcher's name: K. Mwakutema

No. of Crew: 4

Estimated Volume:

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-47	in	60,840	1000	14 : 15	3		Peponi lane
	out			14 : 16		1	
Loading-48	in	60,842	2000	14 : 20	4		Three Dee lane
	out			14 : 35		15	
Loading-49	in	60,845	3,000	14 : 45	10		Resurrection rd
	out			14 : 47		2	
Loading-50	in	60,847	2,000	14 : 52	5		
	out			14 : 53		1	
Loading-51	in	60,849	2,000	14 : 57	4		Farm lane
	out			14 : 59		2	
Loading-52	in	60,851	2,000	15 : 1	2		Dagoretti
	out			15 : 2		1	
Loading-53	in	60,852	1,000	15 : 4	2		
	out			15 : 5		1	
Loading-54	in	60,853	1,000	15 : 10	5		Warai South
	out			15 : 11		1	
Loading-55	in	60,854	1,000	15 : 14	3		
	out			15 : 14		0	
Loading-56	in	60,855	1,000	15 : 16	2		
	out			15 : 16		0	
Loading-57	in	60,856	1,000	15 : 18	2		Nandi rd.
	out			15 : 20		2	
Loading-58	in	60,857	500	15 : 23	3		Motoni lane
	out			15 : 24		1	
Loading-59	in	60,857	500	15 : 27	3		
	out			15 : 28		1	
Loading-60	in	60,858	700	15 : 30	2		
	out			15 : 31		1	
Loading-61	in	60,859	1300	15 : 37	6		Nandi road
	out			15 : 38		1	
Loading-62	in	60,860	1000	15 : 41	3		
	out			15 : 42		1	
Loading-63	in	60,861	1000	15 : 44	2		
	out			15 : 45		1	
Loading-64	in	60,862	1000	15 : 48	3		Warai south
	out			15 : 49		1	
Loading-65	in	60,865	3,000	15 : 50	1		Dagoretti
	out			15 : 51		1	
Dumping site	in	60,879	14,000	16 : 36	45	45	
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	60,880	1,000	17 : 6	30	30	
Reach to workshop	in	60,894	14,000	17 : 30	24	24	
Total			124,000		330	219	Total min.: 549 min.
Collection			94,600		230	219	tire changing

Time & Motion Study

Organization: BINS

Trip 1

Date: 21/5/97

Vehicle No. KAB593R

Loading Capacity: 3TONS

Researcher's name: K. Mwakutema

No. of Crew: 4

Estimated Volume:

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Transportation		28,400		70	0	
Inside the dumping site		1,000		30	0	Dumping time
Idling time						

Time & Motion Study

Organization: bins

Trip 1 Date:21/5/97

Vehicle No. KAE761R

Loading Capacity: 2.69ton

Researcher's name: L. Mimbo

No. of Crew: 5

Estimated Volume: 3ton

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	22,842		9 : 52			Kampala rd.
Loading-1	in	22,844	2,000	9 : 54	2		to Lusaka rd
	out			9 : 54		0	
Loading-2	in	22,845	1,000	9 : 57	3		Machakos rd
	out			10 : 5		8	
Loading-3	in	22,854	9,000	10 : 22	17		Mombasa rd
	out			10 : 33		11	
Loading-4	in	22,860	6,000	10 : 54	21		Witui rd
	out			11 : 5		11	
Loading-5	in	22,862	2,000	11 : 17	12		Dunga rd
	out			11 : 48		31	
Loading-6	in	22,866	4,000	12 : 5	17		Nanyuki rd
	out			13 : 24		79	
Loading-7	in	22,870	4,000	13 : 35	11		Enterprise rd
	out			15 : 45		130	
Loading-8	in	22,873	3,000	15 : 45	0		Kitui rd
	out			15 : 54		9	
Loading-9	in	22,876	3,000	16 : 5	11		Enterprise rd
	out			16 : 10		5	
Loading-10	in	22,876	0	16 : 15	5		
	out			16 : 16		1	
Loading-11	in	22,880	4000	16 : 27	11		Kitui rd
	out			17 : 19		52	
Dumping site	in			:		0	
Start dumping				:		0	
Finish dumping				:		0	
Dumping site	out			:		0	
Reach to workshop	in	22,881	1,000	17 : 22	3		
Total			39,000		113	337	Total min.:450 min.
Collection			36,000		108	337	
Transportation			3,000		5		
Inside the dumping site			0		0	0	Dumping time
Idling time							

Time & Motion Study

Organization: bins

Trip 1 Date:21/5/97

Vehicle No. KQY636

Loading Capacity: 12tons

Researcher's name: j. Atieno

No. of Crew: 6

Estimated Volume: 10tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			9 : 30			
Loading-1	in			10 : 9	39		Tetra pak on Migwani rd
	out			10 : 30		21	
Loading-2	in			10 : 35	5		Tibbet&Britten (k) ltd
	out			11 : 30		55	
Loading-3	in			12 : 9	39		back to w/shop
	out			12 : 20		11	to SEN-TECH Baba Dogo rd.
Loading-4	in			13 : 25	65		
	out			14 : 25		60	
Dumping site	in			14 : 45	20		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			15 : 40	55		
Reach to workshop	in			17 : 0	80		closed down
Total			0		303	147	Total min :450 min.
Collection			0		109	147	
Transportation			0		139		
Inside the dumping site			0		55	0	Dumping time
Idling							

Time & Motion Study

Organization: bins

Trip 1 Date:21/5/97

Vehicle No. KST976

Loading Capacity: 2.5tons

Researcher's name: A. Wangu

No. of Crew: 4

Estimated Volume: 7.875m³

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			9 : 52			
Loading-1	in			10 : 10	18		Rickshaw c/rest.
	out			10 : 25		15	
Loading-2	in			10 : 35	10		Macdonnas
	out			10 : 38		3	
Loading-3	in			10 : 40	2		Lukes Ltd.
	out			10 : 44		4	
Loading-4	in			10 : 45	1		Sielel Properties
	out			11 : 0		15	
Loading-5	in			11 : 11	11		City Nursing Home
	out			11 : 14		3	
Loading-6	in			11 : 15	1		Steers Tom Mboya str.
	out			11 : 25		10	
Loading-7	in			11 : 35	10		Reflection
	out			11 : 43		8	
Loading-8	in			11 : 55	12		Valeo (K) Ltd
	out			12 : 0		5	
Loading-9	in			12 : 10	10		Sterrs opp. Jevanje
	out			12 : 35		25	
Loading-10	in			12 : 45	10		Norfolk Hotel
	out			12 : 50		5	
Loading-11	in			12 : 55	5		Norfolk Towers
	out			13 : 20		25	
				:			
Dumping site	in			13 : 45	25		
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			14 : 25	40		
Reach to workshop	in			:			
Total			0		155	118	Total min.:273 min.
Collection			0		72	118	
Transportation			0		43		
Inside the dumping site			0		40	0	Dumping time
Idling							

Time & Motion Study

Organization: bins

Trp 2 Date:21/5/97

Vehicle No. KST976

Loading Capacity: 2.5tons

Researcher's name: A. Wangu

No. of Crew: 4

Estimated Volume: 7.875m3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			14 : 46			
Loading-1	in			16 : 36	110		Longonot place
	out			:			Kijabe str. to Murang'a rd.
							to Thika rd-Outer Ring
							rd.-Komatock rd. to
							D/site
Dumping site	in			17 : 39	63		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			17 : 50	11		
Reach to workshop	in			18 : 20	30		
Total			0		214	0	Total min.:214 min.
Collection			0		0	0	
Transportation			0		203		
Inside the dumping site			0		11	0	Dumping time
Idling							

Time & Motion Study

Organization: bins

Trip 1 Date: 21/5/97

Vehicle No. KXF820

Loading Capacity: 7tons

Researcher's name: P. Wanjiru

No. of Crew: 5

Estimated Volume: 6.5tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			10 : 34			From W/shop to
Loading-1	in			10 : 36	2		South C via Msa rd
	out			10 : 40		4	
Loading-2	in			10 : 40	0		Mombasa rd.
	out			10 : 45		5	
Loading-3	in			10 : 53	8		
	out			11 : 1		8	Plains view av
Loading-4	in			11 : 20	19		
	out			11 : 37		17	
Loading-5	in			11 : 40	3		
	out			11 : 45		5	
Loading-6	in			11 : 48	3		
	out			11 : 49		1	to Msa rd.
Loading-7	in			12 : 8	19		
	out			12 : 11		3	
Loading-8	in			12 : 13	2		To Vita foam, Simba Colt
	out			12 : 14		1	
Loading-9	in			12 : 20	6		
	out			12 : 22		2	
Loading-10	in			12 : 23	1		
	out			12 : 24		1	St. James Hospital
Loading-11	in			12 : 30	6		
	out			12 : 34		4	
Loading-12	in			12 : 35	1		
	out			12 : 36		1	Amboseli estate
Loading-13	in			12 : 37	1		
	out			12 : 40		3	
Loading-14	in			12 : 42	2		
	out			12 : 45		3	Rugby estate
Loading-15	in			12 : 46	1		
	out			13 : 3		17	
Loading-16	in			13 : 5	2		Muhoho avenue
	out			13 : 8		3	
Loading-17	in			13 : 21	13		Muthithi road
	out			13 : 23		2	
Loading-18	in			13 : 28	5		
	out			13 : 31		3	
Loading-19	in			13 : 36	5		
	out			13 : 41		5	
Loading-20	in			13 : 50	9		
	out			13 : 53		3	
Loading-21	in			13 : 57	4		
	out			13 : 59		2	30 min. lunch break
Loading-22	in			14 : 3	4		
	out			14 : 5		2	
Loading-23	in			14 : 37	66		New Musafi rd.
	out			14 : 38		1	

Time & Motion Study

Organization: bins Trip 1 Date: 21/5/97
 Vehicle No. KXF820 Loading Capacity: 7tons Researcher's name: P. Wanjiru
 No. of Crew: 5 Estimated Volume: 6.5tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24	in			14 : 40	2		
	out			14 : 42		2	Kodi rd.
Loading-25	in			14 : 44	2		
	out			14 : 52		8	
Loading-26	in			14 : 54	2		
	out			15 : 8		14	Mbagathi way
Loading-27	in			15 : 12	4		
	out			15 : 35		23	
Loading-28	in			15 : 40	5		Langata rd.
	out			15 : 42		3	Wilson Airport
Loading-29	in			15 : 43	6		
	out			15 : 49		3	Nairobi dam estate
Loading-30	in			15 : 52	3		Uhuru Gardens estate to
	out			15 : 55		5	Akiba estate into Kungu
Loading-31	in			16 : 0	85		Karumba rd.to Langata rd.
	out			17 : 25			Wild life rd.
Dumping site	in						Orphanage to W/shop
Start dumping					0		
Finish dumping						0	
Dumping site	out				0		
Reach to workshop	in						
Total			0		321	124	Total min.:445 min.
Collection			0		289	124	
Transportation			0		2	0	
Inside the dumping site			0		0	0	Dumping time
Idling time					30		lunch break

