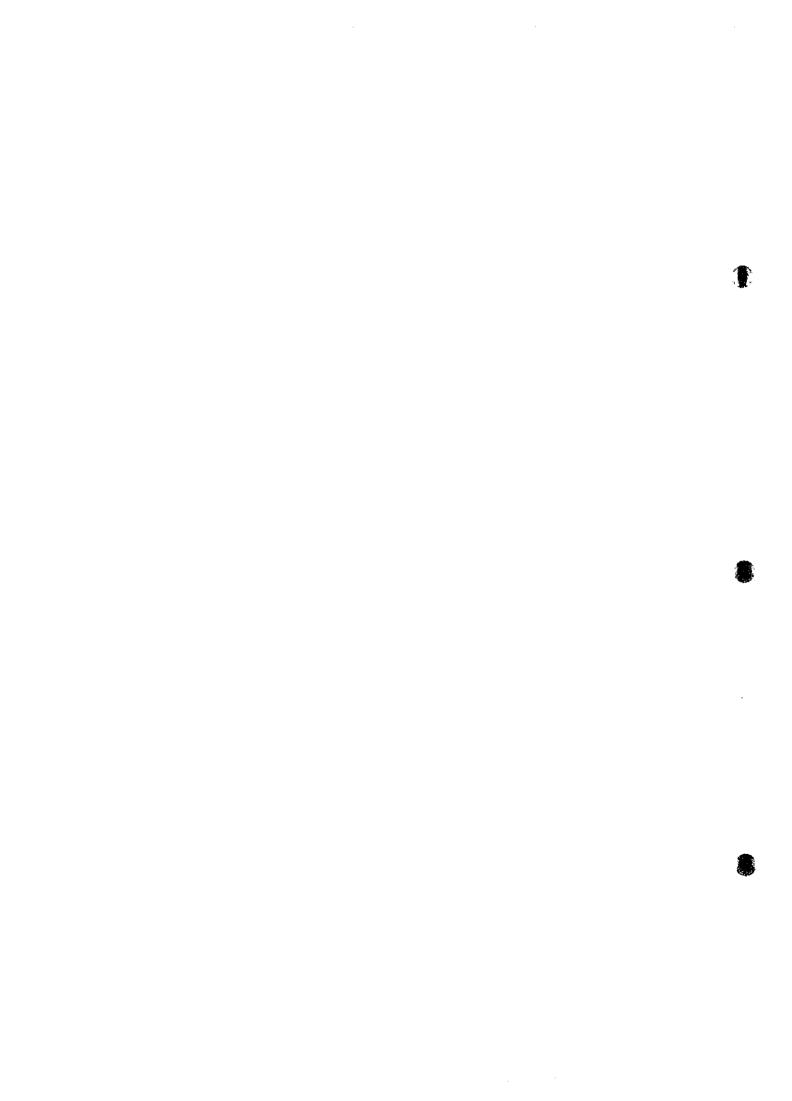
CITY BINS

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Time	&	Motion Study
Vehicle	No	o. KAE 636 H

y Organization:CITY BINS Loading Capacity:4 TON Estimated Volume:7.9m³ Trip-1 Date: 17th MAY 1997 Researcher's name: M. Mapenzi

o, of Crew: 4	E	istimated '	Volume:7.9	<u>m'</u>		.	~ 1	·····
Location		Mileage (m)	Distance (m)	Time	Moving time (min.)	Į	oading time min.)	Remarks (route)
			0	8:24		+	nm.)	The vehicle had had refuse
tart from workshop	$\frac{1}{2}$ Dut 4	5966.6		0.27		+		The vehicle went from the
	<u> </u>							workshop to the dumping site
						+		
						+		
					<u> </u>	+		·····
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					<u> </u>			
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	<u> </u>		<u> </u>					
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		<u> </u>	+		<u></u>			
				_ <u> </u>		-+		
						-+		
		10000		<u>n e .</u>	51	27		
Dumping site	in	45980.7	<u> - 14, R</u>	0 8 : :	54	27		
Start dumping				4 9 :	가네			34
Finish dumping				<u>4 9 :</u> 9 :	20	4		
Dumping site	out	46600.0			54			
Reach to workshop	in	45980.9	2	<u> x i x</u>				
	<u></u>					34		34 Total min.: 68 min.
Total			14,3			 0		0
Collection		_		0		27		0
Transportation		_ _	14,3			7		34 Dumping time
Inside the dumping site	;	_		14			~	Janping univ
Idling time		<u> </u>		<u> </u>				

Time & Motion Study Organization:CITY BINS Vehicle No. KAE 636 H

Loading Capacity:4 TON Estimated Volume:

Trip-2 Date: 17th MAY 1997 Researcher's name: M. Mapenzi

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venicie no. NAE 030 i	1	Loaonig C	• •	UN	Researcher	S name ivi	, mapenzi
No. of Crew: 4		Estimated	Volume:				
		Mileage	Distance		Moving	Loading	
Location		-		Time	time	time	Remarks (route)
		(km)	(m)		(min.)	(min.)	
Start from workshop	out	45980.9		9:32			· · · · · · · · · · · · · · · · · · ·
Loading-1	in	45995.8	14,900	10:0	28		westlands
¥	out			10:3		3	· · · · · · · · · · · · · · · · · · ·
Loading-2	in	45996.3	500	10:9	6	<u> </u>	
	out			10:13		4	· · · · · · · · · · · · · · · · · · ·
Loading-3	in	45996.7	400	10:15	2	······	
Louding 5	out	10000.1		10:15		0	
Loading-4	in	45996.9	200	10:13	2		
Loaomg-1	out	+3770.7	200	$\frac{10}{10}$: 20		3	
Laadina S		45998	1 100	10 : 20 10 : 26	6		· · · · · · · · · · · · · · · · · · ·
Loading-5	in	43990	1,100	10 : 20 10 : 30	0		
x x x	out	40000.0	200			4	
Loading-6	in	45998.3		10:31	<u>l</u>		
	out			10:36		5	
Loading-7	in	45998.4	100	10:37	1		
	out	<u> </u>	<u> </u>	10:37		0	
Loading-8	in	45998.5	100	10:37	0		
	out			10:41		4	
Loading-9	in	45998.5	10	10:41	0		
	out			10:43		2	
Loading-10	in	45998.5	10	10:43	0		
	out	1		10:45		2	
Loading-11	in	45998.7	200	10:46			
	out			10:49		3	Sports road
Loading-12	in	45999	300	10:51	2		
	out	10777		10:53		2	
Loading-13	in	45999.2	200	10:53			
i.o.duing-10	out	43777.4		10:54		1	
Loading-14	in	45999.7	500	10:54 10:55	1		Waiyaki way
Luading-14	out	433337.1		10:55 10:56		1	
Loading-15	in	46000.3	600	10:50 10:57		*********************************	
Loading-15		4000.5	000				
	out	4/001	70/	11:2		5)
Loading-16	in	46001	<u>/0</u>	11:4	2		
	out			11:7		3)
Loading-17	in	46001.2	200	11:8			
	out		<u> </u>	13:11		3	
Loading-18	in	46001.4	200	11:11		<u> </u>	
	out	ļ		11:15		4	· · · · · · · · · · · · · · · · · · ·
Loading-19	in	46001.9	500) 11 : 17			
	out			11:19		1	2
Loading-20	in	46002.3	1 400) 11 : 21	2		
	out			11:22		1	
Loading-21	in	46002.4	10)11:22	÷	1	
	out	1	1	11:24			2
Loading-22	in	46002.5	10)11:24			
	out	1.000	1	11 : 25			
Loading-23	in	46002.6	10)11:25			
Coaung-23		40002.0				<u>;</u>	
Leading 24	out	46002.2	70	11:26			1
Loading-24	in	46003.3)11:29			
L	out	1	1	11:30	יייייייייייייייייייייייייייייייייייייי		1

Time & Motion chicle No. KAE 636	-		on:CITY B apacity:4 T		Trip- 2 Researcher		MAY 1997 . Mapenzi
o. of Crew: 4	971	Estimated	• •	UN	NUSCALENCE	3 10110/141	mapener
0.01 CICW, 4					Moving	Loading	
Location		Mileage	Distance	Time	time	time	Remarks (route)
		(km)	(m)		(min.)	(min.)	
oading-25	in	46003.8	500	11:32	2		
	out			11:36		4	· · · · · · · · · · · · · · · · · · ·
oading-26	in	46004.8	1,000	11:40	4		
	out		<u> </u>	11:41		1	
oading-27	in	46006.6	1800	11:45	4		
	out			11:47		2	idling time-12:09
.oading-28	in	46008.8	2200	12:13	26		·
	out	· · · · · · · · · · · · · · · · · · ·	<u> </u>	12:17		4	
.oading-29	<u>in</u>	46008.9	100	12:18	-1		
	out	 		12:18		0	
.oading-30	in	46009.1	200	12:19	1		
	out			12:22		3	
.oading-31	in	46009.3	<u> </u>	12:22	0	· · · · · · · · · · · · · · · · · · ·	
	out	46000 5		12:24	<u> </u>	2	
.oading-32	in	46009.5	200	$\frac{12}{12}:25$		<u> </u>	
	out			12:25	the second s	<u> </u>	· · · · · · · · · · · · · · · · · · ·
.oading-33	in	46010	<u> </u>	12:27			
	out	46010.2	200	12:28			
.oading-34	in	46010.3	<u> </u>	$\frac{12}{12}:29$			······
1: 25	out	46010.4	100	12:32 12:33		· · · ·	,
.oading-35	in	140010.4	1	12:33 12:34			
Landian 26	out in	46010.9	50	$12 \cdot 34$ 0 12 : 36		,	<u> </u>
Loading-36	out	40010.5		12:30 12:37		·	1
Loading-37	in	46011.5	60	012:39		<u>,</u>	
Luading-57	out	10011.0		12:40		· · · · · · · · · · · · · · · · · · ·	
Loading-38	in	46011.6	10	012:41			
Louoing-50	out		1	12:41			0
Loading-39	ia	46011.7	10	012:42		2	
	out			12:43			1
Loading-40	in	46011.8	10	0 12 : 43)	
<u></u>	out			12:44			1
Loading-41	in	46011.8	1	0 12 : 44	<u>ا</u>)	
	out			12:4:	5		1
Loading-42	in	46011.9	10	012:4	5	0	
	out			12:40	5		1
Loading-43	in	46012	10	012:4		1	
	out			12:4			0
Loading-44	in	46012.2	20	012:4		0	
	out			12:4			1
Loading-45	in	46012.2	1	012:4		0	
	out			12:5			2
Loading-46	in	46012.4	20	0 12 : 5		2	
	out			12:5			2
Loading-47	in	46012.5	10	0 12 : 5		1	
	out			12:5		. <u> </u>	1
Loading-48	in	46012.7	2(0 12 : 5		1	
	out	<u> </u>		12:5	8	<u> </u>	1

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Time & Motion Study	Organization:CITY BINS
Vehicle No. KAE 636 H	Loading Capacity:4 TON
No. of Crew: A	Estimated Volume:

Trip-2 Date: 17th MAY 1997 Researcher's name: M. Mapenzi

venicie no. KAE 030 i	1		араснузч т	ON	Researcher	s name.m	, maponzi
No. of Crew: 4		Estimated	Volume:				
		Mileage	Distance	. 1	Moving	Loading	
Location		-		Time	time	time	Remarks (route)
		(km)	(m)		(min.)	(min.)	
Loading-49	in	46012.9	200	12:58	0		
	out		·	13 : 0		2	
Loading-50	in	46013.1	200	13 : 2	2		
touting to	out	100101		13:8		6	
Loading-51	in	46013.6	500	13:10	2	×	
Loaung-51		40013.0	500	13 : 10 13 : 10		0	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	out	16012 6	10	13 : 10 13 : 10	0		· · · · · · · · · · · · · · · · · · ·
Loading-52	in	46013.6	10			1	
	out			13:11		1	······································
Loading-53	in	46013.6	10	13 : 11	0		
	out			13 : 12		1	
Loading-54	in	46013.7	100	13:12	0		
	out			13:13		1	l
Loading-55	in	46014.6	900	13:16	3		Secta Enterprises
· · · · · · · · · · · · · · · · · · ·	out		<u> </u>	13:33		17	
Loading-56	in	46014.7	100	13:35	2		
	out			13:36		1	
Loading-57	in	46014.8	100	13:36	0		
Loading-51	out	10011.0	100	13:37	v	1	
Leading 50		46015.3	500	13:37 13:41	4	I	Parklands
Loading-58	in	40013.3		13:41 13:45	*	4	
	out	4/015.0					
Loading-59	in	46015.3	10	13:45	0		AGIP
	out			13 : 55		10	
Loading-60	in	46016.2	900	13 : 57	2		
	out	· · · · ·	ļ	14 : 0		3	· · ·
Loading-61	in	46016.5	300	14 : 1	1		
	out		<u>i</u>	14 : 2		1	
Loading-62	in	46016.5	10	14 : 2	0		
	out			14:3		1	
Loading-63	in	46016.6	100	14:3	0		· ····································
<u> </u>	out		1	14 : 3	·	0)
Loading-64	in	46017.2	600	14 : 5	2		·
Eoaoni <u>5</u> 04	out	10017.2		14 : 7		2	
Loading-65		46017.5	300	14 : 9	2		Parklands - Individual houses
Loaumg-05		40017.5		14:9	2		
N N 44	out ·	1(0)0.0	700				· · · · · · · · · · · · · · · · · · ·
Loading-66	in	46018.2	/	14 : 11			Individual Houses
	out			14:11			
Loading-67	in	46018.3	100) 14 : 11	**		Individual Houses
	out	.L		14:11	*		
Loading-68	in	46018.4	100) 14 : 11			Individual Houses
	out			14:12		1	1
Loading-69	in	46019.1	700	0 14 : 14	2		Individual Houses
	out			14:15		1	
Loading-70	in	46019.2	100) 14 : 15	-		Individual Houses
	out		+	14 : 16		1	
Loading-71	in	46019.3	10	014:16			Individual Houses
roading-71			1	14:18			2
L I' 22	out	1000					
Loading-72	in	46019.4	100	14:20			Individual Houses
	out	L	1	14 : 20	1	1. (0