Time & Motion Study

Organization: bins

Trip 1 Date: 21/5/97

Vehicle No. KZV006

Loading Capacity: 3tons

Researcher's name: M. Mwangi

No. of Crew: 4

Estimated Volume: 4tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	146,779		8 : 0			To W/lands
Loading-1	in	146,780	1,000	8 : 20	20		
	out			8 : 25		5	
Loading-2	in	146,781	1,000	8 : 30	5		Thomas Barnardos estate
	out			8 : 37		7	
Loading-3	in	146,783	2,000	8 : 41	4		Chaanat restaurant
	out			8 : 46		5	
Loading-4	in	146,785	2,000	8 : 51	5		Hill par court
	out			8 : 55		4	
Loading-5	in	146,790	5,000	8 : 59	4		Fairview hotel
	out			9 : 1		2	
Loading-6	in	146,792	2,000	9 : 3	2		Israel Embassy
	out			9 : 10		7	
Loading-7	in	146,796	4,000	9 : 15	5		Car&General
	out			9 : 20		5	
Loading-8	in	146,797	1,000	9 : 26	6		Rank xerox
	out			9 : 30		4	
Loading-9	in	146,799	2,000	9 : 36	6		Panaccs house
	out			9 : 41		5	
Loading-10	in	146,800	1,000	10 : 0	19		Apex centre
	out			10 : 15		15	
Loading-11	in	146,806	6000	10 : 21	6		Iguana rest.
	out			11 : 0		39	
Loading-12	in	146,807	1000	11 : 30	30		Phoototorn
	out			11 : 35		5	
Loading-13	in	146,808	1000	11 : 42	7		Ruby printers
	out			12 : 0		18	
Loading-14	in	146,809	1000	12 : 30	30		Shimners plaza
	out					70	
Loading-15	in	146,809	0	13 : 40	40		30 min. lunch break
	out					10	
Loading-16	in	146,810	1,000	14 : 20	15		Chinese rest
	out			14 : 30		15	
Loading-17	in	146,812	2,000	14 : 45	26		Durga restaurant
	out			15 : 0		14	
Loading-18	in	146,814	2,000	15 : 26	20		Forest court
	out			15 : 40		15	
Loading-19	in	146,815	1,000	16 : 0	15		MCL house
	out			16 : 15		30	
Loading-20	in	146,816	1,000	16 : 30			Palm court
	out			17 : 0			

Time & Motion Study

Organization: bins

Trip 1 Date: 21/5/97

Vehicle No. KZV006

Loading Capacity: 3tons

Researcher's name: M. Mwangi

No. of Crew: 4

Estimated Volume: 4tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Dumping site in	146,820	4,000	17 : 15	15		Dandora
Start dumping			:			
Finish dumping			:		0	
Dumping site out	146,825	5,000	17 : 20	5		
Reach to workshop in	146,831	6,000	18 : 30	70		
Total		52,000		355	275	Total min.: 630 min.
Collection		36,000		215	275	
Transportation		11,000		105	0	
Inside the dumping site		5,000		5	0	Dumping time
Idling				20	0	lunch break

Time & Motion Study

Organization: BINS

Trip- 1 Date: 22nd May 1997

Vehicle No. KAD 794

Loading Capacity: Stons

Researcher's name: Januaris Kioko

No. of Crew: 5

Estimated Volume: 6800cm³

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	48464		8 : 0			To petrol station for Fueling
Loading-1	in			:			from 8:05 to 8.20 a.m
	out			:			
				:			From workshop to Lusaka rd.-
				:			Petrol station, back to connect
				:			Enterprise rd.-City stadium
				:			branched through Kamukunji field
				:			(Majengo) KBS station workshop
				:			
				:			Huruna via Juja rd. up to
				:			Dandora Dumping site
Dumping site	in	48480	16,000	9 10	70		
Start dumping		48481	1,000	9 20	10		
Finish dumping				9 50		30	
Dumping site	out	48481.3	300	10 10	20		
Reach to workshop	in			:			
Total			17,300		100	30	Total min.:130min.
Collection			0		0	0	
Transportation			16,000		55		
Inside the dumping site			1,300		30	30	Dumping time
Idling time					15		Fuel

Time & Motion Study

Organization: BINS NBI SERVICE

Trip- 2 Date: 22nd may 1997

Vehicle No. KAD 794

Loading Capacity: 5TON

Researcher's name: Jamaris Kioko

No. of Crew: 5

Estimated Volume: 6812CM³

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	48481.3		10 : 10			To Kitisuni-Loresho-Lower
Loading-1	in	48494	12,700	10 : 25	15		Kabete-Riverside drive-
	out			11 : 0		35	Australian H. comm. -
Loading-2	in	48498	4,000	11 : 10	10		Kibonden College
	out			11 : 15		5	
Loading-3	in	48503	5,000	11 : 23	8		Lower Kabete road
	out			11 : 25		2	
Loading-4	in		100	11 : 26	1		Peponi road
	out			11 : 27		1	Stanhope centre
Loading-5	in		100	11 : 29	2		
	out			11 : 30		1	
Loading-6	in	48504	800	11 : 31	1		Peponi grove
	out			11 : 32		1	Individual Houses
Loading-7	in	48505	1,000	11 : 33	1		
	out			11 : 34		1	
Loading-8	in	48505.7	700	11 : 35	1		Peponi road
	out			11 : 36		1	Individual house
Loading-9	in	48506	300	11 : 37	1		Peponi close
	out			11 : 38		1	Individual house
Loading-10	in	48506.7	700	11 : 39	1		Peponi cliffs
	out			11 : 40		1	Individual houses
Loading-11	in	48507	300	11 : 43	3		Kitisuru area
	out			11 : 44		1	Individual houses
Loading-12	in		200	11 : 45	1		Individual houses
	out			11 : 46		1	
Loading-13	in	48508	800	11 : 47	1		Individual houses
	out			11 : 48		1	
Loading-14	in	48509	1,000	11 : 50	2		Peponi road
	out			11 : 51		1	tow. coffe plant
Loading-15	in	48512	3,000	11 : 55	4		Manga Gardens
	out			11 : 57		2	Individual houses
Loading-16	in	48513	1,000	12 : 5	8		
	out			12 : 6		1	
Loading-17	in	48516	3,000	12 : 10	4		Kitisuru road
	out			12 : 11		1	
Loading-18	in	48518	2,000	12 : 15	4		Individual houses
	out			12 : 17		2	
Loading-19	in	48518.5	500	12 : 18	1		Individual houses
	out			12 : 19		1	
Loading-20	in	48519	500	12 : 20	1		Individual houses
	out			12 : 22		2	
Loading-21	in	48519.3	300	12 : 23	1		Individual houses
	out			12 : 23		0	
Loading-22	in	48519.39	90	12 : 23	0		Individual houses
	out			12 : 24		1	
Loading-23	in	48519.4	10	12 : 24	0		Individual houses
	out			12 : 25		1	

Time & Motion Study

Organization: BINS NBI SERVICE

Trip- 2 Date: 22nd may 1997

Vehicle No. KAD 794

Loading Capacity: 5TON

Researcher's name: Januaris Kioko

No. of Crew: 5

Estimated Volume: 6812CM³

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24	in	48519.6	200	12 : 25	0		Individual houses
	out			12 : 26		1	
Loading-25	in	48519.7	100	12 : 26	0		Individual houses
	out			12 : 27		1	
Loading-26	in	48520	300	12 : 28	1		Individual houses
	out			12 : 30		2	
Loading-27	in	48520.5	500	12 : 31	1		Individual houses
	out			12 : 32		1	
Loading-28	in		100	12 : 33	1		Individual houses
	out			12 : 34		1	
Loading-29	in	48521	400	12 : 35	1		Individual houses
	out			12 : 36		1	
Loading-30	in	48522	1,000	12 : 38	2		Tate close
	out			12 : 40		2	
Loading-31	in	48523	1,000	12 : 43	3		Embassy of Argentina
	out			12 : 44		1	Residence
Loading-32	in	48523.5	500	12 : 45	1		Individual houses
	out			12 : 46		1	
Loading-33	in	48524	500	12 : 46	0		Tate close
	out			12 : 47		1	
Loading-34	in		200	12 : 54	7		Individual house
	out			12 : 55		1	
Loading-35	in		100	12 : 56	1		Forward close in Mitini estate
	out			12 : 57		1	
Loading-36	in	48524.7	400	12 : 58	1		Forward close in Mitini estate
	out			12 : 59		1	
Loading-37	in	48525	300	13 : 0	1		Forward close in Mitini estate
	out			13 : 2		2	
Loading-38	in	48527	2,000	13 : 4	2		Individual houses
	out			13 : 5		1	
Loading-39	in	48528	1,000	13 : 6	1		Individual houses
	out			13 : 7		1	
Loading-40	in	48528.7	700	13 : 8	1		Individual houses
	out			13 : 9		1	
Loading-41	in	48529	300	13 : 11	2		Individual houses
	out			13 : 11		0	
Loading-42	in	48529.7	700	13 : 13	2		Peponi house school
	out			13 : 24		11	
Loading-43	in	48530	300	13 : 26	2		Individual houses
	out			13 : 27		1	
Loading-44	in	48530.6	600	13 : 30	3		Individual houses
	out			13 : 31		1	
Loading-45	in	48531	400	13 : 32	1		Lower Kabete rd.
	out			13 : 32		0	
Loading-46	in	48532	1,000	13 : 33	1		Ambassador of Iran
	out			13 : 34		1	Residence

Time & Motion Study

Organization: BINS NBI SERVICE

Trip- 2 Date: 22nd may 1997

Vehicle No. KAD 794

Loading Capacity: 5TON

Researcher's name: Januaris Kioko

No. of Crew: 5

Estimated Volume: 6812CM³

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-47	in	48533	1,000	13 : 35	1		Individual houses
	out			13 : 36		1	
Loading-48	in	48533.4	400	13 : 39	3		Individual houses
	out			13 : 40		1	
Loading-49	in	48534	600	13 : 44	4		Loresho Ridge road
	out			13 : 45		1	
Loading-50	in	48536	2,000	13 : 50	5		
	out			13 : 51		1	
Loading-51	in	48537	1,000	13 : 54	3		Kibagare Way
	out			13 : 54		0	
Loading-52	in	48538	1,000	13 : 56	2		Kibagare lane
	out			13 : 57		1	Individual houses
Loading-53	in	48538.5	500	13 : 58	1		
	out			14 : 0		2	
Loading-54	in	48539	500	14 : 2	2		Kibagare way
	out			14 : 3		1	
Loading-55	in	48539.3	300	14 : 4	1		Kassim Owango
	out			14 : 5		1	
Loading-56	in		100	14 : 6	1		Individual houses
	out			14 : 6		0	
Loading-57	in		20	14 : 7	1		Individual houses
	out			14 : 7		0	
Loading-58	in	48540	580	14 : 12	5		Individual houses
	out			14 : 13		1	
Loading-59	in	48540.3	300	14 : 15	2		Individual houses
	out			14 : 16		1	
Loading-60	in	48541	700	14 : 18	2		Loresho ridge road
	out			14 : 19		1	
Loading-61	in		100	14 : 19	0		
	out			14 : 20		1	
Loading-62	in	48541.9	800	14 : 21	1		Loresho grove
	out			14 : 22		1	
Loading-63	in	48542	100	14 : 23	1		Individual houses
	out			14 : 24		1	
Loading-64	in		50	14 : 25	1		Individual houses
	out			14 : 26		1	
Loading-65	in	48543	950	14 : 30	4		Loresho valley
	out			14 : 32		2	
Loading-66	in		100	14 : 33	1		Loresho rise
	out			14 : 34		1	
Loading-67	in		50	14 : 35	1		Individual houses
	out			14 : 36		1	
Loading-68	in	48544	850	14 : 38	2		Individual houses
	out			14 : 40		2	
Loading-69	in		75	14 : 41	1		Individual houses
	out			14 : 42		1	