/chicle No. KAE 636 I	1	Loading C	apacity:4 T	ON	Researcher	r's name:M	. Mapenzi
lo. of Crew: 4		Estimated	Volume:				
I		Mileage	Distance		Moving	Loading	• • • • •
Location		(km)	(m)	Time	time	time	Remarks (route)
.oading-73	in	46019.7	300	14:21	(min.) 1	(min.)	Individual Houses
	out	10015.1		14:22		1	
.oading-74	in	46019.8	100	14:23	1		Individual Houses
<u> </u>	out			14:23		0	· · · · · · · · · · · · · · · · · · ·
.oading-75	in	46020	200	14:24	1		Individual Houses
	out			14:26		2	
.oading-76	in	46020.5	500	14:28	2		Individual Houses
	out			14:30		2	
.oading-77	in	46021.1	600	14:32	2		Individual Houses
	out	· · · ·		14:37		5	
.oading-78	in	46021.5	400	14:38	1		individual Houses
	out			14:39		1	· · · · · · · · · · · · · · · · · · ·
Loading-79	in	46021.5	10	14:40	<u> </u>	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	Individual Houses
	out			14:40		0	
Loading-80	in	46021.7	200	14:41	1		Individual Houses
	out	46023.0	100	14:41		0	
Loading-81	in	46021.8	100	14:41	0		Individual Houses in
Loading-82	out	46021.0	10	14:43 14:43	0		Parklands
	in	46021.8		14 : 43 14 : 52	0		Individual Houses in Parklands
Loading-83	out in	46022.3	500	14 : 52 15 : 1	9	9	Individual Houses in
Loauing-65		40022.5		15 : 1 15 : 3	9	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Parklands
Loading-84	<u>out</u> in	46022.9	600	$15 \cdot 5$ 15 : 5	2	<u> </u>	Individual Houses in
Loading-04	out	40022.9		15 : 3 15 : 7		2	Parklands
Loading-85	in	46023.1	200	15:7 15:8	1		Individual Houses in
Loading 05	out	10023.1	200	15:9	!	i	Parklands
Loading-86		46023.7	600	15:10	1	· · · · ·	Individual Houses in
beauting oo	out	1.0020.1	†	15 : 10 15 : 12	· · · ·	2	Parklands
Loading-87	in	46023.9	200	15 : 13	1		Individual Houses in
	out	1		15:19		6	Parklands
Loading-88	in	46023.9		15:19	0	the second se	Individual Houses in
	out		1	15:21		2	Parklands
Loading-89	in	46023.9	10	15:21	0		Individual Houses in
	out			15:23		2	Parklands
Loading-90	in	46024.1	200	15:23	0		Individual Houses in
	out			15:26		<u> </u>	Parklands
Loading-91	in	46024.9	800	15:31	5		Individual Houses in
······································	out		ļ	15:31			Parklands
Dumping site	in	46038.1		15 : 55			
Start dumping		46038.1	10	15:58			· · · · · · · · · · · · · · · · · · ·
Finish dumping			<u> </u>	16:32		34	
Dumping site	out	100000	10.000	16:34			
Reach to workshop	in	46051.9	13,800	17:10	36	 	
T1		+		 			Tatal ania -450
Total Collection		↓	71,130		235	• • • • • • • • • • • • • • • • • • •	Total min.:458 min.
Collection			29,220		142		
Transportation		+	41,900	↓	66		· · · · · · · · · · · · · · · · · · ·
Inside the dumping sit Idling time	.c		10	' {	5 22		Dumping time Idling Time

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Vehicle No. KAD 554 J

Time & Motion Study Organization: CITY BINS Loading Capacity: 2.6 TON Estimated Volume: 5.051m³

Trip-1 Date: 17th May 1997 Researcher's name:m. M. S. Nyawira

No. of Crew: 3]	Estimated	Volume:5.0	51m ³			
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	74468		8:25			Truck had Garbage
					· ·		collected previous day
				t	<u> </u>		Straight to Dumping site
			<u> </u>				· · · · · · · · · · · · · · · · · · ·
			1 1				
		·····	1				·
· · · · · · · · · · · · · · · · · · ·		<u> </u>					
<u></u>			11				
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<u></u>		· ····	1				
<u> </u>			11				
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			-			1	
· · · · · · · · · · · · · · · · · · ·		†				1	
			-				
			-				
Dumping site	in	74484.1	16,100	9:10	45	,	1
Start dumping				9:14	4		
Finish dumping		1		9:35		2	1
Dumping site	out	74484.5	400		4		
Reach to workshop	in	1		:	<u> </u>	í	
		1		İ	t	1	
Total		1	16,500		53	2	1 Total min.: 74 min.
Collection		·	0		(0
Transportation		1	16,100		4		
Inside the dumping site		1	400		1		1 Dumping time
Idling time				t	†`	<u>+</u>	
Idling time				<u> </u>	l	·	

Time & Motion St	udv	Organizatio	on:CITY B	INS	Trip- 2	Date: 17th	May 1997
Vehicle No. KAD 554 J	-	-	apacity:2.6		Researchei	r's name:m	M. S. Nyawira
No. of Crew: 3			Volume:6.7	_			•
					Moving	Loading	
Location		Mileage	Distance	Time	time	time	Remarks (route)
		(km)	(m)		(min.)	(min.)	
Start from workshop		74484.5		9:39			From Dumping Site
Loading-1	in	74498.5	14,000	10:15	36		South B Melili Road
· · · · · · · · · · · · · · · · · · ·	out			10:20		5	
Loading-2	in	74499	500	10:22	2		South B Shopping Centre
	out		1.600	10:23		3	South B Residential
Loading-3	in	74500.5	1,500	10:28	5	<u>,</u>	South B Residential
	out		100	10:29		J	South B Residential
Loading-4	in	74500.9	400	10:30	1	2	
	out	24600.0		10:32 10:33		<u> </u>	South B Residential
Loading-5	in	74500.9	<u> </u>	10:33 10:35	<u>_</u>		
T Nor C	out	74500.9	<u> </u>	10:35 10:36	1		South B Residential
Loading-6	in	74300.9	<u>↓ </u>	10:30 10:37	1	1	Joani D Kondenna
T	out	74501	100	10:37 10:38	1	1	South B Residential
Loading-7	in	1/4301	100	10:30 10:39		· · · · · · · · · · · · · · · · · · ·	South D Residentiat
Loading-8	out in	74501.1	100	10:39 10:39		1	South B Residential
Loading-8	out	14301.1	1 100	10:39 10:40		<u></u>	John D Residential
Loading-9	in	74501.1		10:41		<u></u> † <u>-</u>	South B Residential
Luaung-9	out	14.001.1	<u> </u>	10:47			
Loading-10	in	74503.7	2.600	10 : 53		· · · · · · · · · · · · · · · · · · ·	Mombasa Road
	out	14505.1		10 : 56			3
Loading-11	in	74507.8	4.100	11:4		3	South C Muhoho Road
	out			11: 5		1	
Loading-12	in	74507.8	<u>+</u>) 11 : :		5	South C Muhoho Road
	out	<u> </u>		11: 0	<u> </u>	-	1
Loading-13	in	74508	200) 11 : 8	3	2	South C Punda Milia Crescent
	out	· · · · ·		11:1	3	1	0
Loading-14	in	74508.1	100	011:10)	2	South C Punda Milia Crescent
	out			11:1			1
Loading-15	in	74508.1		011:1		0	South C Punda Milia Crescent
	out			11:12			1
Loading-16	in	74508.3	20	0 11 : 1		1	South C Punda Milia Crescent
	out			11:1	-		2
Loading-17	in	74508.5	20	0 11 : 1		1	South C Ndekwa Avenue
	out			11:1			3
Loading-18	in	74508.7	20	011:2		1	South C Muhoho Rosd(Avenue)
	out			11:2			
Loading-19	in	74509		011:2		<u>I</u>	South C Oluvimu Road
	out			11:2		<u>.</u>	
Loading-20	in	74509.1		011:2		.4	South C Sungura Road
	out		_	11:2		<u>_</u>	I Pouth C Pressure David
Loading-21	in	74509.1		0 11 : 2		0	South C Sungura Road
	out			11:3			6 Sunaura Estata
Loading-22	in	74509.2	- 10	0 11 . 3		0	Sungura Estate
	out			11:3			2 Sungura Ectata
Loading-23	in	74509.3		0 11 : 3		1	Sungura Estate
	out	<u> </u>		11:3	3		<u> </u>

.

ľ

chicle No. KAD 5		Loading C					M. S. Nyawira
lo. of Crew: 3		Estimated	Volume:6.	75m²	<u></u>	T	
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
.oading-24	in	74509.3	0	11:38	3	(unu.)	Sungura Estate
Dauing-24	out	74,09.5		11:30 11:42	Y	4	Builguin Boute
.oading-25	in	74509.3	0	11:43		· · · · · · · ·	Sungura Estate
Joanne-25	out	14.507.5		11:44			<u> </u>
.oading-26	in	74509.3	0	11:45	l		Sungura Estate
Daoing-20	out	11507.5		11:47		2	8
.oading-27	in	74509.4	100	11:50	3		Kaisungur Road
Xading 21	out	1100011		11:51		1	
.oading-28	in	74509.5	100	11:52	1		Muhoho Road(Avenue)
Rodding 20	out			11:55		3	and and an an an and an and an an an and a second
Loading-29	in	74510.1	600	12:0	5		off Muhoho Road
counting an	out			12:0		0	off M.O.W Sports club
Loading-30	in	74510.8	700	12:4	4		Mugaya Estate
ixading 50	out			12:5		1	
Loading-31	in	74510.9	100	12:6	1		Mugaya Estate
Locating of	out			12:7		1	
Loading-32	in	74511	100	12:10	3		Mugaya Estate
Loading 52	out	<u> </u>		12:12		2	
Loading-33	in	74512.3	1.300	12:15	3		K.M.A Estate (Muhoho Rd(Av
Loaumg-55	out	11012.0	-,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	12:16			
Loading-34	in	74512.8	500) 12 : 19			K.M.A Estate
	out	11012.0		12:19			
Loading-35	in	74513	200) 12 : 20			Ole Shapara Rd(Av)
Bouding of	out		1	12:21			
Loading-36	in	74513.2	200) 12 : 22	1	1	Rumi Rd
Louiding 50	out		+	12:23			1
Loading-37	in	74513.3	100	0 12 : 25			Ndekwa Avenue
Louiding 51	out			12:27			2
Loading-38	in	74513.4	10	0 12 : 29		2	Ndekwa Avenue
	out		1	12:30			1
Loading-39	in	74513.5	10	012:31			Ndekwa Avenue
Locioning 07	out		1	12:3		(Ö.
Loading-40	in	74513.8	30	0 12 : 34		3	Mufulu Avenue
	out		-	12:3			1
Loading-41	in	74514	20	0 12 : 30			Mufulu Avenue
	out			12:3			1
Loading-42	in	74514.2	20	0 12 : 3			Mufulu Avenue
	out	1	-	12:3			0
Loading-43	in	74514.4	20	012:4		3	Ole Shapara Avenue
	out	1	1	12:4			2
Loading-44	in	74515	60	012:4		2	Sungura road
	out	1	1	12:5		1	5
Loading-45	in	74515.6	60	0 12 : 5		4	Ole Shapara Avenue
	out	- †		12:5		1	3
Loading-46	in	74515.8	20	0 12 : 5		2	Mtelo road
Loading-40	out			13 :			1
Loading-47	in	74515.9	10	0 13 :		1	Muhuti crescent
	out			13 :		1	3

Time & Motion St		Organizatio Loading Ca					May 1997 . M. S. Nyawira
chicle No. KAD 554 J lo. of Crew: 3		Estimated '			Resourcher	3 101114-011	
(0. 01 Crew: 5	r	I			Moving	Loading	
Location		Mileage	Distance	Time	time	time	Remarks (route)
Lotanou		(km)	(n)		(min.)	(min.)	
.oading-48	in	74516	100	13:7	3		Muhuti crescent
	out			13:9		2	· · ·
.oading-49	in	74516.3	300	13:10	1		Muhoho road
	out			13:11		1	WALCH A Mainshi Chauth
.oading-50	in	74516.5	200	13:12	I	12	Y.M.C.A Nairobi South
	out		000	13:24		12	Mtelo road
.oading-51	in	74516.7	200	13:25	·····	1	Mielo Ioau
	out	01516.0		13 : 26 13 : 28	2		Mtelo road
Loading-52	in	74516.8	100	13:20 13:29	2		Witcid Idad
	<u>out</u>	746160	100	13:29 13:30	1		Mtelo road
Loading-53	in	74516.9	100	13:30 13:30		(
	out	74517.9	1 1000	13:30 13:40	10	<u> </u>	Ole Shapara Avenue
Loading-54	<u>in</u>	14511.9	1,00	13:40 13:40			Unch break for 10 minits
	outin	74518.4	500	13 : 40			United Housing
Loading-55	out	14510.4		13:52			2
Landian S6	in	74518.5	100	13:53		1	United Housing
Loading-56	out	14510.5		13:58			5
Loading-57	in	74518.7	200	0 14 : 0			United Housing
Loaumg-57	out	140.000		14 : 2	<u> </u>		2
Loading-58	in	74519	30	0 14 : 4			United Housing
Luading-50	out		1	14 : 7	1		3
Loading-59	in	74519.2	20	0 14 : 10	3	3	United Housing
	out			14 : K)		0
Loading-60	in	74519.3	10	014:10) ()	Akiba Estate
<u> </u>	out			14:1			1
Loading-61	in	74519.8	50	0 14 : 1		3	Akiba Estate
	out			14:1			1
Loading-62	in	74520	20	0 14 : 1		1	Kabiyet road
	out			14:1			
Loading-63	in	74520.1	10	014:1		1	Kabiyet road
	out			14:1			1
Loading-64	in	74520.2	10	0 14 : 2		<u> </u>	Kabiyet road
	out			14:2			0 Mai Mahiu road (Mila Estate
Loading-65	in	74520.5	3(0 14 : 2		4	Mai Manu Ioad (Mina Estan
	out			14:2		1	Mai Mahiu road (Mila Estate
Loading-66	in	74520.7	2	0 14 : 2 14 : 3		<u></u>	3
	out			14:3 014:3		1	Thogoto road
Loading-67	in	74521.3				1	4
	out			14:3 0014:3		1	kodi road 1
Loading-68	in	74521.6	- <u> </u>	14:3			1
	out			14:3 0014:3		1	kodi road 1
Loading-69	in	74521.9	'	14:4			2
	out	74522		14 : 4 00 14 : 4		0	kodi road 1
Loading-70	in		_ ^{_1}	14 : 4		~ 	2
1	oul	74522.2		$\frac{14}{00}$ 14 : 4		1	kodi road 1
Loading-71	in			14 : 4			2

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Time & Motion St	udy	Organizati	on:CITY B	INS	Trip- 2	Date:17th	May 1997
Vehicle No. KAD 554 J	-	Loading C	apacity:2.6	TON	Researcher	's name:m.	M. S. Nyawira
No. of Crew: 3		Estimated	Volume:6.	75m ³	÷ ;		•
[Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
				·	(min.)	(min.)	······································
Loading-72	in	74522.3	100	14:45	0		kodi road 1
	out			14:46]	
Loading-73	in	74522.3	0	14:48	2		kodi road 1
	out			14:49		1	·
Loading-74	in	74522.5	200	14 : 50	1		Nairobi West- Gandhi Ave.
	out	;;		14:52		2	
Loading-75	in	74523.1	600	14 : 55	3		Nairobi west -Bukani road
	out	· · · ·		14 : 57		2	
Loading-76	in	74523.3	200	15 . 0	3		Nairobi west-Bukani road
	out			15:0		0	
Loading-77	in	74523.6	300	15 : 5	5		Niamey road
	out			15:9		4	
Loading-78	in	74524.2	600	15:10	1		Muthaiti road
	out			15:13	•	3	
Loading-79	in	74524.5	300	15:14	1		Kifaru Estate
	out	<u> </u>		15:14		0	
Loading-80	in	74524.6	100	15:15	1		Kifaru Estate
	out			15 : 16		1	
Loading-81	in	74525.1	500	15:19			Kisauni road-Nairobi West
	out			15:20		1	
Dumping site	in	74540.4	15,300	15:52			Dandora
Start domping		74540.4	<u> </u>	16 : 0			
Finish dumping		74540.4		16:30		30	
Dumping site	out	74541.3	900	16:30			
Reach to workshop	in	<u> </u>		17:10	40		
	<u> </u>	<u> </u>		<u> </u>	L		
Total		 	56,800		276		Total min.: 451 min.
Collection		ļ	26,600		150		
Transportation		ļ	29,300		108		
Inside the dumping site		<u> </u>	900	Y	8		Dumping time
Idling time		<u> </u>			10	l	Lunch Break

Time & Motion St	udy	Organizatio	on:CITY B	INS	Trip- 1	Date: 19th	MAY 1997
Vehicle No. KAE 636 I	l	Loading Ca	apacity:4 T	ON	Researcher	's name:M	. Mapenzi
No. of Crew: 4		Estimated	Volume:				-
		Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
				0.00	(min.)	(min.)	71
Start from workshop	out	46051.9	4 100	8:23	25		The truck had no trash
.oading-1	in	46056	4,100	8:48 9:46		<0	Industrial area (The Wrigley Co (EA)LTD.)
	out	46059.9	2 000	9:40	12		Masaba road
_oading-2	in out	40039.9	5,900	10:2	12	A	Masaba ibau
andian 2	out in	46060.1	200	$10 \cdot 2$ 10 : 3	1		Upper Hill
.oading-3		40000.1	200	10 : 3		0	
and in a d	<u>out</u> in	46061	000	10:5 10:5	2	· · · · · ·	Casia court
Loading-4	out	40001		10 : 5 10 : 5		0	
onding S	in	46061.3	300	10:5	0		
Loading-5	out	40001.5		10:6		1	•
Loading-6	in	46061.8	500	10:8	2	-	
Loaunig-o	out	40001.0		10 : 11		3	
Loading-7	in	46062.1	300	10 : 11	0		· · · · · · · · · · · · · · · · · · ·
Loaumg-7	out	40002.1		10 : 12	· · · · · · · · · · · · · · · · · · ·	1	
Loading-8		46062.4	300	10 : 12		·	
Luaung-o	out	10002.1		10 : 13			
Loading-9	in	46062.8	400	10:14		`	
Loaoing-9	out	40002.0		10 : 16		2	· · · · · · · · · · · · · · · · · · ·
Loading-10	in	46063.5	700	10 : 18			Longonot road
	out	10003.5		10:26	the second se	1	
Loading-11	in	46068.4	4,900	10:37			Mbangati way
Loading-11	out	10000.1	<u>_</u>	10:37			
Loading-12	in	46068.9	500	010:39	and the second se		Ngumo Estate
	out	1	1	10:40			
Loading-13	in	46069	100	0 10 : 41			
Boundary B. C.	out		1	10:41			
Loading-14	in	46069.1	100	0 10 : 41			
	out			10:42			
Loading-15	in	46069.3	200	0 10 : 4:		3	
<u> </u>	out			10:45		1 ()
Loading-16	in	46069.4	10	0 10 : 40	i i		
	out			10:40	<u>;</u>		0
Loading-17	in	46069.4	1	0 10 : 47	7	1	
	out			10:47	7		0
Loading-18	in	46069.4	10	010:4	7)	
	out			10:4	7		0
Loading-19	in	46069.5	10	010:4		1	
	out			10 : 5			2
Loading-20	in	46069.7	20	<u>010:5</u>		2	
	out			10:5			1
Loading-21	in	46070.2	50	010:5	and the second se	0	Mtongwe road
	out			10:5			0
Loading-22	in	46070.7	50	010:5		2	Longinye rd.
	out			10:5		<u> </u>	1
Loading-23	in	46070.9	20	0 10 : 5		2	
	out	· · · · ·	<u> </u>	10:5			0
Loading-24	in	46071.2		0 10 : 5		1	
l	out	<u> </u>		10:5	9	1	0

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Time & Motion Study Organization: CITY BINS Vehicle No. KAE 636 H No. of Crew: 4

Loading Capacity:4 TON Estimated Volume:

Trip- 1 Date: 19th MAY 1997 Researcher's name:M. Mapenzi

No. of Crew: 4		Estimated	Volume:			· · · · · · · · · · · · · · · · · · ·	
Location		Mileage (km)	Distance (m)	Time	Moving time	Loading time	Remarks (route)
Landing Of	<u>.</u>			11 0	(min.)	(min.)	<u></u>
Loading-25	in	46071.5	300	11:0	1		City mortury
2	out	4(070.0		11:0		0	Ngong rd.
Loading-26	in	46072.2	700	11:2	2		
	out			11:2		0	Woodland road
Loading-27	in	46073.5	1,300		3		
	out			11 : 5		0	
Loading-28	in	46073.7	200	11:6	1		
	out			11:6		0	
Loading-29	in	46074.1	400	11:8	2		Lenana road
	out			11:8		0	
Loading-30	in	46074.4	300	11:9	1		state house road
	out			11:16		7	
Loading-31	in	46076.7	2,300	11:20	4		
	out			11:22		2	
Loading-32	in	46078.2	1,500	11:25	3		Ring road riverside drive
	out			11:26		1	
Loading-33	in	46078.8	600	11:28	2		Chiromo Estate
	out	1		11:32		4	
Loading-34	in	46078.8	10	11:38	6		
P	out			11:38		0	
Loading-35	in	46079.3	500		2		Chiromo Mortury
	out		<u>`````</u>	11 : 10 11 : 41		1	canonio mortary
Loading-36	in	46080.1	800	11:43	2		Garden road
Examples	out	10000.1	000	11:43	<u>_</u>	0	
Loading-37	in	46080.3	200	11 : 45	2	0	
Loading of	out	40000.5	200	11 : 45 11 : 46		1	
Loading-38	in	46081	700	11:40	3		Raju Estate
Loaomg-56		40001	700				Kaju Estate
Loading-39	out	46081.2	200	11:53	1	4	Data Tatat
1.0aumg-59	in	40061.2	200	11:54	1		Raju Estate
Loading-40	out	46001.6	200	11:58		4	
Loading-40	in	46081.5	300	11 : 59	1		Riverside
· · · · · · · ·	<u>out</u>	1.000.0		12:0]	
Loading-41	in	46081.6	100	12:0	0		
	out		Į	12:0		0	
Loading-42	in	46082.1	500	12:1	1		Riverside Lane
	out			12:2		1	
Loading-43	in	46082.2	100	12:2	0		
	out		_	12:2	,	0	
Loading-44	in	46082.6	400	12:4	2		
	out	<u> </u>		12:4		0	
Loading-45	in	46082.8	200	12:5	1		
	out			12:7		2	·
Loading-46	in	46083.4	600	12:9	2		Riverside Groove
	out		Γ	12:9		0	
Loading-47	in	46083.8	400	12:11	2		Riverside
* *	out	1		12:12		1	
Loading-48	in	46084.8	1.000	12:15	3		Riverside Gardens
¥	out	1	t	12:16		1	Children Childrens

Vehicle No. KAE 63	6 H	Loading C	apacity:4 T	ON	Researcher	's name:M	. Mapenzi
No. of Crew: 4		Estimated	Volume:				· · · · · · · · · · · · · · · · · · ·
		Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
·····					(min.)	(min.)	
Loading-49	in	46085.8	1,000	12:20	4		Garden close
	out			12:20		0	
Loading-50	in	46086	200	12:21	1		Jalipa Flats
	out			12:22		1	
Loading-51	in	46087.5	1,500	12:25	3		Laikipia Road
	out			12:27		2	
Loading-52	in	46088.4	900	12:31	4		Riverside ring rd.
	out		1	12:32		1	
Loading-53	in	46088.8	400	12:34	2		Kileleshwa
	out			12:34		0	
Loading-54	in	46089	200	12:35	1		Kileleshwa
	out			12:35		0	
Loading-55	in	46089.5	500	12:37	2		Kangundo road
*	out		1	12:37		0	
Loading-56	in	46089.6	100	12:41	4		Kileleshwa
	out			12:41	·	0	
Loading-57	in	46090.4	800	12:43	2		Kileleshwa
	out		1	12:45		2	
Loading-58	in	46091.8	1.400	12:51	6	·	Elite Shelter
201011-200	out	1.002.1.0		12:53		2	
Loading-59	in	46092.4	600	12:55	2		
Louding 07	out	10072.7		12:56		1	
Loading-60	in	46092.5	100	12:50	1		Raju Estate
roading to	out	40072.5		13:3	L	e	1 ··· · · ·
Loading-61	- in	46093.9	1 400	13:3			Dik Dik Gardens
Lodding Of	out	10075.7	1,100	13:5		† (
Loading-62	in	46094.4	500	$\frac{13}{13}$: 7	the second s		Kenya High School
Loading-02	out	140074.4		$\frac{13}{13}$: 9			
Loading-63	in	46094.9	500	13 : 12		· · · · · · · · · · · · · · · · · · ·	Raju Estate
Loading-05		40074.7		13:14			
Looding 64	out in	46095.3	100	$13 \cdot 14$			Gatundu Close
Loading-64		40093.3	40	13:10		(
· · · · · ·	out	4005 4	100	13:10) 13:17		···· ····	Gatundu Close
Loading-65	in	46095.4	1 10			<u> </u>	
	out	10000		13 : 17		1	
Loading-66	in	46096.1	+)13:21		-	Siaya road
	out	4/002.5		13:21		{	1
Loading-67	in	46096.7	600)13:24			
	out			13:25			
Loading-68	in	46099.6	2,900) 13 : 37		·	Kileleshwa
	out	_ _		13:38	······································	<u> </u>	
Loading-69	in	46100	40	0 13 : 40			Raju Estate
	out			13:42		+	2
Loading-70	in	46101.2	1,20	0 13 : 46		l <u> </u>	Mbaozi close
	out			13:47		ļ	1
Loading-71	in	46101.4	20	013:50		3	Dagoretti Corner
	out			13:54		· · · ·	4 Egyptian Embassy

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Time & Motion Stu Vehicle No. KAE 636 H	•	-	on:CITY B apacity:4 T		Trip-1 Date: 19th MAY 1997				
No. of Crew: 4		Estimated		ON	Researcher's name:M. Mapenzi				
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)		
Dumping site	in	46124.9	23,500	14:43	49				
Start dumping				15 : 5	22				
Finish dumping				:					
Dumping site	out			15 : 55	50				
Reach to workshop	in	46139.2	14,300	16 : 15	20				
Total			87,330		331	141	Total min.:472 min.		
Collection	-		45,430		165	141			
Transportation			41,900		94	0	· ·		
Inside the dumping site			0		72	0	Dumping time		
Idling time									

	J		apacity:2.6 Volume:6.7				
o, of Crew: 3	· · I	T		<u>, , , , , , , , , , , , , , , , , , , </u>	Moving	Loading	
Location		Mileage (km)	Distance (m)	Time	time (min.)	time (min.)	Remarks (route)
tart from workshop	out	74554.7		8:24		<u></u>	
oading-1	in	74556.2	1,500		15		Nairobi west-Muthaiti road
	out	:		8:45		6	1
oading-2	in	74560	3,800		5	6	Dam Estate
	out	74569.4	0,400	8:56		0	Karen Langata road
.oading-3	in	74568.4	8,400	9:10 9:10		0	×
1. 4	<u>out</u>	74573.6	5,200		6		Karen Langata road
.oading-4	in out	14313.0	5,200	9:17	V	1	
.oading-5	in	74578.6	5,000		8		Karen Langata View Rise
Joaunig-5	out	11010.0		9:26		1	
Loading-6	in	74588.6	10,000	9:43	17		Karen ressurection road
	out		<u> </u>	9:44		1	
Loading-7	in	74598.4	9,800	9:55	11		Karen Ngong road
	out			9:55		(
Loading-8	in	74604.3	5,900				Agip Naivasha road
	out			10:4		2	2
Loading-9	in	74605	700	10:7	1		Lavington Naivasha road
	out		(0)	10:9		<u> </u>	Lavington Riara road
Loading-10	in	74605.6	00	10 : 10 10 : 11			
Loading-11	out in	74605.9	200	10:11			Lavington Riara road
		74003.9		10 : 15		<u> </u>	1
Landian 10	outin	74607.7	1.800	10:10			lavington Gitanga road
Loading-12	out	14001.1	1,000	10:29			9
Loading-13	in	74607.8	100) 10 : 30			lavington Gitanga road
Loading 10	out	1		10:39			9
Loading-14	in	74607.9	100) 10 : 40		l	lavington Gitanga road
	out			10:44			4
Loading-15	in	74608.6	70	0 10 : 4		2	lavington Gitanga road
	out			10:5			9
Loading-16	in	74608.7	10	0 10 : 5		<u>)</u>	lavington Gitanga road
	out	74600.0		10:5 010:5			Lavington Kolloh road
Loading-17	in	74609.2		10:5		1	1
	out in	74609.9	70	010:5		1	Lavington Kolloh road
Loading-18	out			10:5		<u>-</u>	0
Loading-19	in	74610.3	40	011:		1	Lavington James Gichuru road
Loading-17	out				0		0
Loading-20	in	74610.8	50	011:	2	2	Lavington James Gichuru road
Long 10	out			11 :			3
Loading-21	in	74611.2	40	011:		1	Lavington Owashika road
	out			11 :			0
Loading-22	jn	74611.9	70	011:		2	Lavington Owashika road
	out			11:			0 Laviastas Chalhi Driva
Loading-23	in	74612.5	- 60	<u>x0 11 : 1</u>		2	Lavington Chalbi Drive
	out			11 : 1 0 11 : 1		2	J Lavington Njumbi road
Loading-24	inou	74613.1				<u> </u>	0

5 - 535

Time & Motion S	tudy	Organizati	on:CITY B	INS	Trip- 1	Date: 19th	May 1997
Vehicle No. KAD 551	, ,	Loading C	apacity:2.6	TON	Researcher	's name:m	M. S. Nyawira
No. of Crew: 3		•	Volume:6.	_			-
		Milcage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
	<u> </u>				<u>(min.)</u>	(min.)	
Loading-25	in _	74614.1	1,000	11:19	4		Lavington Chalbi Drive
	out		200	11:19		0	
Loading-26	in	74614.4	300	11:22	3		Lavington Isaac Gathanju Rd
	out	24616	(00	11:22		0	
Loading-27	in	74615	600	11:25 11:25	3	0	Lavington Isaac Gathanju Rd
1	out	74616.3	1 200		3	V	Lavington Elmolo Drive
Loading-28	in	14010.3	1,500	11:28 11:31		3	
Loading 20	out in	74619.1	2.800	11 : 31 11 : 39			Lavington Muhoya road
Loading-29		74019.1	2,000	11 : 39	0	0	
Loading-30	out in	74619.4	300			0	Lavington Ole nguruone Rd
Loading-50	out	74019.4	300	11:40 11:41	1	1	Lavington Oit nguraone Ku
Loading-31	in	74620.5	1 100	11:44	3		Lavington
Loading-91	out	1+020.0	1,100	11:44 11:45		1	Lavingion
Loading-32	in	74621.4	900	11:46	1		Lavington Mageta road
Louing 50	out			31:47		1	<u> </u>
Loading-33	in	74622.3	900	11 : 50	3		Laving ton Muthangari road
2000000	out			11 : 50		0	
Loading-34	in	74623.6	1,300	11:53			Lavington Kiputi road
	out		· · · · · · · · · · · · · · · · · · ·	11:56		3	
Loading-35	in	74623.8	200	11:56	0		Lavington Oloitokitok Rd
	out			11:57		i i	
Loading-36	in	74626	2,200	12:0	3		Kilimani Elegeyo Marakwet Rd
	out			12:1		1	
Loading-37	in	74626.1	100	12:2	1		Kilimani Elegeyo Marakwet Rd
	out			12 : 5			
Loading-38	in	74626.6	500	12:7			Kilimani Kilungu road
	out		<u> </u>	12:7	A second second second	0	
Loading-39	<u>in</u>	74627.1	500	12:11			Kilungu Rd
	out	ļ		12:13		1	
Loading-40	in	74628.8	1,700) 12 : 21			Kirichwa Rd
	out			12:22		1	
Loading-41	in	74629.4	600	12:25			Kirichwa road
	out		I	12:25		(
Loading-42	in	74629.8	400) 12 : 27			Menelik Road
	out			12:29			1
Loading-43	in	74629.9	101	0 12 : 29			Menelik Road
	out	74620		12:30			
Loading-44	in	74630	1 100	12:32			Menelik road
1 10	out	74(20.0		12:32		•	
Loading-45	in	74630.2	200	12:34		·	Kindaruma road
I and an AC	out	74620 4		12:33		<u>.</u>	Kindonuma raad
Loading-46	in	74630.4	200	$\frac{12}{12}$			Kindaruma road
Landian AT	out	74620 5	104	12:38		; 	Kindanuna saad
Loading-47	in	74630.5	100	$\frac{12}{12}$			Kindaruma road
1 and in a 19	out	74630.5		12:47 012:47			3 Wood Avenue
Loading-48	in out	14030.3	'	12:4			2
L	out		_1	112:44	*1	L	<u> </u>