Time & Motion Study

Organization: BINS NBI SERVICE

Trip- 2 Date: 22nd may 1997

Vehicle No. KAD 794

Loading Capacity: 5TON

Researcher's name: Januaris Kioko

No. of Crew: 5

Estimated Volume: 6812CM³

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)	
Loading-70	in		75	14 : 43	1	Individual houses	
	out			14 : 44	1		
Loading-71	in		100	14 : 44	0	Individual houses	
	out			14 : 45	1		
Loading-72	in	48544.9	650	14 : 46	1	Loresho crescent	
	out			14 : 48	2		
Loading-73	in		30	14 : 48	0	Individual houses	
	out			14 : 49	1		
Loading-74	in		50	14 : 50	1	Individual houses	
	out			14 : 50	0		
Loading-75	in	48545	20	14 : 51	1	Individual houses	
	out			14 : 52	1		
Loading-76	in	48545.5	500	14 : 53	1	Individual houses	
	out			14 : 54	1		
Loading-77	in	48545.9	400	14 : 55	1	Individual houses	
	out			14 : 56	1		
Loading-78	in	48547	1,100	14 : 58	2	Individual houses	
	out			15 : 0	2		
				:			
				:			
				:			
				:			
Dumping site	in	48572	25,000	16 : 15	75		
Start dumping				16 : 20	5		
Finish dumping				17 : 0	40		
Dumping site	out	48573	1,000	17 : 10	10		
Reach to workshop	in	48590	17,000	17 : 40	30		
				:			
Total			108,700	:	279	171	Total min.: 450min.
Collection			64,750	:	155	131	
Transportation			42,950	:	109		
Inside the dumping site			1,000	:	15	40	Dumping time
Idling time				:			

Time & Motion Study

Organization: bins

Trip 1 Date:22/5/97

Vehicle No. KAE341U

Loading Capacity: 6tons

Researcher's name: L. Kadere

No. of Crew: 5

Estimated Volume: 5.8tons

Location		Mileage (km)	Distance (m)		Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	30,508		8 : 35			Kamapla rd.
Loading-1	in	30,512	4,000	8 : 43	8		Shimo la tewa rd.
	out			8 : 48		5	
Loading-2	in	30,512	0	8 : 52	4		Dunga rd
	out			9 : 1		9	
Loading-3	in	30,514	2,000	9 : 9	8		Lusaka rd
	out			9 : 15		6	
Loading-4	in	30,514	0	9 : 21	6		Busia rd.
	out			9 : 26		5	
Loading-5	in	30,515	1,000	9 : 33	7		Changamwe rd
	out			9 : 56		23	
Loading-6	in	30,517	2,000	10 : 1	5		Likoni rd.
	out			10 : 36		35	
Loading-7	in	30,517	0	10 : 39	3		Jogoo rd.
	out			10 : 59		20	
Loading-8	in	30,520	3,000	11 : 7	8		Enterprise rd.
	out			11 : 46		39	
Loading-9	in	30,524	4,000	12 : 0	14		
	out			12 : 52		52	
Loading-10	in	30,524	0	12 : 54	2		
	out			13 : 32		38	
Loading-11	in	30,525	1000	13 : 43	11		
	out			14 : 51		68	Isiolo rd.
Loading-12	in	30,525	0	14 : 53	2		
	out			15 : 50		57	
				:			
Dumping site	in	30,539	14,000	16 : 30	40		James Osogo rd.
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	30,539	0	17 : 25	55		
Reach to workshop	in	30,542	3,000	18 : 5	40		
Total			34,000		213	357	Total min.:570 min.
Collection			13,000		70	357	
Transportation			21,000		88		
Inside the dumping site			0		55	0	Dumping time
Idling							

Time & Motion Study

Organization: bins

Trip 1 Date:22/5/97

Vehicle No. KAE386R

Loading Capacity: 6tons

Researcher's name: e. Charo

No. of Crew: 4

Estimated Volume: 7.5tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	35,701		6 : 0			
Loading-1	in	35,750	49,000	7 : 30	90		Central bank
	out			9 : 0		90	
Loading-2	in	35,766	11,000	9 : 35	35		
	out			9 : 37		2	Esso plaza
Loading-3	in	35,766	0	9 : 38	1		
	out			9 : 40		2	
Loading-4	in	35,767	1,000	9 : 42	2		Muthaiga
	out			9 : 43		1	
Loading-5	in	35,768	1,000	9 : 46	3		Aberdare Investments
	out			9 : 48		2	
Loading-6	in	35,768	0	9 : 51	3		
	out			9 : 55		4	
Loading-7	in	35,770	2,000	10 : 0	5		Paper hse.
	out			10 : 4		4	
Loading-8	in	35,770	0	10 : 5	1		Kenjiro services
	out			10 : 8		3	
Loading-9	in	35,771	1,000	10 : 12	4		Coca cola Africa
	out			10 : 14		2	
Loading-10	in	35,774	3,000	10 : 16	2		
	out			10 : 17		1	
Loading-11	in	35,774	0	10 : 18	1		Parlane Car hire
	out			10 : 21		3	
Loading-12	in	35,778	4000	11 : 23	62		
	out			11 : 25		2	
Loading-13	in	35,779	1000	11 : 26	2		
	out			11 : 27		3	
Loading-14	in	35,780	1000	11 : 30	2		
	out			11 : 32		8	
Loading-15	in	35,780	0	11 : 40	4		
	out			11 : 44		2	
Loading-16	in	35,789	9000	11 : 46	2		
	out			11 : 48		15	
Dumping site	in	35,796	7,000	12 : 3	18		
Start dumping		35,796	0	12 : 6	3		
Finish dumping		35,796	0	13 : 12		66	
Dumping site	out	35,796	0	13 : 14	2		
Reach to workshop	in	35,831	3,500				
Total			93,500		242	210	Total min.:452 min.
Collection			34,000		129	144	
Transportation			59,500		108	0	
Inside the dumping site			0		5	66	Dumping time
Idling time							

Time & Motion Study

Organization: bins
 Vehicle No. KAF386R
 No. of Crew: 4
 Loading Capacity: 6tons
 Estimated Volume: 7.5tons
 Trip2 Date:22/5/97
 Researcher's name: e. Charo

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	35,796		13 : 14			
Loading-1	in	35,798	2,000	13 : 16	2		Ken West Fall works
	out			13 : 18		2	
Loading-2	in	35,798	0	13 : 19	1		
	out			13 : 20		1	
Loading-3	in	35,798	0	13 : 24	4		
	out			13 : 25		1	
Loading-4	in	35,798	0	13 : 27	2		Creative Innovations
	out			13 : 31		4	
Loading-5	in	35,798	0	13 : 34	3		
	out			13 : 38		4	Sandwich tree
Loading-6	in	35,798	0	13 : 39	1		
	out			13 : 42		3	
Loading-7	in	35,798	0	13 : 46	4		
	out			13 : 49		3	
Loading-8	in	35,815	17,000	14 : 0	11		AbbacusC. T/system
	out			14 : 2		2	
Loading-9	in	35,815	0	14 : 5	3		
	out			14 : 8		3	Havelli Rest.
Loading-10	in	35,817	2,000	14 : 12	4		
	out			14 : 14		2	
Loading-11	in	35,817	0	14 : 16	2		
	out			14 : 17		1	LabChem ltd.
Loading-12	in	35,820	3000	14 : 21	4		
	out			15 : 0		39	
Loading-13	in	35,820	0	15 : 4	4		
	out			15 : 15		11	Manufacturing Phamacitical
Loading-14	in	35,823	3000	:			
	out			:		0	
Dumping site	in	35,828	5,000	15 : 45	30		Dandora
Start dumping		35,828	0	15 : 46	1		Dumping site
Finish dumping		35,828	0	17 : 3		77	
Dumping site	out	35,828	0	17 : 6	3		
Reach to workshop	in	35,831	3,000	18 : 2	56		work shop
Total			35,000		135	153	Total min.:288 min.
Collection			27,000		45	76	
Transportation			8,000		86		
Inside the dumping site			0		4	77	Dumping time
Idling time							

Time & Motion Study

Organization: bins

Trip 1 Date: 22/5/97

Vehicle No. KAE441W

Loading Capacity: 6.5 tons

Researcher's name: M.Gonda

No. of Crew: 5

Estimated Volume:

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 5			
Loading-1	in		15,000	8 : 45	40		Enterprise rd
	out			8 : 46		1	to Lusaka rd
Loading-2	in		200	8 : 50	4		to Ladhics rd Park rd.
	out			8 : 55		5	-Muranga rd
Loading-3	in		40	8 : 56	1		to Kipipiri rd to
	out			8 : 57		1	to Forest rd
Loading-4	in		80	8 : 57	0		and Museum hill
	out			8 : 58		1	to Chiromo rd to
Loading-5	in		50	8 : 59	1		oof Ring rd W/lands
	out			9 : 0		1	
Loading-6	in		20	9 : 0	0		
	out			9 : 1		1	
Loading-7	in		40	9 : 1	0		
	out			9 : 3		2	
Loading-8	in		50	9 : 4	1		
	out			9 : 6		2	
Loading-9	in		80	9 : 8	2		
	out			9 : 9		1	
Loading-10	in		200	9 : 11	2		off Waiyaki way
	out			9 : 13		2	
Loading-11	in		200	9 : 15	2		
	out			9 : 18		3	
Loading-12	in		40	9 : 19	1		
	out			9 : 21		2	
Loading-13	in		150	9 : 23	2		Church rd
	out			9 : 31		8	
Loading-14	in		150	9 : 34	3		
	out			9 : 39		5	
Loading-15	in		40	9 : 40	1		
	out			9 : 42		2	Mimosa rd
Loading-16	in		50	9 : 43	1		
	out			9 : 47		4	
Loading-17	in		250	9 : 52	5		Rhapta rd collection
	out			9 : 52		0	
Loading-18	in		80	9 : 53	1		
	out			9 : 53		0	
Loading-19	in		80	9 : 54	1		
	out			9 : 55		1	
Loading-20	in		30	9 : 56	1		
	out			9 : 57		1	
Loading-21	in		80	9 : 57	0		
	out			9 : 58		1	
Loading-22	in		80	9 : 58	0		
	out			9 : 59		1	
Loading-23	in		100	10 : 1	2		
	out			10 : 1		0	