Time & Motion S	tudy	Organizati	on:CITY B	INS	Trip- 1	Date: 19th	May 1997
/ehicle No. KAD 554	J		apacity:2.6	-	Researcher	's name:m	. M. S. Nyawira
to. of Crew: 3		Estimated	Volume:6.	75m ³			
		Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
				12:45	<u>(min.)</u>	(min.)	Wood Gardens
.oading-49	in	74630.7	200	$\frac{12}{12}$: 45	<u>I</u>		wood Gardens
anding 50	out	74630.9	200	12:40	1		Wood Gardens
.oading-50	in	14030.9	200	$\frac{12}{12}$; 50	1	3	wood Galuens
Loading-51	out	74631	100	12 : 50 12 : 52	2		Wood Avenue
Loaung-51	in	74031	100	12:52	<u>~</u>		WOOU AVENUE
Loading-52	out in	74631.2	200	$12 \cdot 39$ 13 : 0	1		Chania Avenue
Loaomg-52		14051.2	200	13 : 0 13 : 0	1	0	
Loading-53	out in	74631.5	300	$13 \cdot 0$ $13 \cdot 1$	1	0	Chania Avenue
Loaunig-55	out	14031.3	300	13 : 1 13 : 2	1	1	Chanta Avenae
Loading-54	in	74631.8	300	$13 \cdot 2$ $13 \cdot 5$	3	a	Chania Avenue
Loading-04	out	74031.0		13:6		1	
Loading-55	in	74632.2	400	13 : 0 13 : 7	1		Chania Avenue
Loading-00	out	140.52.2	400	13 : 7 13 : 8	· ·	1	
Loading-56	in	74632.6	400	13:0 13:10			Chania Avenue
Louding 50	out	100.2.0		13 : 13 13 : 14			•
Loading-57	in	74632.7	100	13 : 15			Wood Avenue
Localing of	out	110.2.1		13 : 15		0	
Loading-58	in	74633	300	13 : 16		· · · · · · · · · · · · · · · · · · ·	Komo Lane
Louding 50	out	1000		13:19		3	
Loading-59	in	74633.4	400	13:22			Argwings Kodhek Rd
	out	1100011		13:26		4	
Loading-60	in	74633.9	500	13:30			Lenana road
	out	11000017		13:31			
Loading-61	in	74634.2	300	13:32			Spanish Villas (Lenana Rd)
	out			13:35		3	
Loading-62	in	74634.7	500) 13 : 37			Lenana road
	out			13:39		2	
Loading-63	in	74635.3	600	13:42	3		Likoni Lane
	out			13:44		2	
Loading-64	in	74636.1	800) 13 : 45	1		Tigoni road
¥	out		1	13:46			
Loading-65	in	74636.2	100	0 13 : 47	1		Tigoni road
¥	out			13:48	5	1	
Loading-66	in	74636.6	400) 13 : 52	2 4		Jabavu villas (Jabavu Rd)
	out			13:55	5		
Loading-67	in	74636.7	10() 13 : 57	2		Kasuku road
	out			14 : (3
Loading-68	in	74637.2	500) 14 : 1	1		Lenana road
	out			14 : 1		()
Loading-69	in	74637.3	10	014:4			Lenana road
	out			14 : 9)		5
							
Dumping site	in	74657.6	20,30	0 14 : 47			
Start dumping				15 : (and the second s	
Finish dumping				15:30		30	<u></u>
Dumping site	out	74672.8	15,20	0 15 : 50			
	in			16:15	5 25		



Vehicle No. KAD 551 J No. of Crew: 3

Time & Motion Study Organization:CITY BINS Loading Capacity:2.6 TON Estimated Volume:6.75m³

Date: 19th May 1997 Trip- 1 Researcher's name:m. M. S. Nyawira

No. of Crew: 3	Estimateo	volume:o.	/ <u>əm</u>			
Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Total		118,100		308	163	Total min.: 471min.
Collection		81,100		197	133	
Transportation		21,800		78		
Inside the dumping site		15,200		33	30	Dumping time
Idling time						

Time & Motion Study /chicle No. KAE 636 H		Loading Ca	Organization:CITY BINS Trip-1 Date:20th MAY 1997 Loading Capacity:4 TON Researcher's name:M. Mapenzi Estimated Volume:							
No. of Crew: 3			T		Moving	Loading	······································			
Location		Mileage (km)	Distance (m)	Time	time	time	Remarks (route)			
				8:29	<u>(min.)</u>	(min.)				
Start from workshop	out	46139.2	5,900	8:52	23		Eastleigh section 3			
Loading-1	in	46145.1	3,300	8:55		3	Lusheigh section 5			
	out in	46145.9	800	8:59	4		Eastleigh section 2			
Loading-2		40143,7	000	8:59		0	Distrigation 2			
Landing 2	out in	46148.7	2,800	9:8	9		Kariokor			
Loading-3	out	40140.7	2,000	$\frac{2}{9}:8$		0				
Loading-4	in	46148.9	200	9:9			Kariokor			
Loading-4	out	101/10.2	200	9:15		6				
Loading-5	in	46150.3	1,400	9:20	5	<u> </u>	Pangani			
Louding 5	out			9:21		1				
Loading-6	in	46150.5	200	9:22	1		Ngara			
Louising o	out			9:24		2				
Loading-7	in	46151.7	1,200	9:29	5		Juja road			
	out			9:30		1				
Loading-8	in	46152.7	1,000	9:33	3		Garissa road			
	out			9:35		2				
Loading-9	in	46153.1	400		2		Kipanga Athumani St			
0	out			9:38		I				
Loading-10	in	46153.2	100	9:38	0		Kipanga Athumani St			
	out			9:40						
Loading-11	in	46153.3	100				Kipanga Athumani St			
	out			9:44			3			
Loading-12	in	46153.8	500				Juja road Estate			
	out			9:47			l			
Loading-13	in	46154	200				Juja road Estate			
	out		 	9:48						
Loading-14	in	46154.7	700				North View Rd			
	out		ļ	9:57			6			
Loading-15	in	46155	300	9:58			Bustani Lane			
	out	1		9:58			0 Luio Dat			
Loading-16	in	46155.4	400	10:0			Juja Rd 0			
	out	116166	1	10 : 0						
Loading-17	<u>in</u>	46155.5	100	10:10			4			
1 - 1' - 10	out	46155.8	204	10: 10			Pangani			
Loading-18	in	140100.8		10:19			2			
L	out	46156.6	000	10:15			Pagani			
Loading-19	in	40130.0		10:42		+	1			
Landing 20	out in	46157	1	10:4		1	·			
Loading-20	in	40107		10:4		<u> </u>	0.			
Loading-21		46157.1	10	$\frac{10.4}{10:4}$			Pareto Rd			
Loaung-21	out		ⁱ	10:4			1			
Loading-22	in	461587.3	20	310:4		3				
Luaung-22	out	.101.01.0		10:5		1	3			
Loading-23	in	46158.8	1.50	0 10 : 5		3	Muranga road			
LVaging-23	out			10:5		1	1			
Loading-24	in	46158.9	10	010:5		4				
Loading 24	out		-l	11 :			3			

• • •

Time & Motion Stud	y –	Organization:CITY BINS			Trip-1 Date:20th MAY 1997				
Vehicle No. KAE 636 H		Loading C	apacity:4 T	ON	Researcher	's name:M	. Mapenzi		
No. of Crew: 3		Estimated	Volume:						
		Mileage	Distance		Moving	Loading			
Location		(km)	(ni)	Time	time	time	Remarks (route)		
					(min.)	(min.)			
Loading-25 ir		46158.9	10	11 : 2	0				
	ut	16150.1	000	11:2		0			
Loading-26 in		46159.1	200	11:3	1	. 1			
	ut:	46150.2	100	$\frac{11:4}{11:4}$	0	1	Okoth Aura Rd		
Loading-27 in		46159.2	100	$\frac{11}{11}$: 4	0	0			
	ut_	46161.2	2,000	$\frac{11}{11}$: 10	6	0	Desai Road		
Loading-28 in		40101.2	2,000	11:10	0	1	Desar Road		
Loading-29 in	ut	46161.3	100	$\frac{11}{11}$: 12	1	1	Desai Road		
		40101.5	100	11 : 12 11 : 13		·			
Loading-30 in	ut	46161.9	600	11:13 11:14	1		Muranga road		
	ut	40101.7		11:20		6			
Loading-31 in		46162.5	600	11:20	1	~Ÿ	Kenjeku Rd		
	ut	40102.5		11:24		3	a second and the second and the second at th		
Loading-32 ii		46162.7	200	11:24					
	ut	10102.1		11:26		2			
Loading-33 in		46163.2	500	11:28			Mushebi road		
	ut	10103.2		11:28		0			
Loading-34 i		46163.9	700	11:31			Mushebi road		
	ut			11:31		0			
Loading-35 i		46164.1	200	11:32	1		Mushebi road		
	ut			11:34		2			
Loading-36 i		46164.4	300	11:35			Mushebi rozd		
	ut	<u> </u>		11:35		Û			
Loading-37 i	_	46164.8	400	11:38			Raju Estate		
· · · · · · · · · · · · · · · · · · ·	at			11:40		2			
Loading-38 i	n	46165	200	11:40	0				
	ut			11:40		0			
Loading-39 i	n	46165.1	100	11:40	0		Galla Lane		
	RH			11:43		3			
Loading-40 i	<u>n</u>	46165.2	100	11:43			Kolobot Road		
	out			11:45		2			
Loading-41 i	<u>n</u>	46165.3	100	11:45			Kolobot Road		
	out		<u> </u>	11:45		0			
Loading-42 i	n	46165.5	200	11:46			Forest road		
	out			11:52		(
}	<u>n _</u>	46165.9	400	11 : 53			parklands road		
	out		L	11 : 57		4			
· · · · · · · · · · · · · · · · · · ·	n	46165.9	10	11 : 58			parklands road		
	out			11:58		(
	11	46166.1	200	12:0			parklands road		
	out	1	<u> </u>	12: 2					
······································	<u>n</u>	46166.2	100) 12 : 4		 	Wambugu road		
	out			12: 5		ļ			
}	n	46166.6	400	12:6		ļ	Wambugu road		
the second	out	41944		12:7		<u> </u>			
	n	46166.7	100	12:7			Wambugu road		
	out		<u> </u>	12: 7	′ I		<u>ų</u>		

Time & Motion Study Organization: CITY BINS Trip-1 Date: 20th MAY 1997

Time & Motion	-	-			- f		MAY 1997
/ehicle No. KAE 6	36 H	Loading C	• •	ON	Researcher	's name:M	. Mapenzi
to. of Crew: 3		Estimated	Volume:	······			
		Mileage	Distance	T	Moving	Loading	Remarks (route)
Location		(km)	(m)	Time	time (min.)	time (min.)	Remarks (rome)
anding 40	in	46167.1	400	12:9	2		Wambugu road
.oading-49	out	40107.1	400	12:32	2	23	
oading-50	in	46167.2	100	12:32 12:35	3		Wanibugu road
Joaonig-50	out	10107.2		$\frac{12}{12}:37$		2	
_oading-51	in	46167.4	200	12:39	2		Wambugu road
Souding-51	out	10101.1		12:52		13	
.oading-52	in	46167.8	400	12:53	1		Wambugu road
5040115 02	out			12:57		4	
.oading-53	in	46167.8	10	12:58	1		Wambugu road
	out			12:58		0	
Loading-54	in	46167.8	10	12:59	1		
	out	[1	13:4		5	
Loading-55	in	46168.4	600	13 : 5	1		First Parklands Avenue
	out	1	1	13:6		1	
Loading-56	in	46168.5	100	13 : 7	1		First Parklands Avenue
	out			13 : 7		0	
Loading-57	in	46168.8	300	13:10	3		First Parklands Avenue
	out	1		13:16		6	
Loading-58	in	46169	200) 13 : 19	3		First Parklands Avenue
	out			13:21		2	
Loading-59	in	46169.2	200) 13 : 21	0	L	First Parklands Avenue
	out			13 : 23		2	2
Loading-60	in	46170.3	1,100) 13 : 32			Second Ave Parklands
	out			13:34			2
Loading-61	- in	46170.6	300) 13 : 36			Second Ave Parklands
	out			13:38		\$	2
Loading-62	in	46170.8	20	013:40			Msanako Rd
	out			13:41			l
Loading-63	in	46171	20	0 13 : 43			
	out		+	13:44		4	1
Loading-64	in	46171.5	50	0 13 : 47			
	out			13:48			1
Loading-65	in	46172.4	90	0 13 : 54		and the second se	Mtama road
	out	1.6100.0		14 : 2			8
Loading-66	in	46172.8	40	0 14 : 4			
	out		1.00	14:0			2
Loading-67	in	46174	1,20	0 14 : 13		′ 	.
	out	461714		14:10		3	1
Loading-68	in	46174.4	40	0 14 : 19			3
	out	4(124.0		14:2		1	Bhanderi Rd
Loading-69	in	46174.8	40	0 14 : 2		·	1
1 1: 00	out	16176		14:2		, 	1
Loading-70	in	46175	20	0 14 : 2		<u>'</u>	0 Bhanderi Rd
	out			14:2		· <u> </u>	V DRABUCH AU
Loading-71	in	46175.2	<u></u>	0 14 : 2		<u>'</u>	0
1	out			14:2 0 14:3		4	
Loading-72	in	46175.2				¹┤────	2
L	out			14:3	4	<u> </u>	4

Time & Motion Study	Organization:CITY BINS	Ŧ
Vehicle No. KAE 636 H	Loading Capacity:4 TON	R
No. of Crew: 3	Estimated Volume:	

Trip- 1	Date:20th I	MAY	1997
Researcher	r's name:M.	. Марс	enzi

No. of Crew: 3		Estimated	Volume:			. •	
		Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
·	·				<u>(min.)</u>	(min.)	
Loading-73	in	46175.2	10	14:32	0		
	out	16176.0	10	14:32		0	
Loading-74	in	46175.2	10	14:33	!		
1	out	16176.0	(0)	14:33		0	
Loading-75	in	46175.8	600	14:34			
	out	16126.0	100	14:35		I	
Loading-76	in	46175.9	100	14:36	1		
	out	141941		14:36		0	
Loading-77	in	46176.1	200	14:38	2		·
	out			14:39		1	
Loading-78	in	46176.6	500	14:41	2		2nd Avenue Parklands
<u></u>	out			15:2		21	
Loading-79	in	46177.9	1,300		6		5th Avenue Parklands
	out			15:8		0	
Loading-80	in	46178	100	15:9	1		5th Avenue Parklands
<u> </u>	out			15:9			
Loading-81	in	46178	0	15 : 10	i		
	out			15:13		3	
Loading-82	in	46178.2	200	15:13	0		Mpaka Rd
	out		L	15 : 14		1	
Loading-83	<u>in</u>	46178.5	300	15:15	1		6th Parkland Ave
	out			15:18		3	
Loading-84	in	46178.7	200	15 : 22	4		6th Parkland Ave
	out			15 : 23		1	· · · · · · · · · · · · · · · · · · ·
Loading-85	in	46179.2	500	15:24	1		6th Parkland Ave
	out	_		15:24		0	
Loading-86	in	46179.3	100	15:26	2		6th Parkland Ave
· · · · · · · · · · · · · · · · · · ·	out	}		15:28		2	
Loading-87	in	46179.4	100	15:29	1		City Park Estate
	out			15:30		1	
Loading-88	in	46181.4	200	15:37	7		City Park Estate
	out			15:39		2	
Loading-89	in	46181.8	400	15:41	2		City Park Estate
	out			15:45		4	
Loading-90	in	46182.4	600	15:52	7		City Park Estate
	out			15:53		1	
Loading-91	in	46182.9	500	15:54			City Park Estate
	out			15 : 55		1	
Dumping site	in			:			To workshop: Vehicle
Start dumping			1	:	0		developed mechanical
Finish dumping				:		0	problems and could not
Dumping site	out			:	0		proceed to Dumping site
Reach to workshop	່າກ	46191.5	8,600	16:30			F
· · · · · · · · · · · · · · · · · · ·		1	1	1		t -	·····

Time & Motion Study Organization: CITY BINS

Organization:CITY BINS Loading Capacity:4 TON Estimated Volume: Trip-1 Date:20th MAY 1997 Researcher's name:M. Mapenzi

Vehicle No. KAE 636 H No. of Crew: 3

No. of Crew: 3	Estimated Mileage	Distance	Time	Moving time	Loading time	Remarks (route)
	(km)	(m)		(min.)	(min.) 214	Fotal min.: 481 min.
Total		50,570		267		
Collection		36,070	L	209	214	
Transportation		14,500		58	0	
Inside the dumping site		0		0	0	Dumping time
Idling time		<u> </u>		L		· · · · · · · · · · · · · · · · · · ·

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Researcher's name:m. M. S. Nyawira Loading Capacity:2.6 TON Vehicle No. KAD 554 J Estimated Volume:6.75m³ No. of Crew: 3 Moving Loading Mileage Distance Time Remarks (route) Location time time (km) (m)(min.) (min.) 74672.5 8:29 (From 8:29to 9:25am mechanical Start from workshop out 71 20,300 9:40 Problem) Lavington Kabasirani 74692.8 Loading-1 in 9:40 0 out Lavington Manyani West Av 74693.6 800 9:41 1 Loading-2 in 9:41 0 out Lavington Musa Gitau 900 9:45 4 Loading-3 74694.5 in Õ 9:45 out 74695.5 1.000 9:47 2 Lavington Waiyaki Way Loading-4 in 9:48 out 2,800 3 Mountain view Estate 74698.3 9:51 Loading-5 in 3 Off Waiyani Ways 9:54 out 74698.4 100 9:54 0 Mountain view Estate Loading-6 in 9:55 1 Off Waiyaki Ways out Mountain view Estate 74698.6 200 9:56 1 Loading-7 in 9:57 1 Off Waiyani Ways out 74698.7 100 9:58 Mountain view Estate 1 Loading-8 in 1 Off Waiyani Ways 9:59 out 100 10 : Mountain view Estate 74698.8 4 5 Loading-9 in 4 0 Off Waiyani Ways 10 : out 600 10 : 6 2 Mountain view Estate 74699.4 Loading-10 in 2 Off Waiyani Ways 10: 8 out 700 10 : 10 2 74700.1 Mountain view Estate Loading-11 in Off Waiyani Ways 10:11 out Mountain view Estate 74700.5 400 10 : 15 4 Loading-12 in 10:15 0 Off Waiyani Ways out 74700.6 100 10 : 16 Mountain view Estate Loading-13 in ŧ 0 Off Waiyani Ways 10:16 out 100 10 : 17 1 Mountain view Estate Loading-14 74700.7 in 10:20 Off Waiyani Ways out 3 74704.6 3,900 10 : 25 5 Loresho Shinyalu Road Loading-15 in 10:26 1 out 74705 400 10 : 26 0 Loresho Shinyalu Road Loading-16 in 10:30 4 out 100 10 : 31 Loading-17 74705.1 1 Loresho Thego road in 10:32 out 74706.1 1,000 10 : 32 0 Loresho Thego road Loading-18 in 10:342 out 2 74707 900 10 : 36 Loresho Thego road Loading-19 in 10:39 3 out Loading-20 1,400 10 : 41 2 Loresho Mweiga road 74708.4 in 10:42 1 out

Time & Motion Study Organization: CITY BINS

Date: 20th May 1997

Trip-1

1.800 10 : 44

1,000 10 : 46

900 10 : 50

10:45

10:46

10:50

Loading-21

Loading-22

Loading-23

in

out

in

out

in

out

74710.2

74711.2

74712.1

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Loresho Kyuna road

Loresho Kyuna road

Loresho Mugumo crescent

Time & Motion St Vehicle No. KAD 551 J	-	Loading Ca			Researcher	's name:m.	. M. S. Nyawira
to. of Crew: 3		Estimated '		-			
		Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
				10:55	<u>(min.)</u> 5	<u>(min.)</u>	westlands grevillia Groove
.oading-24		74714	1,900	$\frac{10}{10}$: 55	J	0	Westland's grevinia Groote
Loading-25	out in	74714.9	900	10:55 10:59	4	· · · · · · · · · · · · · · · · · · ·	westlands grevillia Groove
Loading-25	out	1-11-1-12		11:0	······································	1	
Loading-26	in	74715.2	300	11 . 2	2		westlands grevillia Groove
	out			11:4		2	
Loading-27	in	74715.4	200	11 : 5	1		westlands grevillia Groove
	out			11:6		1	
Loading-28	in	74715.8	400	11:8	2		westlands grevillia Groove
	out	0.0016		11 9	2	<u> </u>	westlands grevillia Groove
Loading-29	in	74716	200	11:11 11:12	2		Westiantis grevinia Groove
	out	74716.5	500	11:12	1		westlands grevillia Groove
Loading-30	in out	74710.5		11:15			
Loading-31	in	74716.9	400	11:20			westlands Off Muguga Gardens
Loading-51	out			11 : 21			
Loading-32	in	74717.5	600	0 11 : 21	()	Brookside Gardens
	out	1		11:21			
Loading-33	in	74719.1	1,600	011:26			School Lane-westlands
	out			11:30	1		4
Loading-34	in	74720.1	1,00	011:33		3	School Lane(Upper)-westlands
	out	74700.6		11:34		. <u> </u>	Brookside Drive(Lower)-Westlands
Loading-35	in	74720.5	40	$\frac{0}{11} : 33}{11} : 36$	· · · · · · · · · · · · · · · · · · ·	1	Brookside Diriellower)- riestands
I	out in	74720.6	10	0 11 : 30		2	Brookside Drive(Lower)-Westlands
Loading-36	out	14120.0		11:4			3
Loading-37	in	74720.9	30	011:4		2	Brookside Drive(Lower)-Westlands
Loading 57	out	1	1	11:4	5		3
Loading-38	in	74721	10	011:4		2	Brookside Drive(Lower)-Westlands
	out			11:4			1
Loading-39	in	74721.2	20	011:5		2	Brookside Drive(Lower)-Westlands
	out			11:5		0	3 Lower Kabete road
Loading-40	in	74721.5		011:5 11:5		<u> </u>	5
1 11 11	out in	74721.6		11.5 011:5		0	Lower Kabete road
Loading-41	out			12 :		<u> </u>	1
Loading-42	in	74722.4	80		5	5	General Mathenge Drive (Lower
Loading 42	out			12 :			3
Loading-43	in	74722.7	30	012:1	0	2	General Mathenge Drive (Lower
	out			12:1			2
Loading-44	in	74723	30	0 12 : 1		2	General Mathenge Drive (Lowe
	out			12:1			I General Mathenge Drive (Lowe
Loading-45	in	74723.2	20	0012:1		2	General Mathenge Drive (Lowe
	out		·	12 : 1 00 12 : 2		3	General Mathenge Drive (Lowe
Loading-46	in	74723.6		12:2		-' 	3
Loading-47	out	74723.8		$\frac{12}{0012}$		1	Donyo Sabuk Lane
Loading-47	ou		_ <u></u>	12 : 1			4
Loading-48	in	74724.5	7	00 12 : 1		2	Peponi road

Time & Motion Study Organization: CITY BINS Vehicle No. KAD 554 J No. of Crew: 3

Loading Capacity: 2.6 TON Estimated Volume: 6.75m³

Trip- 1 Date:20th May 1997 Researcher's name:m. M. S. Nyawira

No. of Crew: 3		Estimated	Volume:6.	75m²			
		Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
				10	(min.)	(nin.)	
	out		400	12:32		0	
Loading-49	in	74724.9	400	12:35	3		Peponi road
	out			12:35		0	
Loading-50	in	74725.6	700	12:36	1		Donyo Sabuk Lane
	out			12:38		2	
Loading-51	in	74726.1	500	12:40	2		General Mathenge Drive
	out			12:40		0	
Loading-52	in	74726.2	100	12:41	1		General Mathenge Drive
	out			12:46		5	
Loading-53	in	74726.3	100	12:47	1		General Mathenge Drive
	out			12:48		1	
Loading-54	in	74726.5	200	12:50	2		The Pine Wood Grove
·	out			12:50		0	
Loading-55	in	74726.7	200	12:51	1		The Pine Wood Grove
	out	[12:51		0	
Loading-56	in	74727.4	700	12:55	4		Shanzu road
¥	out	f	1	12:55		0	· ·
Loading-57	in	74732.8	5,400	13:4	. 9		Kitisuru Road
	out			13:6		2	
Loading-58	in	74734.5	1.700	13:9	3		Kitisuru Road
Louding of	out		<u>_</u>	13:12			Lunch Break from 1:12-1:34
Loading-59	in	74738.5	4 000	13:34	22		Lake view cross road
Louding 07	out		1,,,,,,,	13:34		0	
Loading-60	in	74739.1	600	13:38	4		Lake view cross road
Loading-oo	out	14137.1		13:30 13:39		1	
Loading-61	in	74739.6	500	13:41	2		Lake view cross road
	out	14137.0		13:41	£	1	
Loading-62	in	74740.1	500	13:42 13:45	3	-	Hill View
itoading-02	out	11140.1		13:45		0	
Loading-63	in	74741.4	1 200	13:43 13:50			Spring Valley road
Loading-05		14741.4	1,500	13:50 13:50	Contractory of the Contractory o		
Landing 64	out	74742.4	1.000	13:50 13:53			Spring Valley road
Loading-64	in	14142.4	1,000				
	out	24242.4	1 000	13:55		2	
Loading-65	<u>in</u>	74743.4	1,00	13:56			Peponin road (Lower)
	out	74742 6		13:57		ļ	
Loading-66	in	74743.6	200	13:58			Peponi close
	out	121210	<u> </u>	13:58	•		
Loading-67	in	74743.7	100) 14 : 0			peponi road (Lower)
	out			14:0			
Loading 68	in	74744.3	600) 14 : 1	1	1	Muthaiga Thigiri rigde
	out		<u> </u>	14:3			
Loading-69	in	74745.9	1,600	014:7			Muthaiga Thigiri Lane
	out			14 : 9			
Loading-70	in	74748.4	2,50) 14 : 15			Red hill road Nyali Estate
	out			14:16		· 1	
Loading-71	in	74750.3	1,90	0 14 : 21	5		Red hill road Nyali Estate
	out			14:21			
Loading-72	in	74751.4	1,10	0 14 : 26	5		Red hill road Nyali Estate
¥	out		1	14 : 27		· · · ·	
L		- -			I	I	

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	1,800 2,400 1,300 100 1,900	75m ³ Time 14 : 33 14 : 33 14 : 40 14 : 40 14 : 40 14 : 45 14 : 45 14 : 50 14 : 54 14 : 55	Researcher Moving time (min.) 6 7 5 5 4 4	Loading time (min.) 0	M. S. Nyawira Remarks (route) Roselyn close Roselyn close Gigin United Ntions Wispers Avenue (Gigin)
Mileage (km) 74754.9 74756.7 74759.1 74760.4 74760.5 74762.4 74763.3	Distance (m) 3,500 1,800 2,400 1,300 1,300 1,900	$\begin{array}{c} \text{Time} \\ \hline 14 : 33 \\ \hline 14 : 33 \\ \hline 14 : 40 \\ \hline 14 : 40 \\ \hline 14 : 45 \\ \hline 14 : 45 \\ \hline 14 : 49 \\ \hline 14 : 50 \\ \hline 14 : 51 \\ \hline 14 : 55 \\ \hline$	time (min.) 6 7 5 5 4	time (min.) 0	Roselyn close Roselyn close Gigin United Ntions
Mileage (km) 74754.9 74756.7 74759.1 74760.4 74760.5 74762.4 74763.3	Distance (m) 3,500 1,800 2,400 1,300 1,300 1,900	$\begin{array}{c} \text{Time} \\ \hline 14 : 33 \\ \hline 14 : 33 \\ \hline 14 : 40 \\ \hline 14 : 40 \\ \hline 14 : 45 \\ \hline 14 : 45 \\ \hline 14 : 49 \\ \hline 14 : 50 \\ \hline 14 : 51 \\ \hline 14 : 55 \\ \hline$	time (min.) 6 7 5 5 4	time (min.) 0	Roselyn close Roselyn close Gigin United Ntions
(km) 74754.9 74756.7 74759.1 74760.4 74760.5 74762.4 74763.3	(m) 3,500 1,800 2,400 1,300 100 1,900	$ \begin{array}{r} 14 : 33 \\ 14 : 33 \\ 14 : 40 \\ 14 : 40 \\ 14 : 45 \\ 14 : 45 \\ 14 : 45 \\ 14 : 50 \\ 14 : 54 \\ 14 : 55 \end{array} $	(min.) 6 7 5 4	(min.) 0 0	Roselyn close Roselyn close Gigin United Ntions
74754.9 74756.7 74759.1 74760.4 74760.5 74762.4 74763.3	3,500 1,800 2,400 1,300 100 1,900	14 : 33 14 : 40 14 : 40 14 : 45 14 : 45 14 : 45 14 : 50 14 : 54 14 : 55	6 7 5 4	0	Roselyn close Gigin United Ntions
74756.7 74759.1 74760.4 74760.5 74762.4 74763.3	1,800 2,400 1,300 100 1,900	14 : 33 14 : 40 14 : 40 14 : 45 14 : 45 14 : 45 14 : 50 14 : 54 14 : 55	7 5 4	0	Roselyn close Gigin United Ntions
74759.1 74760.4 74760.5 74762.4 74763.3	2,400 1,300 100 1,900	14 : 40 14 : 40 14 : 45 14 : 45 14 : 45 14 : 50 14 : 54 14 : 55	5	0	Gigin United Ntions
74759.1 74760.4 74760.5 74762.4 74763.3	2,400 1,300 100 1,900	14 : 40 14 : 45 14 : 45 14 : 49 14 : 50 14 : 54 14 : 55	5	0	Gigin United Ntions
74760.4 74760.5 74762.4 74763.3	1,300 100 1,900	14:45 14:45 14:49 14:50 14:54 14:55	4		
74760.4 74760.5 74762.4 74763.3	1,300 100 1,900	14 : 45 14 : 49 14 : 50 14 : 54 14 : 55	4	0	
74760.5 74762.4 74763.3	100	14:49 14:50 14:54 14:55		0	Wispers Avenue (Gigin)
74760.5 74762.4 74763.3	100	14 : 50 14 : 54 14 : 55			Wispers Avenue (Gigin)
74760.5 74762.4 74763.3	1,900	14 : 54 14 : 55	4	1	
74762.4	1,900	14:55	4		
74762.4 74763.3					Wispers Avenue (Gigin)
74763.3		14 . 20		1	•
74763.3		14:58	3		Lobelia Drive Gigin Estate
74763.3		15 : 4		6	
	900	15:6	2		Fuchsia Close
	1	15:7		1	
74764.2	900	15:14	7		Daisy Close
	1	15:14		0	
74764.7	500	15 : 16			Camella Close
t 1		15:16		0	,
74768.2	3.500	15 : 25	the second s		Limuru road
t		15:30		5	
74770.4	2.200) 15 : 31		1	Runda road
t		15:35			
	800				Runda road
				<u></u>	1
	5 70			,	Runda road
	200				Ridgeways Estate Ridgeway Road
	2,00				
2	70				Ridgeways Estate Ridgeway Road
and the second sec	1 10				Kigwa Lane
	- 1,10				3
		1			Kigwa Lane
					3
	10.00				
					<u></u>
					<u> </u>
1 74809.1	14,30	17:4		<u>.</u>	
	136.60)0	40	1 15	0 Total min.: 551min.
					26 Dumping time
		~			Lunch break/Mechanical probl
	11 74778.9 11 74779.6 11 74780.7 11 74780.7 11 74780.8 11 74793.7 74793.7 74793.7 74793.7 14793.7	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	t 15:39 74776.9 $5,700$ tt 15:54 74778.9 $2,000$ tt 15:59 74779.6 700 74779.6 700 74779.6 700 74779.6 700 74779.6 700 74779.6 700 74779.6 700 7479.7 $16:0$ $16:10$ 16:10 $16:100$ 16:30 74793.7 16:30 74793.7 17:10 $10:74793.7$ 17:10 $10:74794.8$ 1,100	t 15:39 74776.9 5,700 15:51 12 11 15:54 74778.9 2,000 15:59 2 11 15:59 74779.6 700 16:0 16:0 17 16:0 17 16:7 16:7 16:10 16:10 16:30 17 16:39 74793.7 12,900 16:39 74793.7 74793.7 17:5 10 14,300 17:5 136,600 136,600 40 88,000 18 47,500 12 1,100 14	t 15:39 1 74776.9 5,700 15:51 12 at 15:54 2 74778.9 2,000 15:59 5 74778.9 2,000 15:59 5 74778.9 2,000 15:59 5 74779.6 700 16:0 1 nt 16:0 0 0 74780.7 1,100 16:4 4 at 16:7 3 74780.8 100 16:7 3 at 16:30 20 74793.7 12,900 16:30 20 74793.7 17:5 2 2 74793.7 17:5 2 2 74793.7 17:40 30 30 74794.8 1,100 17:40 30 $136,600$ 401 15 $88,000$ 188 12 $47,500$ 121 3