Time & Motion Study

Organization: bins

Trip 1 Date:22/5/97

Vehicle No. KAE441W

Loading Capacity: 6.5tons

Researcher's name: M.Gonda

No. of Crew: 5

Estimated Volume:

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24	in		40	10 : 2	1		
	out			10 : 3		1	
Loading-25	in		50	10 : 3	0		
	out			10 : 4		1	
Loading-26	in		20	10 : 4	0		
	out			10 : 5		1	
Loading-27	in		50	10 : 7	2		
	out			10 : 8		1	
Loading-28	in		80	10 : 9	1		
	out			10 : 10		1	
Loading-29	in		80	10 : 12	2		
	out			10 : 12		0	
Loading-30	in		100	10 : 13	1		
	out			10 : 15		2	
Loading-31	in		20	10 : 15	0		
	out			10 : 18		3	
Loading-32	in		40	10 : 19	1		
	out			10 : 21		2	
Loading-33	in		20	10 : 21	0		Lantana rd
	out			10 : 22		1	
Loading-34	in		20	10 : 22	0		
	out			10 : 24		2	
Loading-35	in		150	10 : 26	2		
	out			10 : 27		1	off Lantana rd
Loading-36	in		50	10 : 28	1		
	out			10 : 29		1	
Loading-37	in		30	10 : 31	2		
	out			10 : 34		3	Cedar rd.
Loading-38	in		180	10 : 36	2		
	out			10 : 37		1	
Loading-39	in		20	10 : 37	0		
	out			10 : 37		0	David Oseli rd
Loading-40	in		80	10 : 40	3		
	out			10 : 40		1	
Loading-41	in		50	10 : 41	2		
	out			10 : 43		1	
Loading-42	in		50	10 : 44	1		
	out			10 : 45		2	
Loading-43	in		100	10 : 47	6		
	out			10 : 53		0	
Loading-44	in		30	10 : 53	4		East Church rd
	out			10 : 57		1	
Loading-45	in		40	10 : 58	0		
	out			10 : 58		1	
Loading-46	in		80	10 : 59	2		
	out			11 : 1		2	

Time & Motion Study

Organization: bins

Trip 1 Date: 22/5/97

Vehicle No. KAE441W

Loading Capacity: 6.5 tons

Researcher's name: M. Gonda

No. of Crew: 5

Estimated Volume:

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-47	in		80	11 : 4	3		
	out			11 : 5		1	
Loading-48	in		40	11 : 6	1		
	out			11 : 13		7	
Loading-49	in		50	11 : 15	2		East Church rd
	out			11 : 16		1	
Loading-50	in		20	11 : 16	0		
	out			11 : 17		1	Terrace close
Loading-51	in		20	11 : 17	0		
	out			11 : 17		0	
Loading-52	in		50	11 : 18	1		
	out			11 : 21		3	
Loading-53	in		30	11 : 21	0		
	out			11 : 22		1	
Loading-54	in		500	11 : 23	1		Fox close
	out			11 : 23		0	
Loading-55	in		80	11 : 24	1		
	out			11 : 27		3	
Loading-56	in		50	11 : 28	1		
	out			11 : 28		0	
Loading-57	in		120	11 : 30	2		
	out			11 : 33		3	
Loading-58	in		20	11 : 33	0		
	out			11 : 37		4	
Loading-59	in		20	11 : 37	0		Kipipri way
	out			11 : 38		1	
Loading-60	in		30	11 : 39	1		
	out			11 : 42		3	
Loading-61	in		50	11 : 43	1		
	out			11 : 43		1	
Loading-62	in		20	11 : 44	0		
	out			11 : 44		1	
Loading-63	in		50	11 : 45	1		
	out			11 : 46		0	
Loading-64	in		20	11 : 46	2		
	out			11 : 48			
Loading-65	in		50	11 : 50	2		Kipipri way
	out			11 : 52		2	
Loading-66	in		200	11 : 55	3		
	out			11 : 59		4	
Loading-67	in		100	12 : 2	3		
	out			12 : 7		5	
Loading-68	in		60	12 : 9	2		Back to Waiyaki way
	out			12 : 10		1	
Loading-69	in		50	12 : 10	0		
	out			12 : 11		1	

Time & Motion Study

Organization: bins

Trip 1 Date:22/5/97

Vehicle No. KAE441W

Loading Capacity: 6.5tons

Researcher's name: M.Gonda

No. of Crew: 5

Estimated Volume:

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-70	in	40	12 : 13	2		
	out		12 : 17		4	
Loading-71	in	200	12 : 24	7		From this loading point
	out		12 : 52		28	track broke down on its
Loading-72	in		:			eway to lower Kabete
	out		:	206	0	Repaired by 16:18
Dumping site	in		:			
Start dumping			:	0		
Finish dumping			:		0	
Dumping site	out		:	0		
Reach to workshop	in	17,000	17 : 46	88		
Total		37,420		434	149	Total min.:583 min.
Collection		5,420		100	149	
Transportation		32,000		128	0	
Inside the dumping site		0		206	0	Dumping time
Idling time						Repair

Time & Motion Study

Organization: bins

Trip 1

Date: 22/5/97

Vehicle No. KAE593R

Loading Capacity: 3 tons

Researcher's name: K. Mwakutema

No. of Crew: 5

Estimated Volume: 5 tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	60,907		8 : 10			Kampala rd. to Lukasa rd. for
Loading-1	in	60,921	14,000	8 : 55	45		patrol purposes.
	out			9 : 32		37	Lukasa to Kimathi Lane.
Loading-2	in	60,924	3,000	9 : 44	12		Lower hill
	out			9 : 57		13	20 min. tea break
Loading-3	in	60,949	25,000	11 : 15	78		Lower Kabete
	out			11 : 16		1	
Loading-4	in	60,950	1,000	11 : 20	4		
	out			11 : 21		1	
Loading-5	in	60,952	2,000	11 : 26	5		Brookside close
	out			11 : 27		1	
Loading-6	in	60,953	1,000	11 : 29	2		
	out			11 : 30		1	
Loading-7	in	60,954	700	11 : 33	3		
	out			11 : 34		1	
Loading-8	in	60,954	300	11 : 37	3		Mutundi Lane
	out			11 : 38		1	
Loading-9	in	60,955	700	11 : 40	2		Karuna close
	out			11 : 41		1	
Loading-10	in	60,955	300	11 : 44	3		School lane
	out			11 : 45		1	
Loading-11	in	60,956	1000	11 : 48	3		Mutundu close
	out			11 : 49		1	
Loading-12	in	60,957	600	11 : 51	2		School lane
	out			11 : 52		1	
Loading-13	in	60,957	400	11 : 58	6		Brookside grove
	out			11 : 59		1	
Loading-14	in	60,959	2000	12 : 9	10		Spring valley
	out			12 : 10		1	
Loading-15	in	60,960	1000	12 : 13	3		Hill view close
	out			12 : 14		1	
Loading-16	in	60,962	2000	12 : 21	7		Lake view drive
	out			12 : 23		2	
Loading-17	in	60,963	1,000	12 : 27	4		Naivasha street
	out			12 : 31		4	
Loading-18	in	60,964	500	12 : 34	3		Lake view estate
	out			12 : 35		1	
Loading-19	in	60,964	200	12 : 36	1		Baringo drive
	out			12 : 42		6	
Loading-20	in	60,964	300	12 : 45	3		Lake view est.
	out			12 : 47		2	
Loading-21	in	60,964	400	12 : 48	1		Elementaita drive
	out			12 : 49		1	
Loading-22	in	60,965	400	12 : 50	1		Turkana drive
	out			12 : 55		5	
Loading-23	in	60,965	200	12 : 57	2		Hill view rise
	out			12 : 59		2	

Time & Motion Study

Organization: bins

Trip 1

Date: 22/5/97

Vehicle No. KAE593R

Loading Capacity: 3tons

Researcher's name: K. Mwakutema

No. of Crew: 5

Estimated Volume: 5tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24	in	60,966	900	13 : 1	2		Hill view crescent
	out			13 : 2		1	
Loading-25	in	60,966	100	13 : 5	3		Spring valley
	out			13 : 11		6	
Loading-26	in	60,967	1,000	13 : 14	3		
	out			13 : 24		10	
Loading-27	in	60,968	800	13 : 25	1		Bendera lane
	out			13 : 26		1	
Loading-28	in	60,968	200	13 : 28	2		
	out			13 : 28		0	
Loading-29	in	60,969	1000	13 : 33	5		
	out			13 : 35		2	
Loading-30	in	60,970	1000	13 : 42	7		Spring valley
	out			13 : 43		1	
Loading-31	in	60,971	1000	13 : 45	2		
	out			13 : 48		3	
Loading-32	in	60,972	1000	13 : 50	2		Spring valley close
	out			13 : 55		5	
Loading-33	in	60,973	600	14 : 4	9		Spring valley crescent
	out			14 : 6		2	
Loading-34	in	60,973	400	14 : 13	7		Peponi rd gardens to D/site
	out			14 : 15		2	20 min. puncture repair
Dumping site	in	60,995	22,000	15 : 35	80		Peponi rd gardens to D/site
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	60,997	2,000	16 : 14	39		
Reach to workshop	in	61,010	13,000	16 : 44	30		
Total			103,000		395	119	Total min.: 514 min.
Collection			66,000		226	119	
Transportation			35,000		90	0	
Inside the dumping site			2,000		39	0	Dumping time
Idling time					40		tea break/ repair

Time & Motion Study

Organization: bins

Trip 1 Date:22/5/97

Vehicle No. KAF761R

Loading Capacity: 2.69ton

Researcher's name: L. Mumbo

No. of Crew: 6

Estimated Volume: 3ton

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	22,881		8 : 0			Kampala rd-Enterprise rd
Loading-1	in			:			to Lusaka rd-Jogoo rd.-
	out			:		0	O/Ring rd.
							to Komarock rd.
							15 min part unloading
							to D/site
Dumping site	in	22,891	10,000	9 : 15	75		
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	22,896	5,000	10 : 18	63		
Reach to workshop	in			:			
Total			15,000		138	0	Total min.: 138 min.
Collection			0		0	0	
Transportation			10,000		60		
Inside the dumping site			5,000		63	0	Dumping time
Idling time					15		