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Time & Motion StudyOrganization:CITY BINSTrip-1Date:20th May 1997Vchicle No.KAH 850SLoading Capacity:3.29 TONResearcher's name:A. WanjohiNo. of Crew:3Estimated Volume:3.94m³

NO. OF CICW.5		Isumated	V010110.5.7411						
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)		
Start from workshop	out	6417.1	0	8:32			To dumping site		
						•••••••••••••••••••••••••••••••••••••••			
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			<u>†</u>						
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Dumping site	in	6432.8	15,700	9:15	43				
Start dumping		1	,	9:15 9:37	22	<u> </u>	· · · · · · · · · · · · · · · · · · ·		
Finish dumping	·	1	<u></u>	;		<u> </u>	· · · · · · · · · · · · · · · · · · ·		
Dumping site	out	1		:	0	<u></u>			
Reach to workshop	in	1		:	Ö		· · · · · · · · · · · · · · · · · · ·		
and to nononop					<u> </u>	†			
Total		+	15,700	·	65	1	Total min.: 65 min.		
Collection		+	0		0				
Transportation		<u> </u>	15,700		43				
Inside the dumping site			0		22		Dumping time		
Idling time		1	1			t	Donaping mac		

lo. of Crew:3		Loading C Estimated	Volume:3.9				·
10. 01 CICW.5	·····]		Distance	T T	Moving	Loading	
Location		Mileage		Time	time	time	Remarks (route)
		(km)	(m)		(min.)	(min.)	
tart from workshop	out						
.oading-1	in	6458.3	25,500	10:34			Westlands Houses
	out	<u> </u>	100	10:34		0	Westlands Houses
.oading-2		6458.4	100	10:36	2	2	· · · · · · · · · · · · · · · · · · ·
	out	(150 (200	10:38 10:40	2	2	Westlands Houses
.oading-3	in	6458.6	200	10:40 10:42	2	2	and the second
	out	6458.9	200	10:42 10:44	2		Westlands Houses
Loading-4	in	0436.9	300	10:44 10:46	2		
	out in	6459.2	700	10:40 10:47	1		Westlands Houses
.oading-5	out	0439.2	1.00	10:41 10:51	1	4	Lantana Road
Loading-6	in	6459.7	500	10:51 10:53	2	1	Westlands Houses
Joading-0	out	0455.7		10:53 10:54		the second secon	Sports road
Loading-7	in	6460	300	10:57	3		Westlands Houses
Loading-7	out	10100		10:59			Westlands Ave
Loading-8	in	6460.2	200	11:0	1		Westlands Ave
Luaumg-o	out	0100.2		11:4			1
Loading-9	in	6460.3	100	11: 5	1		Westlands Ave
	out			11: 5		(0
Loading-10	in	6460.4	100)11: 7	2	2	Sports road
	out			11: 9	1		2
Loading-11	in	6460.5	100) 11 : 11		2	Sports road
	out	1		11 : 12			1
Loading-12	in	6460.6	100) 11 : 12		5	Sports road
	out		<u>† </u>	11:13	1		1
Loading-13	in	6460.6		11:13	5	0	Sports road
	out			11:14			1
Loading-14	in	6460.7	10	011:15	5	1	Sports road
	out			11:10	1		1
Loading-15	in	6460.8	10	0 11 : 22		6	Sports road
_	out			11:24			2
Loading-16	in	6460.9	10	0 11 : 2		2	Sports road
	out			11:3			4
Loading-17	in	6461	10	011:3		1	Sports road
	out			11:3			0
Loading-18	in	6461.1	10	011:3		1	Sports Road West
	out			11:3			
Loading-19	in	6461.4		011:3		1	Mvuli road
	out			11:3		<u> </u>	0
Loading-20	<u>in</u>	6461.5	10	011:3		4	Mvuli road
<u> </u>	out			11:3			1
Loading-21	in	6462.2		011:3		2	Hill crest Hotel-Waiyaki wa
· · · ·	out		_	11:4			3 Ndimore Read
Loading-22	in	6462.9	70	0 11 : 4		2	Mimosa Road
· · · · · · · · · · · · · · · · · · ·	out			$\frac{11:4}{11:4}$		<u></u>	6
Loading-23	in	6463		0 11 : 4		0	Mvuli road
	out			11:5			5 David Oxidi cond
Loading-24	in	6463.8	80	00 11 : 5 11 : 5		1	David Osieli road 0

Time & Motion S	-	÷	on:CITY B		-	Date:20th	•
Vchicle No.KAH 850S			apacity:3.2		Researcher	's name:A.	. Wanjohi
No. of Crew:3		Estimated	Volume:3.	94m'	· .	· · · ·	
<u>.</u> .		Mileage	Distance	m :	Moving	Loading	_ ; , , ,
Location		(km)	(m)	Time	time	time	Remarks (route)
Loading-25	in	6464.2	• •	11:57	<u>(min.)</u> 2	<u>(mio.)</u>	East Church Road
Loading-20	out	0404.2		11:57		2	
Loading-26	in	6464.3	100	11:59	0	2	East Church Road
Loading-20	out		100	12 . 1	· · · · · · · · · · · · · · · · · · ·	2	
Loading-27	in	6464.5	200	12:2	1	£	East Church Road
Louding 21	out	0101.5	200	12:3		1	
Loading-28	in	6465.1	600	12:5	2		Mangu Gardens-Lilly court
	out			12:9		4	intinga Galdens Enty Court
Loading-29	in	6465.7	600	12:12	3	-	Body Wise Fitness
	out			12:14		2	
Loading-30	in	6465.8	100	12:16	2		······
<u> </u>	out	1		12:17		1	
Loading-31	in	6466.3	500	12:19	2		Prime Executive Apartments
	out			12:28		9	
Loading-32	in	6466.9	600	12:30	2		Terrace Close
v	out	1		12:31	······································	1	
Loading-33	in	6470.7	3,800	12:39	8		Museum Hill
	out		<u>_</u>	12:43		4	
Loading-34	in	6470.8	100	12:43	0		Muthithi road
······································	out	1		12:44		ī	+
Loading-35	in	6471.1	300	12:45	1		Muthithi road
	out	1		12:49		4	
Loading-36	in	6471.1	0	12:49	0		Muthithi road
	out		1	12:53		4	
Loading-37	in	6471.3	200	12:54	1		Muthithi road
······································	out	1		12:55]	
Loading-38	in	6471.5	200	12:56	1		Chiromo road
	out			12:58		2	
Loading-39	in	6471.9	400	13:0	2		Westlands Road
	out			13 : 1		1	
Loading-40	in	6472	100	13: 3			Westlands Road
	out		<u> </u>	13:4		l	
Loading-41	in	6472.2	200	13: 5			Westlands Road
	out	_	<u> </u>	13:10		5	
Loading-42	in	6472.2	0	13:11			Westlands Road
	out	<u> </u>		13:11		0	
Loading-43	in	6472.3	100	13 : 12			Westlands Road
	out		 	13:15		3	
Loading-44	in	6472.7	400	13 : 18			Muthithi road
	out			13:20		2	
Loading-45	in	6473.3	600	13:22			
	out			13:23		1	
Loading-46	in	6473.4	100	13:24			Mogotio road
	out		ļ	13:25		1	. :
Loading-47	in	6473.5	100	13:26		L	
	out			13:28		2	
Loading-48	in	6473.7	200	13:29			
	out	L		13:30	1.	l	

					's name:A.	
	Estimated	Volume:3.9	94m	Marian	Landian	
à	Mileage (km)	Distance (m)	Time	time	time	Remarks (route)
in	6473.8	100	13:31	1		Mogotio road
out			13:32		1	······································
in	6474	200	13:33	1		Mogotio road
out			13:34		1	
in	6474.1	100	13:37	3		Lunch Break
out			13:55		18	Lunch Break
in	6474.2	100	13:57	2		Muthithi road
out			14 : 0		3	
in	6474.4	200	14 : 1]		
out		1	14 : 2		1	
in	6474.5	100	14:3	1		Mpaka road
out	[<u> </u>	14 : 3		0	
in	6475	500		2		May Fair Court Hotel
out	 		14 : 7		2	
in	6475.4	400	14 : 8	1		The Crescent
out			14:10		2	
in	6475.5	100	14:11	1		The Crescent
out			14:11		0	
in	6475.6	100	14:12	1		The Crescent
out			14 : 15			
in	6476.1	500) 14 : 17	2		
out			14:19		7	2
in	6476.2	100) 14 : 19	0		Parklands road
out			14:22		3	
in	6476.6	400) 14 : 25	3		Maua close
out			14:27			2
in	6476.7	100				
out	Ţ					3
in	6477	300				Ring road
out						7
in	6477.9	900				General Mathenge road
out					.	5
in	6478.2	30			ļ	General Mathenge road
out						1
in	6478.9	70			ų	Elda Ravine Drive
out						1
in	6479	10			+	Elda Ravine Drive
out						0
in	6479.2	20			·	Elda Ravine Gardens
out					ļ	
in	6479.9	70				Elda Ravine Gardens
out	1				<u> </u>	0
in	6480	10			l	Elda Ravine Gardens
out						0
in	6480.7	70				General Mathenge road
		1	E 4 6			01
out	6481.1		<u>15:4</u> 015:4		2	0 3rd Parklands road
	in out out in out out in in out in out in out in out in out in out in out in out in out in out in out in out in out in out in out in out in in out i i i i i i i i i i i i i i i i i i i	Mileage (km) in 6473.8 out	Milcage (km) Distance (m) in 6473.8 100 out	(km)(m)fincein 6473.8 10013 : 31out13 : 3213 : 32in 6474 20013 : 33out13 : 341334in 6474.1 10013 : 37out13 : 551355in 6474.2 10013 : 57out14 : 014 : 0in 6474.4 20014 : 1out14 : 214 : 2in 6474.5 10014 : 3out14 : 314 : 5out14 : 550014 : 5out14 : 1014 : 7in 6475.4 40014 : 8out14 : 1014 : 10in 6475.5 10014 : 11out14 : 1214 : 12out14 : 1214 : 12out14 : 12in 6476.6 100ia : 14 : 1516in 6476.7 100ia : 14 : 2216in 6476.7 100ia : 250ut14 : 22out15 : 7out15 : 7in 6477.9 90015 : 1616in 6477.9 900in 6478.2 300is : 2615 : 32out15 : 32out15 : 33out15 : 33in 6479.2 200is : 3479700in 6479.9 out15 :	Mileage (km)Distance (m)TimeMoving time (min.)in 6473.8 100 $13 : 31$ 1 out $13 : 32$ $13 : 33$ 1 out $13 : 37$ 3 out $13 : 55$ 1 in 6474.1 100 $13 : 57$ out $14 : 0$ $13 : 57$ out $14 : 0$ $13 : 57$ out $14 : 3$ 1 out $14 : 1$ 1 in 6475.4 400 $14 : 10$ $14 : 10$ in 6475.5 100 $14 : 10$ $14 : 10$ in 6476.1 500 $14 : 11$ 1 out $14 : 12$ in 6476.2 100 $14 : 19$ 0 out $14 : 22$ in 6476.7 100 $14 : 22$ 10 in 6477.9 900 $15 : 16$ 16 in 6477.9 300 $15 : 24$ $15 : 30$ in 6478.2 300 $15 : 25$ 100 $15 : 32$ $15 : 32$ out $15 : 32$ in 6478.9 <t< td=""><td>Mileage (km)Distance (m)TimeMoving time (min.)Loading time (min.)in6473.8100 13 : 311out13 : 321in6474200 13 : 331out13 : 341in6474.1100 13 : 373out13 : 5518in6474.2100 13 : 572out14 : 033in6474.4200 14 : 11out14 : 214in6474.5100 14 : 31out14 : 303in6474.5100 14 : 31out14 : 111out14 : 111out14 : 111out14 : 111out14 : 111out14 : 1021in6475.4400 14 : 81out14 : 1021in6475.6100 14 : 111out14 : 1923in6476.1500 14 : 172out14 : 2233in6476.7100 14 : 253out14 : 2923out15 : 733in6476.7100 14 : 292out15 : 3213out15 : 3213in6477.9900 15 : 193out15 : 30<</td></t<>	Mileage (km)Distance (m)TimeMoving time (min.)Loading time (min.)in6473.8100 13 : 311out13 : 321in6474200 13 : 331out13 : 341in6474.1100 13 : 373out13 : 5518in6474.2100 13 : 572out14 : 033in6474.4200 14 : 11out14 : 214in6474.5100 14 : 31out14 : 303in6474.5100 14 : 31out14 : 111out14 : 111out14 : 111out14 : 111out14 : 111out14 : 1021in6475.4400 14 : 81out14 : 1021in6475.6100 14 : 111out14 : 1923in6476.1500 14 : 172out14 : 2233in6476.7100 14 : 253out14 : 2923out15 : 733in6476.7100 14 : 292out15 : 3213out15 : 3213in6477.9900 15 : 193out15 : 30<

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	auy	-			•	Date.zotti i	•
Vehicle No.KAH 850S			apacity:3.2	-	Researcher	s name:A.	Wanjohi
No. of Crew:3	,	Estimated	Volume:3.	94m'			······································
		Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
					(min.)	(min.)	
Loading-73	in	6481.2	100	15:44	<u> </u>		3rd Parklands road
	out			15:45		1	
Loading-74	in	6481.3	100	15:46	1		3rd Parklands road
	out			15:47]	
Loading-75	ា	6481.5	200	15:49	2		3rd Parklands road
	out			15:50		1	·
Loading-76	in	6481.7	200	15 : 51	1		Kusi Lane
· · · · · · · · · · · · · · · · · · ·	out			15:54		3	
Loading-77	in	6481.8	100	15:56	2		Suzo Lane
	out			15:56		0	
Loading-78	in	6482.1	300	15:58	2		Suzo Lane
	out			15 : 59		1	
Loading-79	in	6482.5	400	16:2	3		4th Parklands road
	out			16:4		2	
Loading-80	in	6483	500	16 : 5	1		4th Parklands road
	out			16:6		1	
Loading-81	in	6483.3	300	16:8	2		Mutate Lane
	out			16:9		1	
Loading-82	in	6483.4	100	16:10	1		Mutate Lane
¥	out	[16 : 11		1	
Loading-83	in	6483.5	100	16:13	2		Mutate Lane
	out		[16:13		0	
Loading-84	in	6483.6	100	16:14	1		Mutate Lane
	out			16:16		2	
Loading-85	in	6483.7	100	16:16			Mutate Lane
0	out			16:20		4	
Loading-86	<u>in</u>	6483.8	100	16:21	1		Masari road
	out	0.00.0		16 : 27		6	ŧ
Loading-87	in	6484.1	300	16 : 28			3rd parklands road
including of	out			16 : 30		2	
Loading-88	in	6484.2	100	16:30			4th parklands road
	out	10101.6	1 .00	16:30		0	
Loading-89	in	6484.8	600	16:30			4th parklands road
coating 07	out	0.000	+	16:32		2	
Loading-90	in	6485		16:34 16:35		<u></u>	4th parklands road
L.vaum5-90	out			16:35 16:37		2	
Loading-91	· · · · · · · · ·	6485.5	500	16:37			Githuri road
Loading-31	in			16:39		2	
Londing 02	out	61057		the second s		·	
Loading-92	in	6485.7	200	16:42			Githuri road
L E	out	6405.0		16:45		3	
Loading-93	in	6485.8	100	16:46		ļ	Githuri road
	out			16:49		3	
Loading-94	in	6486	$\frac{200}{1-200}$	16 : 50			Iregi road
	out	<u> </u>	<u> </u>	16:53	<u> </u>	3	· · · · · · · · · · · · · · · · · · ·
Loading-95	in			:	L		1
	out	1		:	1		To workshop-Vehicle
Loading-96	in			:	0		did not go toDumping site
	out					0)
		1					
							•••••••••••••••••••••••••••••••••••••••

Time & Motion Study Organization: CITY BINS Trip-2 Date: 20th May 1997

Time & Motion Study Organization:CITY BINS Trip-2 Date:20th May 1997

Vehicle No.KAH 850S No. of Crew:3

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Loading Capacity:3.29 TON Researcher's name: A. Wanjohi Estimated Volume: 3.94m³

NO. OF CIGWID		Estimated volume.5.74m					
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Dumping site	in			:	0		
Start dumping	_				0		
Finish dumping				:		0	
Dumping site	out			:	0		
Reach to workshop	in	6494.5	8,500	17:20	27		
Total			62,100		174	232	Total min.: 406 min.
Collection			28,100		147	232	
Transportation			34,000		27	0	
Inside the dumping site			0		0	0	Dumping time
Idling time							Lunch Break

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Time & Motion Study	Organization:CITY BINS
Vehicle No. KAE 636 H	Loading Capacity:4 TON
No. of Craw, 2	Retignated Volumes

Trip-1 Date:21st MAY 1997 Researcher's name:M. Mapenzi

Vehicle No. KAE 636	11	-	apacity:4 1	UN	Researcher	s name: w	. Mapenzi
No. of Crew: 2		Estimated	Volume:				
		Mileage	Distance		Moving	Loading	
Location		(km)	1 6 6 10	Time	Time time	time	Remarks (route)
			(m)		(min.)	(min.)	
Start from workshop	out	46191.5		10:37			It had trush
Loading-1	in	46193.1	1,600	10:44	7		Kisauni Rd
• • · · · • • • • • • • • • • • • • • •	out			10:51		7	· · · · · · · · · · · · · · · · · · ·
Loading-2	in	46193.2	100	10:52	1		Nairobi West
	out			10:55		3	
Loading-3	์เก	46193.4	200	10:57	2		Bukani Rd
	out			10:57		0	
Loading-4	in	46193.9	500	10:59	2		······
	out			11:1		2	
Loading-5	in	46194.1	200	11 3	2		Nairobi West
	out	40124.1	200	11:3		0	· · · · · · · · · · · · · · · · · · ·
	in	46194.3	200	11 : 5	2		Matati Ave
Loading-6		40194.3	200	<u> </u>	2	0	
	out	1(101.6			,	0	
Loading-7	<u>in</u>	46194.5	200	11:6	1		
	out			11:7		1	······································
Loading-8	in	46194.8	300	11:8	1		
	out		<u> </u>	11:8		0	
Loading-9	in	46194.9	100	11:8	0		
	out			11:9		1	
Loading-10	<u>in</u>	46194.9	10	11 : 10	1		
	out			11:12		2	
Loading-11	in	46195.1	200	11:13]		
	out			11:14		1	
Loading-12	in	46195.1	10	11:15	1		Bukani Rd
	out		1	11:16		1	
Loading-13	in	46195.6	500	11:18	2		Kodi road 1
	out	1		11:19		1	
Loading-14	in	46195.7	100	11:20	1		Kodi road 1
	out		<u> </u>	11:20		0	
Loading-15	in	46195.7	10	11:20			Kodi road 1
	out	10125.7		11 : 20		0	
Loading-16	in	46195.8	100	11 : 20			
Loading-10		40195.0		11:20			
Lasting 17	out	46105.0	100			1	
Loading-17	in	46195.9	100	11:21			Kedi road 1
	out	4000	100	11 : 21		0	
Loading-18	in	46196	100	11 : 22			Kodi road 1
	ાા		<u> </u>	11:23		1	
Loading-19	in	46196	10	11:23			Kodi road 1
	out	<u> </u>	<u> </u>	11:24		1	
Loading-20	in	46196.2	100	11 : 25			Kodi road 1
	out			11 : 27		2	
Loading-21	in	46196.2	20	11:27	0		Kodi road 1
	out			11:28		1	·····
Loading-22	in	46196.2	10	011:28			Kodi road 1
	out	1		11:30		2	
Loading-23	in	46196.3	100	11:30			Kodi road
	out		1	11 : 30		0	
		46196.3		11:30			Kodi road
1.53aunig. 24	in	140190.5	<u>-</u> 4				· · · · · · · · · · · · · · · · · · ·
L	out	I	1	11 : 32	I	1	I

ehicle No. KAE 636 H	1	Loading Ca	bacity:4 T	ON	Researcher	r's na:	me:M.	Mapenzi
lo. of Crew: 2		Estimated V						
0.01 01011.2	1	Mileage	Distance		Moving	ł	iding	
Location		(km)	(m)	Time	time		me	Remarks (route)
				11 . 22	<u>(min.)</u> 0		<u>in.)</u>	Kodi road
.oading-25	in	46196.3	20	$\frac{11:32}{11:33}$		 		Roution
	out	16106 5	200	$\frac{11}{11}$: 34	1	╂	'	Kodi road
.oading-26	in	46196.5	200	11:34	<u>^</u>	┣━━		
	out in	46196.5	50	11:35				Kodi road
.oading-27	out	40150.5		11:36		1	1	
Loading-28	in	46196.6	100	11:37	1			Kodi road
Loading-26	out	40170.0		11:38			1	
Loading-29	in	46196.8	200	11:38)		Muhoho Ave
Loaung-25	out			11:43			5	
Loading-30		46196.9	100	11:43	()		
	out	1		11:45			2	
Loading-31	in	46197.2	300	11:40		1		Maihahiv Rd
	out	Γ		11:40			0	
Loading-32	in	46197.6	400	(11:4)	/	1		
	out			11:4			2	
Loading-33	in	46197.6	10	0 11 : 50		1		Kabiyet road
	out		L	11:5			0	<u>, </u>
Loading-34	កែ	46197.7	10	<u>) 11 : 5</u>		<u>1</u>		
	out		ļ	11:5		. 	(/
Loading-35	in	46197.7	5	011:5		<u> </u>	(
	out			11:5				Kabiyet road
Loading-36	<u>in</u>	46197.9	20	$\frac{0}{11} : 5$		4		Rabijerioad
	out	1.6100	10	$\frac{11:5}{0 11:5}$		0		Kabiyet road
Loading-37	in	46198	10	11:5		<u> </u>		1
	out in	46198.1		011:5		0		Kabiyet road
Loading-38				11:5				2
(out in	46198.4	30	0 12 :		2		
Loading-39				12 :	8	1-		7
Loading-40	out in	46198.6	20	012:	9	1		Ole shapara Rd
Loading-40	out		+	12 : 1				2
Loading-41	in	46199	40	012:		1		South C
Loading-41	out			12 :				1
Loading-42	in	46199.3	- 30	0012:	14	1		South C
Conding 12	oul			12 :				0
Loading-43	in	46199.4	11	00 12 :	15	1		South C
	ou	1		12 :	15			0
Loading-44	in	46199.6	2	00 12 :		2		South C
	ou			12 :			_	3 South C
Loading-45	in	46199.8	2	0012:		_ _		South C
	08			12 :				8
Loading-46	in	46199.9	<u> </u>	00 12 :				0
	ou			12:				
Loading-47	in		1	00 12 :		0		1
	ou		_	12:		0		
Loading-48	in	46200.1		00 12 :		<u> </u>		0

Time & Motion St	udy	Organizati	on:ClTY B	INS	Trip- 1	Date:21st l	MAY 1997
Vehicle No. KAE 636 H	-	Loading C	apacity:4 T	ON	Researcher	's name:M	. Mapenzi
No. of Crew: 2		Estimated					
Location		Mileage (km)	Distance (nı)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-49	in	46200.9	800	12:34	3	b	South C
¥~~~~~~~~~~~~~~~~~~~~~~~~~~~	out			12:34		0	
Loading-50	in	46201	100	12:35	1		South C
£	out			12:35		0	
Loading-51	in	46201.1	100	12:36	1		South C
	out			12:37		1	
Loading-52	in	46201.4	300	12:39	2		Ole shapara Lane
	out			12:39		0	1
Loading-53	in	46201.6	200	12:43	4		
	out			12:45		2	
Loading-54	in	46201.6	50	12:46	1		Į
	out			12:47		1	
Loading-55	in	46201.7	100	12:48	1		Mtelo road
	out			12:49		1	
Loading-56	in	46201.7	10	12:49	0		Mtelo road
	out			12:52		3	
Loading-57	in	46201.8	100	12:52	0	£	Mtelo road
	out			12:52		0	
Loading-58	in	46201.8	10	12:53	1		Mtelo road
	out			12:54		1	
Loading-59	in	46201.8	20	12:54	0		Mtelo road
	out			12:56		2	
Loading-60	in	46201.9	100	12:57			Mtelo road
	out			12:58		1	
Dumping site	in	46244	42,100	13:53			
Start dumping				14:48			
Finish dumping				14:53			5
Dumping site	out			14 : 55			
Reach to workshop	in	46251.3	7,300) 15 : 50	55	·	
Total		+	60,210);	227	80	5 Total min.: 313 min.
Collection			9,210		53		
Transportation		1	51,00		117		
Inside the dumping site	;	1	- t)	57		5 Dumping time
Idling time				Ţ			

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Time & Motion S /ehicle No. KAD 554	-	Loading C				Date:21st i 's name:m	. M. S. Nyawira
No. of Crew: 3		Estimated			Resourcher	a namona	
	T				Moving	Loading	
Location		Mileage	Distance	Time	time	time	Remarks (route)
		(km)	(m)		<u>(min.)</u>	<u>(min.)</u>	
Start from workshop	out	74809.1		8:35			8:35-10:45 Mechanical problem
_oading-1	in	74811.2	2,100	10:49	134		South B Melili Road
· · · · · · · · · · · · · · · · · · ·	out			10:54		5	
.oading-2	in	74812	800	10:56	2		South B Shopping Centre
	out			10:57		ł	Mchumbi Rd
.oading-3	in	74813.1	1,100		5		Gdden Gates
	out	R 1010 C	400	11:6		4	South B. Sadi Road
_oading-4	in	74813.5	400	11:7 11:8	1	1	South B. Saul Koad
	out	01010.6			1	1	South B. Sadi Road
Loading-5	in	74813.5			-	4	
	out	74012 (100	11:13	0		South B Sadi Road
Loading-6	in	74813.6	100	11:13			Sound B Saur Abau
	out	24012 (11 : 14 11 : 15			South B Sadi Road
Loading-7	in	74813.6	l	11:15 11:16			Sound Disaul Road
	out	74813.6		11 : 10			South B Sadi Road
Loading-8	in	14813.0	<u> </u>	11 : 10 11 : 17	1	ļ	
	out	74813.7	100	11 : 17			South B Sadi Road
Loading-9	<u>in</u>	14813.1	100	11 : 19			Sound B Saur Road
- V. 10	out	74813.7		$(11 \cdot 20)$			South B Sadi Road
Loading-10	in out	14615.1	·	11:21			bouil b budi itoud
Laadina 11	out in	74813.8	10	$\frac{11}{11}$: 21			South B Sadi Road
Loading-11		14013.0	10	11:29			
Looding 12	out in	74816.6	2.80	$\frac{11}{11}$: 34			South C Muhoho road (Ave
Loading-12	out	14010.0	2,00	11:35			1
Loading-13	in	74816.7	10	011:35			South C Muheho road (Ave
Luaung-15	out	74010.1		11:30	1		1
Loading-14	in	74816.7		0 11 : 36			South C Muhoho road (Ave
Loaunig-14	out	1,4010.7		11:37			1
Loading-15	in	74816.8	10	011:39		2	South C. Punda Milia Crescen
Loading-15	out	71010.0		11:4			2
Loading-16	in	74816.9	1 10	011:42	and the second se		South C. Punda Milia Crescen
Loading to	out			11:42			0
Loading-17	in	74816.9		011:43		i	South C. Punda Milia Crescen
Louding II	out	~		11:4			0
Loading-18	in	74817	10	011:4	1	1	South C. Punda Milia Crescen
Ections 10	out		1	11:4	1		0
Loading-19	in	74817.1	10	011:43	5	1	South C Mukariti road
Louding 12	out		1	11:4			4
Loading-20	in	74817.1	1	011:4	9 (0	South C Mukariti road
	out	1	-	11:5			1
Loading-21	in	74817.3	20	011:5		1	South C Ndekwa Av
Loading-21	out	1		11:5			3
Loading-22	in	74817.7	40	011:5		1	South C Oluvimu road
	out	· · · ·	1	11:5			2
Loading-23	in	74817.8	1	011:5	7	0	South C Oluvimu road
	out			11:5	8		1

5 - 557

Time & Motion S Vehicle No. KAD 554 J	•	+	on:CITY B apacity:2.6		•	Date:21st l	May 1997 M. S. Nyawira
No. of Crew: 3			Volume:5.		noscarenci		. 14: 0. 11 junnu
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24	in	74817.9	100	11:59	1		South C Sungura road
	out			12:0		1	
Loading-25	in	74817.9	0	12:0	0		South C Sungura road
	out			12:6		6	
Loading-26	in	74818	100	12:6	0		South C Sungura road
	out	24010		12 : 7 12 : 7	0	1	South C Sungura road
Loading-27	in	74818	0	12 : 7 12 : 8	0	1	Sound C Sungura road
1	out in	74818.1	100	12:0 12:9		i	South C Sungura read
Loading-28		/4010.1	100	12 : 9 12 : 10			South C. Sungura Todo
Loading-29	out in	74818.1	1	12 : 10 12 : 11	1	1	South C Sungura road
Luading-27	out	74010.1		12:12		1	Gouri e congue roud
Loading-30	in	74818.1	0	12:12 12:14	2		South C Sungura road
Loading-30	out		· · · · · · · · · · · · · · · · · · ·	12:15		1	
Loading-31	in	74818.2	100	12:20	5		South C Sungura road
	out			12:21			
Loading-32	in	74818.2	(12:22	1		South C Sungura road
	out		· ·	12:25		3	3
Loading-33	in	74818.3	100	12:28	3		Sungura Estate
	out			12:29		1	
Loading-34	in	74818.3	(0 12 : 29			Sungura Estate
	out			12:30		·]	
Loading-35	in	74818.3	(12:31			Sungura Estate
	out			12:32			
Loading-36	in	74818.4	100	12:33			Muhoho Avenue
	out	0 10 10 1		12:35			2
Loading-37	in	74818.4	· · · · · · · · · · · · · · · · · · ·	012:36	· · · · · · · · · · · · · · · · ·		Muhoho Avenue
1 1	out	74818.6	20	12:36 012:38			Muhoho Avenue
Loading-38	in out	14010.0		12:30 12:40			2
Loading-39	out in	74819	40	0 12 : 43			off Muhoho Opposite
1.030118-37	out	14017	1	12:44			1 M.O.W Sports
Loading-40	in	74819.1	10	0 12:4			off Muhoho Opposite
isouoing to	out	1	1	12:40			1 M.O.W Sports
Loading-41	in	74819.7	60	012:49			Mugoya Estate
0	out			12:50			1
Loading-42	in	74819.7		0 12 : 50			Mugoya Estate
	out			12:5	1		1
Loading-43	in	74819.8	10	0 12 : 5)	Mugoya Estate
	out			12:5			1
Loading-44	in	74819.8		012:5		0	Mugoya Estate
	out			12:5			1
Loading-45	in	74820.2	40	012:5		<u>1</u>	Mugoya Estate
	out			12:5			0
Loading-46	in	74820.6	40	0 12 : 5		1	Mugoya Estate
	out		<u>_</u>	13 :		<u>_</u>	5
Loading-47	in	74821.2	60	013:		2	KMA Estate
	out	7.1021.0		13:			0
Loading-48	in	74821.9	1 /(0 13 :	2	3	KMA Estate