Time & Motion Study

Organization: bins

Trip 2 Date:22/5/97

Vehicle No. KAE761R

Loading Capacity: 2.69ton

Researcher's name: L. Mumbo

No. of Crew: 6

Estimated Volume: 3ton

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	22,896		10 : 18			From Dumping site at the Air
Loading-1	in	22,908	12,000	10 : 52	34		Airport South rd.
	out			10 : 55		3	
Loading-2	in	22,908	0	10 : 59	4		
	out			11 : 2		3	
Loading-3	in	22,908	0	11 : 4	2		
	out			11 : 46		42	
Loading-4	in	22,916	8,000	12 : 3	17		Enterprsie rd.
	out			12 : 21		18	
Loading-5	in	22,921	5,000	12 : 40	19		SASIO RD
	out			14 : 41		121	
Loading-6	in	22,922	1,000	14 : 50	9		
	out			15 : 9		19	
Loading-7	in	22,926	4,000	15 : 19	10		Enterprise rd
	out			15 : 20		1	
Loading-8	in	22,927	1,000	15 : 23	3		Kitui rd
	out			15 : 26		3	
Loading-9	in	22,927	0	15 : 33	7		Gilgil rd
	out			15 : 33		0	
Loading-10	in	22,932	5,000	15 : 43	10		
	out			15 : 46		3	Jogoo rd
Dumping site	in	22,941	9,000	16 : 20	34		
Start dumping		22,942	1,000	16 : 23	3		
Finish dumping				17 : 2		39	
Dumping site	out	22,943	1,000	17 : 11	9		
Reach to workshop	in	22,953	10,000	17 : 57	46		
Total			57,000		207	252	Total min.:459 min.
Collection			24,000		81	213	
Transportation			31,000		114		
Inside the dumping site			2,000		12	39	Dumping time
Idling time							

Time & Motion Study

Organization: bins

Trip 1 Date:22/5/97

Vehicle No. KQY636

Loading Capacity: 12ton

Researcher's name: J. Atieno

No. of Crew: 6

Estimated Volume: 10ton

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 0			
Loading-1	in			8 : 33	33		Meteorological Staff Quarters
	out			9 : 3		30	Department Staff
Loading-2	in		200	9 : 7	4		Quarters 2
	out			9 : 17		10	
Loading-3	in		400	9 : 19	2		Canteen(Meteorological Dept.
	out			9 : 51		32	
Loading-4	in		200	10 : 6	15		Wilson Airport
	out			10 : 47		41	at 6 pints of collection
Loading-5	in		400	10 : 49	2		
	out			11 : 4		15	
Loading-6	in		600	11 : 5	1		
	out			11 : 31		26	
Loading-7	in		600.5	11 : 32	1		
	out			12 : 0		28	
Loading-8	in		700	12 : 1	1		
	out			12 : 40		39	From W/shop route:
Loading-9	in		700.5	13 : 5	25		
	out			13 : 20		15	Enterprise rd.-commercial str.-Bunyala rd.-Lower hill rd.-H/Sellaise Av.-
				:			Ngong rd. to Meteorological dept. and W/airport, truck had mechanical default, repaired and to D/site.
				:			
				:			
				:			
				:			
				:			
Dumping site	in			17 : 0	220		
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			18 : 0	60		
Reach to workshop	in			18 : 30	30		closed down
Total			3,801		394	236	Total min.:630 min.
Collection			3,801		51	236	
Transportation			0		283		
Inside the dumping site			0		60	0	Dumping time
Idling							

Time & Motion Study

Organization: bins

Trip 1 Date:22/5/97

Vehicle No. KST976

Loading Capacity: 2.5tons

Researcher's name: A. Wangu

No. of Crew: 4

Estimated Volume: 7.875m³

Location		Milage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 38			
Loading-1	in			9 : 26	48		NIC
	out			9 : 56		30	
Loading-2	in			10 : 5	9		Germany Embassy
	out			10 : 12		7	
Loading-3	in			10 : 28	16		Steers (T/Mboya str)
	out			10 : 36		8	
Loading-4	in			10 : 40	4		Queen's way
	out			10 : 52		12	
Loading-5	in			10 : 55	3		Rickshaw C/Rest.
	out			11 : 9		14	
Loading-6	in			11 : 15	6		Lukes ltd.
	out			11 : 25		10	
Loading-7	in			11 : 26	1		Queens Cleaners&Dryers
	out			11 : 32		6	ltd
Loading-8	in			11 : 35	3		Chester
	out			13 : 25		110	
Loading-9	in			14 : 14	49		Norfolk Hotel
	out			14 : 22		8	
Loading-10	in			14 : 30	8		Vic Preston ltd.
	out			14 : 45		15	
Loading-11	in			14 : 46	1		St. Paul Chapel
	out			14 : 50		4	
Loading-12	in			14 : 55	5		Steers(Jevanjee gdns)
	out			15 : 26		31	
Dumping site	in			16 : 30	64		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			17 : 0	30		
Reach to workshop	in			17 : 30	30		
Total			0		277	255	Total min.: 532min.
Collection			0		105	255	
Transportation			0		142		
Inside the dumping site			0		30	0	Dumping time
Idling							

Time & Motion Study

Organization: bins

Trip 1 Date: 22/5/97

Vehicle No. KXF820

Loading Capacity: 7tons

Researcher's name: P. Wanjiru

No. of Crew: 5

Estimated Volume: 6.5tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out		8 : 5			From W/shop to D/site
Loading-1	in		:			via; Enterprise rd-
	out		:		0	to petrol stn
						to Ring rd. to Ngara rd to
						Kariobangi estate
Dumping site	in		8 : 52	47		Dandora
Start dumping			8 : 58	6		
Finish dumping			10 : 35		97	
Dumping site	out		10 : 38	3		
Reach to workshop	in		:			
Total		0		56	97	Total min.: 153 min.
Collection		0		0	0	
Transportation		0		47		
Inside the dumping site		0		9	97	Dumping time
Idling time						

Time & Motion Study

Organization: bins

Trip 2 Date:22/5/97

Vehicle No. KXF820

Loading Capacity: 7tons

Researcher's name: P. Wanjiru

No. of Crew: 5

Estimated Volume: 0ton

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out		10 : 38			From Dandora to loading pts. via
Loading-I	in		:			Baba dogo rd.
	out		:		0	Thika rd. Utalii hotel
						But was stopped by Kenya Police
						for inspection for about 6hrs
						so no collection done
Dumping site	in		:	0		
Start dumping			:	0		
Finish dumping			:		0	
Dumping site	out		:	0		
Reach to workshop	in		17 : 0	382		
Total		0		382	0	Total min.: 382 min.
Collection		0		0	0	
Transportation		0		382		
Inside the dumping site		0		0	0	Dumping time
Idling time						

Time & Motion Study

Organization: bins

Trip 1 Date:22/5/97

Vehicle No. KZV006

Loading Capacity: 3ton

Researcher's name: M. Mwangi

No. of Crew: 4

Estimated Volume: 3.9ton

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	146,831		9 : 0			To Hurlingham
Loading-1	in	146,833	2,000	9 : 30	30		Chartered properties
	out			9 : 40		10	
Loading-2	in	146,835	2,000	9 : 51	11		Misono rst.
	out			9 : 51		0	
Loading-3	in	146,836	1,000	10 : 3	12		Loyale house
	out			10 : 9		6	
Loading-4	in	146,838	2,000	10 : 15	6		Swedish school
	out			10 : 20		5	
Loading-5	in	146,840	2,000	10 : 26	6		Makindi house
	out			10 : 33		7	
Loading-6	in	146,841	1,000	10 : 46	13		Murno court
	out			11 : 0		14	
Loading-7	in	146,844	3,000	11 : 6	6		Cavina school
	out			11 : 11		5	
Loading-8	in	146,846	2,000	11 : 20	9		Methodist hsc.
	out			11 : 30		10	
Loading-9	in	146,849	3,000	12 : 0	30		Fedha mangement
	out			12 : 25		25	
Loading-10	in	146,850	1,000	12 : 40	15		GTZ
	out			12 : 46		6	
Loading-11	in	146,852	2,000	13 : 6	20		Nakumat ukay
	out			13 : 14		8	
Loading-12	in	146,853	1,000	13 : 30	16		Elys chemicals
	out			13 : 40		10	
lunch	in	146,856	3,000	14 : 0	20		30 min lunch break
	out			14 : 30		30	
Loading-13	in	146,858	2,000	14 : 40	10		
	out			15 : 0		20	
Loading-14	in	146,862	4,000	15 : 30	30		Jazia agencies
	out			15 : 45		15	
Dumping site	in	146,866	4,000	16 : 0	15		Dandora
Start dumping				:			
Finish dumping				:			
Dumping site	out	146,867	1,000	17 : 10	70		
Reach to workshop	in	146,869	2,000	17 : 30	20		
Total			38,000		339	171	Total min.:510 min.
Collection			29,000		204	141	
Transportation			8,000		65		
Inside the dumping site			1,000		70	0	Dumping time
Idling						30	lunch break

Time & Motion Study

Organization: bins

Trip 1 Date: 23/5/97

Vehicle No. KAD794Y

Loading Capacity: 5tons

Researcher's name: J. Kioko

No. of Crew: 5

Estimated Volume: 5.5m³

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	48,594		8 : 25			to petrol stn for fueling
Loading-1	in			:			
	out			:		0	to dump previous day's garbage
				:			
				:			Enterprise rd.-jogoo rd.-
				:			Buru Buru Dandora
				:			
				:			We had to face a big jam at Buru
				:			Buru road due to a bad accident
				:			involving two motory.
				:			
Dumping site	in	48,611	17,000	8 : 55	30		
Start dumping		48,612	1,000	9 : 5	10		
Finish dumping				10 : 0		55	
Dumping site	out			10 : 15	15		Vehicle had
Reach to workshop	in	48,627	15,000	11 : 0	45		Mechanical problem
Total			33,000		100	55	Total min.:155min.
Collection			0		0	0	
Transportation			32,000		75		
Inside the dumping site			1,000		25	55	Dumping time
Idoling time							

Time & Motion Study

Organization: bins

Trip 1 Date:23/5/97

Vehicle No. KAE341U

Loading Capacity: 6tons

Researcher's name: L. Kadere

No. of Crew: 5

Estimated Volume: 4.9tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	30,543		8 : 10			Kampala rd.
Loading-1	in	30,543	0	8 : 13	3		Lunga Lunga rd.
	out			8 : 17		4	
Loading-2	in	30,543	0	8 : 19	2		Enterprise rd.
	out			8 : 40		21	
Loading-3	in	30,544	1,000	8 : 43	3		Changamwe rd.
	out			9 : 40		57	
Loading-4	in	30,544	0	9 : 42	2		Dakar rd.
	out			10 : 22		40	
Loading-5	in	30,545	1,000	10 : 25	3		Busia rd.
	out			10 : 50		25	
Loading-6	in	30,547	2,000	10 : 55	5		Lusaka rd.
	out			12 : 5		70	
Loading-7	in	30,549	2,000	12 : 15	10		Likoni rd to D/site
	out			14 : 20		125	
				:			
				:			
Dumping site	in	30,563	14,000	15 : 1	41		James Osogo rd.
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	30,563	0	15 : 59	58		
Reach to workshop	in	30,576	13,000	16 : 35	36		Kampala rd.
Total			33,000		163	342	Total min.:505 min.
Collection			6,000		25	342	
Transportation			27,000		80		
Inside the dumping site			0		58	0	Dumping time
Idling							

Time & Motion Study

Organization: Bins

Trip 1 Date:23/5/97

Vehicle No. KAE386R

Loading Capacity :6

Researcher Name:E. Charo

No. of Crew: 4

Estimated Volume: 8tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	35,831		8 : 16			
Loading-1	in	35,850	19,000	9 : 36	80		Gitanga rd
	out			9 : 37		1	
Loading-2	in	35,851	1,000	9 : 40	3		
	out			9 : 43		3	
Loading-3	in	35,852	1,000	9 : 45	2		
	out			9 : 46		1	
Loading-4	in	35,852	0	9 : 49	3		
	out			9 : 51		2	
Loading-5	in	35,852	0	9 : 54	3		
	out			9 : 56		2	
Loading-6	in	35,852	0	9 : 58	2		
	out			9 : 59		1	
Loading-7	in	35,853	1,000	10 : 0	1		Othaya rd
	out			10 : 2		2	
Loading-8	in	35,854	1,000	10 : 7	5		Makueni rd
	out			10 : 11		4	
Loading-9	in	35,856	2,000	10 : 15	4		GITANGA EST.
	out			10 : 26		11	
Loading-10	in	35,859	3,000	10 : 29	3		James Gichuru rd
	out			10 : 30		1	
Loading-11	in	35,861	2000	10 : 35	5		NS Bansal
	out			10 : 38		3	
Loading-12	in	35,861	0	10 : 45	7		Hatheru rd
	out			10 : 55		10	
Loading-13	in	35,862	1000	10 : 57	2		Gitanga rd.
	out			10 : 59		2	
Loading-14	in	35,862	0	11 : 0	1		Thompsons
	out			11 : 3		3	Estate
Loading-15	in	35,862	0	11 : 5	2		
	out			11 : 9		4	
Loading-16	in	35,864	2000	11 : 14	5		St. Tereza Med. Clinic
	out			11 : 20		6	
Loading-17	in	35,865	1,000	11 : 29	9		Kawangware
	out			11 : 30		1	
Loading-18	in	35,866	1,000	11 : 33	3		Gitanga rd
	out			11 : 37		4	
Loading-19	in	35,867	1,000	11 : 40	3		
	out			11 : 41		1	King'ara rd.
Loading-20	in	35,867	0	11 : 43	2		
	out			11 : 43		0	
Loading-21	in	35,867	0	11 : 55	12		Leroghi Gardens
	out			11 : 59		4	
Loading-22	in	35,868	1,000	12 : 2	3		Lavito we kindergarden
	out			12 : 4		2	
Loading-23	in	35,868	0	12 : 5	1		Kitaneala rd.
	out			12 : 5		0	

Time & Motion Study

Organization: Bins

Trip 1 Date: 23/5/97

Vehicle No. KAE386R

Loading Capacity : 6

Researcher Name: E. Charo

No. of Crew: 4

Estimated Volume: 8 tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24	in	35,869	1,000	12 : 17	12		Kunde rd
	out			12 : 20		3	
Loading-25	in	35,870	1,000	12 : 32	12		Argwings Kodhek rd
	out			12 : 36		4	
Loading-26	in	35,871	1,000	12 : 39	3		Hundred Avenue
	out			12 : 49		10	
Loading-27	in	35,871	0	13 : 15	26		
	out			13 : 19		4	
Loading-28	in	35,872	1000	13 : 21	2		Argwings Kodhek rd
	out			13 : 22		1	
Loading-29	in	35,872	0	13 : 25	3		Elgeyo Marakwet rd
	out			13 : 47		22	
Loading-30	in	35,873	1000	13 : 49	2		
	out			13 : 54		5	
Loading-31	in	35,874	1000	14 : 0	6		Kirichwa village
	out			14 : 4		4	
Loading-32	in	35,874	0	14 : 10	6		
	out			14 : 12		2	
Loading-33	in	35,875	1,000	14 : 15	3		Kirichwa rd.
	out			14 : 44		29	
Loading-34	in	35,877	2,000	14 : 52	8		Chania court
	out			15 : 3		11	
Loading-35	in	35,878	1,000	15 : 22	19		Ring rd
	out			15 : 23		1	
Loading-36	in	35,879	1,000	15 : 32	9		Kilimani
	out			15 : 39		7	
Dumping site	in	35,899	20,000	16 : 23	44		Dandora dumping site
Start dumping		35,899	0	16 : 24	1		then back to work shop
Finish dumping		35,899	0	17 : 9		45	
Dumping site	out	35,899	0	17 : 10	1		
Reach to workshop	in	35,909	10,000	18 : 10	60		
Total			78,000		378	216	Total min.: 594 min.
Collection			29,000		192	171	
Transportation			49,000		184	0	
Inside the dumping site			0		2	45	Dumping time
Idling time							

Time & Motion Study

Organization: bins

Trip 1 Date:23/5/97

Vehicle No. KAE111W

Loading Capacity: 6.5tons

Researcher's name: M. Gonda

No. of Crew: 5

Estimated Volume: 7tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out		8 : 9			From the work shop the truck
Loading-1	in		:			went to the filling station
	out		:		0	through enterprise rd. Lusaka
						from 8:16 to 8:25 am.
						From filling station to dandora
						dumping site through Lusaka r
						Landhills rd. Race course rd.
						ring rd. ngara rd. mupanga rd.
						thika rd. outering rd.
Dumping site	in	18,000	8 : 58	49		Dandora
Start dumping		300	9 : 6	8		
Finish dumping		0	9 : 49		43	
Dumping site	out	300	9 : 56	7		
Reach to workshop	in		:			
Total		18,600		64	43	Total min.:107 min.
Collection		0		0	0	
Transportation		18,000		49		
Inside the dumping site		600		15	43	Dumping time
Idling time						

Time & Motion Study

Organization: Bins

Trip 2 Date: 23/5/97

Vehicle No. KAE441W

Loading Capacity: 6.5 tons

Researcher's name: M. Gonda

No. of Crew: 5

Estimated Volume: 7 tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out		0	9 : 56			From D/site into O/Ring rd
Loading-1	in		20,000	10 : 39	43		to Thika rd
	out			10 : 41		2	into Murang'a rd
Loading-2	in		150	10 : 43	2		to Forest rd. to Museum
	out			10 : 43		0	hill rd- Ehiromo rd. Riverside
Loading-3	in		80	10 : 43	0		drive- James Gichuru rd.
	out			10 : 44		1	to collection on
Loading-4	in		80	10 : 45	1		King'ara rd
	out			10 : 46		1	
Loading-5	in		100	10 : 47	1		
	out			10 : 54		7	
Loading-6	in		250	10 : 59	5		
	out			11 : 2		3	
Loading-7	in		200	11 : 3	1		Riara rd
	out			11 : 4		1	
Loading-8	in		400	11 : 5	1		
	out			11 : 6		1	
Loading-9	in		50	11 : 6	0		
	out			11 : 7		1	
Loading-10	in		20	11 : 7	0		
	out			11 : 8		1	
Loading-11	in		200	11 : 9	1		
	out			11 : 13		4	
Loading-12	in		20	11 : 14	1		Makini rd
	out			11 : 14		0	
Loading-13	in		20	11 : 15	1		
	out			11 : 15		0	
Loading-14	in		150	11 : 16	1		
	out			11 : 17		1	
Loading-15	in		20	11 : 17	0		
	out			11 : 19		2	
Loading-16	in		150	11 : 21	2		
	out			11 : 22		1	
Loading-17	in		100	11 : 24	2		
	out			11 : 27		3	
Loading-18	in		200	11 : 31	4		
	out			11 : 35		4	
Loading-19	in		150	11 : 38	3		
	out			11 : 40		2	
Loading-20	in		50	11 : 42	2		
	out			11 : 45		3	
Loading-21	in		250	11 : 50	5		
	out			11 : 52		2	
Loading-22	in		80	11 : 53	1		
	out			11 : 54		1	
Loading-23	in		80	11 : 57	3		
	out			11 : 57		0	

Time & Motion Study

Organization: Bins

Trip 2 Date: 23/5/97

Vehicle No. KAE111W

Loading Capacity: 6.5 tons

Researcher's name: M. Gonda

No. of Crew: 5

Estimated Volume: 7 tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24 in		100	11 : 58	1		From this loading pt.
out			:			truck broke down was
						was repaired by 16:10
						Then to Dandora D/site
						along Waiyaki way, Mus
						eum hill rd., Forest rd.
						Murang'a rd, Thika rd.,
						Outer ring rd, Komarock rd
Dumping site in		16,000	17 : 18	60		Dandora
Start dumping		400	17 : 26	8		
Finish dumping		0	17 : 58		32	
Dumping site out		40	18 : 4	6		
Reach to workshop in		18,000	:			
Total		57,340		155	73	Total min.: 488 min.
Collection		2,900		38	41	
Transportation		54,000		103	0	
Inside the dumping site		440		14	32	Dumping time
Idling time				260		repair

Time & Motion Study

Organization: Bins

Trip 1 Date: 23/5/97

Vehicle No. KAB593R

Loading Capacity: 3tons

Researcher's name: K. Mwakutema

No. of Crew: 5

Estimated Volume: 1.5tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	61,032	0	8 : 10			to Lusaka rd. Fuel for 15min.
Loading-1	in	61,041	9,000	8 : 42	32		to Argwings Kodhek close
	out			8 : 43		1	
Loading-2	in	61,041	100	8 : 46	3		Argwings Kodhek
	out			8 : 49		3	
Loading-3	in	61,042	900	8 : 54	5		
	out			8 : 55		1	
Loading-4	in		200	8 : 58	3		
	out			8 : 59		1	
Loading-5	in	61,043	500	9 : 1	2		
	out			9 : 2		1	
Loading-6	in	61,043	300	9 : 4	2		
	out			9 : 6		2	
Loading-7	in		300	9 : 8	2		Jabavu rd.
	out			9 : 10		2	
Loading-8	in		50	9 : 11	1		
	out			9 : 12		1	
Loading-9	in		80	9 : 13	1		
	out			9 : 14		1	
Loading-10	in	61,044	200	9 : 16	2		
	out			9 : 17		1	
Loading-11	in	61,044	370	9 : 19	2		
	out			9 : 20		1	
Loading-12	in	61,045	650	9 : 22	2		Woodlands rd.
	out			9 : 24		2	
Loading-13	in	61,045	350	9 : 26	2		Lenana rd.
	out			9 : 28		2	
Loading-14	in		300	9 : 30	2		Woodlands rd.
	out			9 : 34		4	
Loading-15	in		400	9 : 36	2		Dennis prit rd
	out			9 : 46		10	
Loading-16	in	61,046		9 : 49	3		
	out			9 : 50		1	
Loading-17	in	61,046	300	9 : 51	1		Dennis prit rd.
	out			10 : 5		14	
Loading-18	in	61,047	400	10 : 7	2		
	out			10 : 10		3	
Loading-19	in	61,047	300	10 : 14	4		Kitale lane
	out			10 : 15		1	
Loading-20	in	61,048	1,000	10 : 18	3		Maalim Juma rd
	out			10 : 20		2	
Loading-21	in	61,049	500	10 : 24	4		Likoni lane
	out			10 : 25		1	
Loading-22	in	61,049	500	10 : 26	1		
	out			10 : 29		3	
Loading-23	in	61,050	1,000	10 : 33	4		State hse avenue
	out			10 : 35		2	

Time & Motion Study

Organization: Bins

Trip 1 Date:23/5/97

Vehicle No. KAI:593R

Loading Capacity: 3tons

Researcher's name: K. Mwakutema

No. of Crew: 5

Estimated Volume: 1.5tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24 in	61,051	1,000	10 : 40	5		State House Avenue
out			10 : 44		4	
Dumping site in			:			
Start dumping			:			
Finish dumping			:			
Dumping site out			:			No dumping done
Reach to workshop in			14 : 55	251		State hse Av. W/shop
Total		13,700		341	64	Total min :405 min.
Collection		4,700		58	64	
Transportation		9,000		268	0	
Inside the dumping site		0		0	0	Dumping time
Idling time				15		Fuel

Time & Motion Study

Organization: bins

Trip 1 Date 23/5/97

Vehicle No. KAB761R

Loading Capacity: 2.69 tons

Researcher's name: L. Mumbo

No. of Crew: 6

Estimated Volume: 2 tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	22,953		8 : 11			Kampala rd.
Loading-1	in	22,954	1,000	8 : 20	9		Kitui rd.
	out			8 : 20		0	Enterprise rd.
Loading-2	in	22,956	1,800	8 : 28	8		
	out			8 : 28		0	
Loading-3	in	22,958	2,200	8 : 38	10		Lusaka rd
	out			8 : 51		13	
Loading-4	in	22,961	3,000	9 : 2	11		Langata rd
	out			9 : 10		8	
Loading-5	in	22,965	4,000	9 : 21	11		Upper hill rd
	out			9 : 45		24	
Loading-6	in	22,967	2,000	9 : 54	9		Lusaka rd
	out			10 : 0		6	
Loading-7	in	22,968	1,000	10 : 5	5		Msa rd
	out			10 : 9		4	
Loading-8	in	22,969	1,000	10 : 20	11		Dunga rd
	out			11 : 4		44	20 min. idling time
Loading-9	in	22,971	2,000	11 : 9	5		Dar-es-saaam rd
	out			11 : 10		1	
Loading-10	in	22,971	0	11 : 18	8		Lusaka rd
	out			11 : 18		0	
Loading-11	in	22,971	0	11 : 19	1		Lusaka rd
	out			11 : 23		4	
Loading-12	in	22,973	2000	11 : 30	7		Busia rd
	out			11 : 33		3	
Loading-13	in	22,976	3000	11 : 49	16		Lung lunga rd
	out			11 : 56		7	
Loading-14	in	22,980	4000	12 : 9	13		Road A
	out			12 : 18		9	
Loading-15	in	22,981	1000	12 : 26	8		Enterprise rd
	out			12 : 32		6	
Loading-16	in	22,981	400	12 : 36	4		
	out			12 : 39		3	
Loading-17	in	22,982	600	12 : 46	7		Likoni rd Jogoo rd Rabai rd
	out			12 : 48		2	Mumias South rd Outer ring
Loading-18	in	22,986	4,000	13 : 1			rd to Koma rock rd
	out			13 : 2		1	lunch break/idle
Dumping site	in	22,995	9,000	13 : 41	143		lunch
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	22,996	1,000	14 : 29	48		
Reach to workshop	in	23,010	14,000	15 : 34	65		
Total			57,000		329	115	Total min. :444 min.
Collection			32,000		134	95	
Transportation			24,000		127	0	
Inside the dumping site			1,000		48	0	Dumping time
Idling time					20	20	lunch break

Time & Motion Study

Organization: bins

Trip 1 Date 23/5/97

Vehicle No. KQY636

Loading Capacity: 12tons

Researcher's name: J. Atieno

No. of Crew: 6

Estimated Volume: 10tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 2			
Loading-1	in			8 : 15	13		B/High Commission (No Garbage
	out			8 : 17		2	Nrbi National Park-Simba Saloon
Loading-2	in			8 : 35	18		Carnivore-Serena Lodges & Hotel
	out			8 : 44		9	(Nairobi West) used langata rd. a
Loading-3	in			8 : 50	6		Muthaiti av. and Birongo sauae.-
	out			10 : 28		98	Dr Double (No Garbage) used
Loading-4	in			10 : 39	11		Enterprise rd.- Kamco Engineerin
	out			10 : 47		8	Ltd. used Changamwe Tibbett&
Loading-5	in			10 : 57	10		Britten (Nanyuki rd.) Nestle
	out			10 : 58		1	(No Garbage) used Pate rd.
Loading-6	in			11 : 2	4		Enterprise rd.- Commerical st.-
	out			11 : 9		7	Bunyala rd.- Lower Hill rd.- Hou
Loading-7	in			11 : 23	14		selassie- Ngong rd.- while going t
	out			12 : 47		84	B/High Commission followed the
Loading-8	in			12 : 50	3		same route while going to Nrbi
	out			12 : 52		2	National Park but entered through
				:			Langata rd. Followed Lusaka rd.-
				:			Likoni rd.- Jogoo rd.- Outer ring r
				:			to the dumping site Dandora.
				:			
				:			
Dumping site	in			14 : 32	100		
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			15 : 30	58		
Reach to workshop	in			17 : 0	90		closed down
Total			0		327	211	Total min.:538 min.
Collection			0		66	211	
Transportation			0		203		
Inside the dumping site			0		58	0	Dumping time
Idling							

Time & Motion Study

Organization: bins

Trip 1 Date: 23/5/97

Vehicle No. KST976

Loading Capacity: 2.5 tons

Researcher's name: A. Wangu

No. of Crew: 4

Estimated Volume: 7.875m³

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			9 : 20			
Loading-1	in			10 : 30	70		Rickshaw C/rest.
	out			10 : 40		10	Lukes ltd.
Loading-2	in			10 : 45	5		
	out			10 : 54		9	
Loading-3	in			11 : 0	6		Barclays Branch
	out			11 : 7		7	
Loading-4	in			11 : 12	5		Ratansi Hse.
	out			11 : 40		28	
Loading-5	in			11 : 44	4		Norfolk Hotel
	out			11 : 51		7	
Loading-6	in			11 : 53	2		Steers(Jevanjee gdns)
	out			12 : 7		14	
Loading-7	in			12 : 25	18		Steers(T/Mboya Av)
	out			12 : 30		5	
Loading-8	in			12 : 35	5		City Nursing Home
	out			12 : 38		3	
							to D/site
Dumping site	in			13 : 5	27		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			13 : 30	25		
Reach to workshop	in			:			
Total			0		167	83	Total min.: 250 min.
Collection			0		45	83	
Transportation			0		97		
Inside the dumping site			0		25	0	Dumping time
Idling							

Time & Motion Study

Organization: bins

Trip 2 Date:23/5/97

Vehicle No. KST976

Loading Capacity: 7.875m³

Researcher's name: A. Wangu

No. of Crew: 4

Estimated Volume:

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out						
Loading-1	in			13 : 48	73		Longonot place
	out			15 : 1		6	
Loading-2	in			15 : 7	33		Norfolk Towers
	out			15 : 40		40	
Loading-3	in			16 : 20	5		Orna's rest.
	out			16 : 25		5	Project Assessment
Loading-4	in			16 : 30	5		
	out			16 : 35			to D/site
Dumping site	in			17 : 16	41		
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			17 : 30	14		
Reach to workshop	in			18 : 0	30		
Total			0		201	51	Total min.: 252 min.
Collection			0		43	51	
Transportation			0		144		
Inside the dumping site			0		14	0	Dumping time
Idling							

Time & Motion Study

Organization: bins

Trip 1 Date:23/5/97

Vehicle No. KXF820

Loading Capacity: 7tons

Researcher's name: P. Wanjiru

No. of Crew: 5

Estimated Volume: 3tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 15			
Loading-1	in			8 : 53	38		
	out			9 : 5		12	Kampala rd to
Loading-2	in			9 : 11	6		Enterprise rd to
	out			9 : 12		1	
Loading-3	in			9 : 14	2		Petrol stn.
	out			9 : 21		7	
Loading-4	in			9 : 25	4		
	out			9 : 28		3	
Loading-5	in			9 : 32	4		
	out			9 : 35		3	
Loading-6	in			9 : 43	8		
	out			9 : 46		3	Uhuru H/way
Loading-7	in			9 : 52	6		
	out			9 : 56		4	
Loading-8	in			10 : 0	4		Museum Hill rd
	out			10 : 1		1	
Loading-9	in			10 : 7	6		
	out			10 : 10		3	
Loading-10	in			10 : 16	6		Chiromo lane
	out			10 : 22		6	
Loading-11	in			10 : 29	7		
	out			10 : 31		2	Mogotio rd
Loading-12	in			10 : 35	4		
	out			10 : 39		4	Mukinduri lane
Loading-13	in			10 : 44	5		
	out			10 : 50		6	Muthithi road
Loading-14	in			11 : 0	10		
	out			11 : 11		11	
Loading-15	in			11 : 28	17		West land lane
	out			11 : 29		1	
Loading-16	in			11 : 45	16		Chiromo road
	out			11 : 47		2	Parklands Mpaka rd. Bhanicle
Loading-17	in			11 : 49	2		rd. Warnbugu 1st parklands A
	out			11 : 54		5	Limuru rd.
Loading-18	in			12 : 0	6		
	out			12 : 15		15	2nd Parklands Ave. to
Loading-19	in			12 : 16	1		General Mathenge drive
	out			12 : 21		5	to Eldama Raving rd
Loading-20	in			12 : 30	9		
	out			12 : 31		1	
Loading-21	in			12 : 36	5		
	out			12 : 41		5	Ring rd
Loading-22	in			13 : 0	19		
	out			13 : 10		10	
Loading-23	in			13 : 25	15		3rd Ave. Parklands
	out			13 : 27		2	

Time & Motion Study

Organization: bins

Trip 1 Date: 23/5/97

Vehicle No. KXI820

Loading Capacity: 7tons

Researcher's name: P. Wanjiru

No. of Crew: 5

Estimated Volume: 3tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24	in			13 : 43	16		Masari rd
	out			13 : 45		2	
Loading-25	in			14 : 0	15		
	out			14 : 2		2	Ngao rd
Loading-26	in			14 : 8	6		
	out			14 : 10		2	4th Ave. Parklands
Loading-27	in			14 : 27	17		
	out			14 : 32		5	
Loading-28	in			14 : 37	5		Githuri rd
	out			14 : 38		1	
Loading-29	in			14 : 55	17		Iregi rd
	out			15 : 0		5	
Loading-30	in			15 : 9	9		
	out			15 : 12		3	5th Ave. Parklands
Loading-31	in			15 : 31	19		Matama rd.
	out			15 : 39		8	
Loading-32	in			15 : 39	0		Limuru rd.
	out			16 : 2		23	
Loading-33	in			16 : 5	3		Citu park Estate
	out			16 : 10		5	
Loading-34	in			16 : 15	5		
	out			16 : 17		2	
Loading-35	in			16 : 19	2		
	out			16 : 20		1	
Loading-36	in			16 : 25	5		
	out			16 : 27		2	
Loading-37	in			16 : 29	2		
	out			16 : 31		2	
Loading-38	in			16 : 33	2		Limuru rd. via Muthaiga rd
	out			16 : 35		2	Naivasha Ave. Tchui rd.
Loading-39	in			16 : 37	2		Thika rd. Msa rd into
	out			16 : 40		3	Enterprise rd. to Kampala rd to W/shop
Dumping site	in			:			
Start dumping				:	0		
Finish dumping				:		0	
Dumping site	out			:	0		
Reach to workshop	in			18 : 0	80		
Total				0	405	180	Total min.: 585 min.
Collection				0	287	180	
Transportation				0	118	0	
Inside the dumping site				0	0	0	Dumping time
Idling time							

Time & Motion Study

Organization: bins

Trip 1 Date:23/5/97

Vehicle No. KZV006

Loading Capacity: 3tons

Researcher's name: M. Mwangi

No. of Crew: 4

Estimated Volume: 3.6tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min)	Loading time (min.)	Remarks (route)
Start from workshop	out	146,869		10 : 30			W/lands
Loading-1	in	146,870	1,000	11 : 0	30		Ornars
	out			11 : 25		25	
Loading-2	in	146,871	1,000	11 : 36	11		Pamstech house
	out			12 : 0		24	
Loading-3	in	146,872	1,000	12 : 20	20		H.P.court
	out			12 : 35		15	
Loading-4	in	146,873	1,000	12 : 40	5		Rank xerox
	out			13 : 0		20	
Loading-5	in	146,875	2,000	13 : 26	26		Fairview hotel
	out			13 : 40		14	
Loading-6	in	146,879	4,000	13 : 53	13		Israel Embassy
	out			14 : 0		7	
Loading-7	in	146,881	2,000	14 : 30	30		Lister P.
	out			14 : 45		15	
Loading-8	in	146,883	2,000	15 : 0	15		Durga rest.
	out			15 : 40		40	
Loading-9	in	146,885	2,000	16 : 0	20		
	out			16 : 20		20	20 min lunch break
Loading-10	in	146,886	1,000	16 : 30	10		Apic Centre
	out			16 : 46		16	
Loading-11	in	146,889	3000	17 : 0	14		Photo form
	out			17 : 32		32	
Loading-12	in	146,890	1000	17 : 40	8		Forerst court
	out			17 : 45		5	
Dumping site	in	146,893	3,000	17 : 53	8		
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	146,894	1,000	18 : 10	17		
Reach to workshop	in	146,896	2,000	18 : 30	20		
Total			27,000		247	233	Total min.:480min.
Collection			20,000		172	213	
Transportation			6,000		58		
Inside the dumping site			1,000		17	0	Dumping time
Idling						20	lunch break

Time & Motion Study

Organization: Bins

Trip 1 Date: 24/5/97

Vehicle No. KAE636H

Loading Capacity: 4ton

Researcher's name: M. Mapenzi

No. of Crew: 3

Estimated Volume: 5m3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	46,384		8 : 32			
Loading-1	in	46,384	500	8 : 35	3		Wajir rd.
	out			8 : 39		4	
Loading-2	in	46,389	4,300	8 : 49	10		Biashara str.
	out			8 : 56		7	
Loading-3	in	46,389	400	8 : 59	3		Koinange str.
	out			9 : 4		5	
Loading-4	in	46,391	2,200	9 : 12	8		Race course rd.
	out			9 : 26		14	
Loading-5	in	46,399	7,500	9 : 41	15		Lunga lunga rd
	out			9 : 54		13	
Loading-6	in	46,400	1,400	9 : 57	3		Migwane rd
	out			10 : 5		8	
Loading-7	in	46,404	3,800	10 : 16	11		Enterprise rd.
	out			10 : 21		5	
Loading-8	in	46,412	7,900	10 : 35	14		Langata
	out			10 : 43		8	
Loading-9	in	46,412	10	10 : 44	1		Muthaita Ave
	out			10 : 45		1	
Loading-10	in	46,412	100	10 : 46	1		
	out			10 : 47		1	
Loading-11	in	46,412	400	10 : 48	1		Bukani rd
	out			10 : 49		1	
Loading-12	in	46,413	200	10 : 51	2		Muthaita Ave.
	out			10 : 51		0	
Loading-13	in	46,413	400	10 : 51	0		
	out			10 : 54		3	
Loading-14	in	46,413	500	10 : 55	1		
	out			10 : 56		1	
Loading-15	in	46,414	10	10 : 58	2		
	out			10 : 58		0	
Loading-16	in	46,414	100	10 : 58	0		
	out			10 : 58		0	
Loading-17	in	46,414	100	10 : 59	1		Muthaita Ave.
	out			11 : 0		1	
Loading-18	in	46,414	10	11 : 1	1		Bukani rd
	out			11 : 3		2	
Loading-19	in	46,414	500	11 : 3	0		
	out			11 : 5		2	
Loading-20	in	46,414	100	11 : 7	2		Kodi rd.
	out			11 : 14		7	
Loading-21	in	46,414	200	11 : 14	0		
	out			11 : 16		2	
Loading-22	in	46,415	100	11 : 16	0		gate close
	out			11 : 17		1	
Loading-23	in	46,415	100	11 : 17	0		
	out			11 : 18		1	

Time & Motion Study

Organization: Bins

Trip 1 Date: 24/5/97

Vehicle No. KAE636H

Loading Capacity: 4ton

Researcher's name: M. Mapenzi

No. of Crew: 3

Estimated Volume: 5m³

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24	in	46,415	50	11 : 18	0		Kodi rd.
	out			11 : 19		1	
Loading-25	in	46,415	100	11 : 21	2		
	out			11 : 21		0	
Loading-26	in	46,415	100	11 : 21	0		
	out			11 : 23		2	
Loading-27	in	46,415	20	11 : 23	0		
	out			11 : 24		1	
Loading-28	in	46,415	20	11 : 26	2		
	out			11 : 26		0	
Loading-29	in	46,415	100	11 : 27	1		
	out			11 : 27		0	
Loading-30	in	46,415	100	11 : 28	1		
	out			11 : 28		0	
Loading-31	in	46,415	100	11 : 28	0		
	out			11 : 31		3	
Loading-32	in	46,415	200	11 : 31	0		
	out			11 : 54		23	
Loading-33	in	46,416		11 : 54	0		Mai mahiu rd
	out		400	11 : 57		3	
Loading-34	in	46,416		11 : 58	1		
	out		300	11 : 58		0	
Loading-35	in	46,416		11 : 59	1		
	out		100	12 : 1		2	
Loading-36	in	46,416		12 : 2	1		
	out		20	12 : 3		1	
Loading-37	in	46,416		12 : 3	0		
	out		200	12 : 3		0	
Loading-38	in	46,417		12 : 4	1		Thogo rd.
	out		200	12 : 8		4	
Loading-39	in	46,417		12 : 9	1		Kabiyet rd.
	out		100	12 : 10		1	
Loading-40	in	46,417		12 : 10	0		
	out		300	12 : 10		0	
Loading-41	in	46,417		12 : 13	3		Muhoho rd.
	out		200	12 : 17		4	
Loading-42	in	46,417		12 : 19	2		Oleshaparo rd.
	out		1000	12 : 21		2	
Loading-43	in	46,418		12 : 28	7		Muhoho Avenue to
	out			12 : 28		0	D/site
Dumping site	in			12 : 57		29	
Start dumping		46,434	15,700	12 : 59	2		
Finish dumping				13 : 18		19	
Dumping site	out	46,436	1,500	13 : 21	3		
Reach to workshop	in	46,450	14,100	14 : 0	39		
Total			65,740		175	153	Total min.: 328 min.

Time & Motion Study

Vehicle No. KAE636H

No. of Crew: 3

Organization: Bins

Loading Capacity: 4ton

Estimated Volume: 5m3

Trip 1 Date:24/5/97

Researcher's name: M. Mapenzi

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Collection		33,940		99	134	
Transportation		14,600		71	0	
Inside the dumping site		17,200		5	19	Dumping time
Idling time						

Time & Motion Study

Organization: bins

Trip 1 Date:24/5/97

Vehicle No. KAE953R

Loading Capacity: 6tons

Researcher's name: L. Kadere

No. of Crew: 5

Estimated Volume: 5tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	61,095		7 : 53			Kampala rd.
Loading-1	in	61,103	7,500	8 : 7	14		Upper Hill rd.
	out			9 : 5		58	Fordha hse.
Loading-2	in	61,113	10,300	9 : 31	26		Rabai rd.-Buru Buru Est.
	out			9 : 50		19	Chiromo rd.-
Loading-3	in	61,131	17,900	11 : 1	71		Riverside Park to D/site
	out			12 : 53		112	
				:			
				:			
Dumping site	in	61,152	21,300	14 : 16	83		James Osogo rd.
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	61,152	400	15 : 3	47		
Reach to workshop	in	61,166	13,200	15 : 45	42		Kampala rd.
Total			70,600		283	189	Total min.:472 min.
Collection			28,200		97	189	
Transportation			42,000		139		
Inside the dumping site			400		47	0	Dumping time
Idling							

Time & Motion Study

Organization: bins Trip 1 Date:24/05/97
 Vehicle No. KQY636 Loading Capacity: 12tons Researcher's name: J. Alieno
 No. of Crew: 6 Estimated Volume: 8tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			7 : 51			
Loading-1	in			8 : 6	15		Income Tax Dept.
	out			9 : 8		62	
Loading-2	in			9 : 23	15		Carousel Ltd. (No Garbage)
	out			9 : 24		1	Perodo (Changamwe rd.)
Loading-3	in			9 : 33	9		Carton Manufactures (Lunga
	out			10 : 20		47	Lunga rd.)
Loading-4	in			10 : 39	19		
	out			12 : 11		92	Passed through Enterprise rd.-
				:			Bunyala rd.- Lower Hill rd.-
				:			Ngong rd. white going to Inco
				:			tax.
				:			
				:			Passed through Haile Selassie
				:			av.- Lower Hill rd.- Bunyala r
				:			Bancho rd.- Entered through
				:			Shenola Tewa rd. white going
				:			Carousel.
				:			
Dumping site	in			13 : 3	52		Dandora (went to the D/Site
Start dumping				:			through Lunga Lunga rd.-Jogo
Finish dumping				:			rd.- Rabai rd.- Mumia rd.
Dumping site	out			13 : 55	52		Mutarakwa rd.
Reach to workshop	in			16 : 0	125		closed down
Total			0		287	202	Total min.:489 min.
Collection			0		43	202	
Transportation			0		192		
Inside the dumping site			0		52	0	Dumping time
Idling							