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Time & Motion S	tudy	Organizati	on:CITY B	INS	Trip- 1	Date:21st M	May 1997
Vehicle No. KAD 551	-	Loading C	apacity:2.6	TON	Researcher	's name:m.	M. S. Nyawira
No. of Crew: 3			Volume:5.0				
		Mileage	Distance		Moving	Loading	
Location		(km)		Time	time	time	Remarks (route)
		(KIII)	(m)		(min.)	<u>(min.)</u>	
	out			13:6		1	
Loading-49	in	74822		13:10	4		Ole Shapara Avenue
	out			13:11		1	
Loading-50	in	74822.1	100	13:11	0	<u></u>	Ole Shapara Avenue
	out			13:12		1	
Loading-51	in	74822.2	100	13:13	1		Ndekwa Avenue
	out			13:15		2	
Loading-52	in	74822.2	0	13:15	0		Ndekwa Avenue
	out			13:19		4	
Loading-53	in	74822.3	100	13:19	0		Ndekwa Avenue
	out			13:20		1	
Loading-54	in	74822.3	0	13:21	1		Mufulu Avenue
	out			13:21		0	
Loading-55	in	74822.4	100	13:22			Mufulu Avenue
	out			13:22		0	<u>}</u>
Loading-56	in	74822.4	0	13:23			Mufulu Avenue
	out			13:24	1	1	
Loading-57	in	74822.6	200	13:24			Mufulu Avenue
	out			13:25		1	
Loading-58	in	74822.8	200	13:25			Mufulu Avenue
	out			13:35		10	
Loading-59	in	74822.9	100	13:37			Mufulu Avenue
	out			13:37		0	
Loading-60	in	74823	100	13:38			Mufulu Avenue
	out			13:39		1	
Loading-61	in	74823.2	200	13:40			Uchumi road
	out			13:43			
Loading-62	in	74823.4	200	13:44			Uchumi road
	out			13:45		!	
Loading-63	in	74823.4	(13:45)	Uchumi road
	out			13:40		1	
Loading-64	in	74823.4	() 13 : 47			Uchumi road
	out			13:49		1	
Loading-65	in	74823.5	100) 13 : 49			Ole Shapara Avenue (South C)
	out			13 : 52			3
Dumping site	in	74840.4	16,90) 14 : 2			
Start dumping				14:3	3	5	
Finish dumping				:			
Dumping site	out	74840.9			0 2		
Reach to workshop	in	74855.7	14,60	0 15 : 3	3)	
Total			46,40		30-		1 Total min.: 415 min.
Collection			12,30	0	7:		
Transportation			33,60	0	7		D
Inside the dumping si	ite		50	0	3		Dumping time
Idling time					13	0	Mechanical problem

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Vehicle No.KAH 850S		Loading C	apacity:3.2	TON	Researcher	'e nama A	Waniohi
No. of Crew:3			Volume:7.8		NUSCALAU	s name.r.	manjon
				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Moving	Loading	·····
Location		Mileage	Distance	Time	time	time	Remarks (route)
		(m)	(m)		(min.)	(min.)	
Start from workshop	out	6494.5		8:31	· · ·		· · · · · · · · · · · · · · · · · · ·
Loading-1	in	6498.2	3,700		14		Koinange street
	out			8:48		3	· · · · · · · · · · · · · · · · · · ·
Loading-2	in	6498.7	500	8:50	2		Biashara street
	out			8:55		5	
Loading-3	in	6498.9	200	8:56	1		Nginda Lane-towiga Towers
	out			9:4		8	
Loading-4	in	6504.9	6,000	9:24	20		Bunyara road-Amazon motors
	out			9:31		7	
Loading-5	in	6506.2	1,300	9:36	5		Chogoria Road-Industrial Area
	out			9:37		1	
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			1				· · · · · · · · · · · · · · · · · · ·
	•••••	1	1				
		1	1				<u></u>
Dumping site	in	6520.2	1,400	10:10	33	<u> </u>	
Start dumping			T	10:40			
Finish dumping		6528.2	800	10:50		10	· · · · · · · · · · · · · · · · · · ·
Dumping site	out	1	1	:		1	· · · · · · · · · · · · · · · · · · ·
Reach to workshop	in			:	0		
			1	_	·		1
Total		1	13,900		105	34	Total min.: 139 min.
Collection		1	8,000		28		
Transportation		†	5,100		47		
Inside the dumping site		1	800		30		Dumping time
Idling time		-	1	t	<u>├'</u>	<u>†</u> [™]	Locupues unic
				L	l	J	1

Time & Motion Study Organization:CITY BINS Trip-1 Date:21st May 1997

Time & Motion S	tudy	Organizati	on:CITY B	INS	•	Date:21st M	•
ehicle No.KAH 8508		Loading C	apacity:3.2	9 TON	Researcher	's name:A.	Wanjohi
lo, of Crew:3		Estimated	Volume:3.9	94m ³			
			Distance		Moving	Loading	
Location		Mileage		Time	time	time	Remarks (route)
		(km)	(m)		<u>(min.)</u>	(min.)	<u> </u>
tart from workshop	out	6528.2		10:50			
.oading-1	in	6529.5	1,300	11:5	15		ken Aluminium products Inc
	out			11:20		15	Area-Miguoani Road
.oading-2	in	6530.9	1,400	11:25	5		Welding Alloys-Ind Area
	out		<u> </u>	11:33		8	-Migaoani rd.
.oading-3	in	6532.2	1,300	11:38	5		Enterprise road
	out			11:47		9	
.oading-4	in	6535.7	3,500	12:2	15		Karimbhai & Quarbanlite
	out			12:57		······	Enterprise road
Loading-5	in	6546.9	11,200	13:27			Nginda Lane-Twiga Towers
	out			14:20		53	····-
				<u> </u>			
							· · · · · · · · · · · · · · · · · · ·
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······································						1	
Dumping cito	in	6550.6	370	0 14 : 5	1 3	1	
Dumping site	10	6558.6	8.00	0 14:5	7	6	
Start dumping		- 0.000-		15:2			2
Finish dumping		6566.6		$\frac{13 \cdot 2}{10 \cdot 15 \cdot 3}$		6	
Dumping site	oul	6572.8		$\frac{15}{10}$ $\frac{15}{16}$ $\frac{15}{10}$		0	
Reach to workshop	in			<u> </u>	<u></u>		
			44,60	<u>n</u>	15	3 17	2 Total min.: 325 min.
Total				<u>~</u>	- ']		

Trip-2 Time & Motion Study Organization: CITY BINS Date:21st May 1997

1

P.

Collection

Idling time

Transportation

Inside the dumping site

5 - 561

17,400

11,200

16,000

55

86

12

140

0

32 Dumping time

Time & Motion Study Organization:CITY BINS Vehicle No. KAE 636 H

Loading Capacity:4 TON Estimated Volume:

Trip-1 Date: 22th MAY 1997 Researcher's name:M. Mapenzi

Venicie No. KAL 030	11	-	араспу:4-1	UN	Researcher	s name:m	. Mapenzi
No. of Crew: 4		Estimated	Volume:			:	
		Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
					(min.)	<u>(min.)</u>	······································
Start from workshop	out	46231.7		8:39			
Loading-1	in	46233.7	2,000		14		Masaba road
	out			8:56		3	
Loading-2	in	46233.8	100	8:56	0		Masaba road
	out			8:58		2	
Loading-3	in	46234.8	1,000	9:0	2		
	out			9:0		0	
Loading-4	in	46235.1	300	9:1	1		
¥	out			9:2		i	
Loading-5	in	46235.5	400		2		<u></u>
Southing o	out	10200.0	400	9:5		1	
Loading-6	in	46235.6	100		0	1	
exacting-0		40233.0	100	9:6	V	1	
Looding 7	out	46335.9	200			<u> </u>	
Loading-7	<u>in</u>	46235.8	200	<u>9:7</u> 9:7	<u> </u>		
	out	46026.5	002			0	
Loading-8	in	46236.1	300				
	out			9:10		1	
Loading-9	<u>in</u>	46236.5	400	9:11	1		
	out			9:11		0	
Loading-10	in	46237.8	1,300				
	out			9:19		2	
Loading-11	in	46241.8	4,000	9:26	7		Ngumogoy course
	out			9:27		1	
Loading-12	in	46242.4	600	9:29	2		
	out			9:30		1	
Loading-13	in	46242.4	10				······································
	out			9:31	`	1	
Loading-14	in	46242.5	100	9:32	1		
<u> </u>	out			9:33		1	
Loading-15	in	46242.6	100				
indung 10	out	10212.0		9:35		2	
Loading-16	in	46242.8	200			Z	
Loading-10	out	40242.0	200				
Loading-17		46242.9	100	9:38		0	
Loading-17	in	40242.9	100				Ngong road
L	out	4000		9:47		8	·····
Loading-18	in	46243.1	200			ļ	State house road
	out		.	9:48		0	· · · · · · · · · · · · · · · · · · ·
Loading-19	in	46244	900				Chiromo Estate
	out	ļ	<u> </u>	9:53		2	
Loading-20	in	46244.2	200	9:54	1		Longonot road
	out			9:59		5	
Loading-21	in	46244.6	400	10:0	1		
	out		1	10:0		0	
Loading-22	in	46244.7	100	10:0			
	out		<u> </u>	10:0		0	<u> </u>
Loading-23	in	46244.8	100	10:0		×	
550000g 20	out	102.34.0	100	10 : 1 10 : 2		•	Ngong road
Loading-24		46245.6	000			<u> </u>	L
Loaung-24	in	40243.0	800	10:3		<u>-</u>	Ngong road
L	out	I	L	10:3		0	L

	611		apacity:4 T		Researcher	5 name.14	. Mapenzi
o. of Crew: 4		Estimated		T	Moving	Loading	
Location		Mileage	Distance	Time	time	time	Remarks (route)
		(km)	(m)	-	(min.)	(min.)	
oading-25	in	46246.6	1,000	10:8	5		Woodlands road
	out			10:8		0	
oading-26	<u>iก</u>	46247	400	10:9	1		
	out			10 : 9		0	
oading-27	in	46247.4	400	10:10	1		Woodlands road
	out			10:10		0	
oading-28	in	46249.9	2,500	10:14	4		State house road
	out		1.400	10:18		4	
.oading-29	in	46251.3	1,400	10:21	3	0	State house road
	out	4(251.0		10:21	2	<u> </u>	Chiromo Estate
.oading-30	in	46251.9	000	10:23 10:28	2	5	
.oading-31	out in	46251.9	10	10:28 10:28	0		Chiromo Estate
54010g-51	Out	10631.7	t	10 : 20 10 : 32	v	4	
.oading-32	in	46252.4	500	10:32 10:33	1		Chiromo Estate
x.uumg 52	out	10232.1		10:33		0	
.oading-33	in	46252.5	100	10:34	1		Ring road Riverside
<u> </u>	out	1		10:35		1	
.oading-34	in	46253.1	600	10:37	2		Ring road Riverside
	out			10:52		15	
.oading-35	in	46253.3	200	10 : 53	1		Ring road Riverside
	out			10 : 53			
_oading-36	in	46253.5	200	0 10 : 54		·	Garden road
	out		ļ	10 : 55		l	
Loading-37	in	46253.8	300	10:55			
	out			10:59		4	
Loading-38	in	46254.5	700	$\frac{11}{11} = 0$	1		Riverside close
	out in	46254.5	10	11:1 11:2	1		Riverside close
Loading-39		40234.3	1	11:2			
Loading-40	<u>out</u> in	46254.6	10)11: 3			
Joading-40	out	402,04.0	1 104	$\frac{11}{11}$: 3)
Loading-41	in	46254.8	200)11:4			Riverside close
	out	1020 1.0	1	11:6			2
Loading-42	in	46255	200	011:6)	Riverside close
	out	1		11: 8			2
Loading-43	in	46255.7	70	011:10	2	2	Riverside close
	out	•		11:12	2		2
Loading-44	in	46255.8	10	311:13	1		
	out			11:13			0
Loading-45	in	46256.1	30	011:15			Riverside drive
	out			11:15		·'	0
	-	46256.2	1 10	011:16		l 	Riverside drive
Loading-46	in						
Loading-46	out			11 : 16			0
	out in	46257.4	1,20	011:20) 4		0 Riverside drive
Loading-46	out) 4		· · · · · · · · · · · · · · · · · · ·

Time & Motion Study	Organization:CITY BINS
Vehicle No. KAE 636 H	Loading Capacity:4 TON
No. of Crew: 4	Estimated Volume:

Trip-1 Date: 22th MAY 1997 Researcher's name:M. Mapenzi

No. of Crew: 4		Estimated	volume:	·····			
		Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
				11 02	<u>(mia.)</u>	(min.)	w.4 1 1
Loading-49		46258.3	800	11:23	2		Riverside
	out	1/0/1 7	0.400	11:27		4	
Loading-50	in	46261.7	3,400	11:34	7		Githunguri road
	out			11:35		1	· · · · · · · · · · · · · · · · · · ·
Loading-51	in	46262.1	400		<u>l</u>		
	out			11:39		3	
Loading-52	in	46262.8	700		0		
	out			11:40		1	
Loading-53	in	46263	200		0		· · · · · · · · · · · · · · · · · · ·
	out			11:41		1	
Loading-54	in	46263.2	200	11:41	0		Kileleshwa
	out			11:44		3	
Loading-55	in	46263.7	500	11:45	1		
	out			11:51		6	
Loading-56	in	46264.2	500	11:51	0		
	out			11 : 52		1	
Loading-57	in	46265	800	11 : 55	3		Gichugu Rđ
	out			11:59		4	
Loading-58	in	46265.6	600	12:1	2		
	out			12:2		1	
Loading-59	in	46265.7	100	12:3	1		
	out			12:6		3	
Loading-60	in	46267.1	1,400	12:10	4		Mandera Rd
	out			12:11		1	
Loading-61	in	46267.1	10	12:12	1		Mandera Rd
	out			12:14		2	
Loading-62	in	46268.1	1,000	12:15	1		
	out			12:18		3	
Loading-63	in	46268.7	600	12:21	3		Siaya road
	out			12:23		2	
Loading-64	in	46269.4	700	12:29	6	·	Gatundo close
	out			12:31		2	
Loading-65	in	46270.3	900	12:33	2		Vibiga road
	out			12:35		2	
Loading-66	in	46271.2	900	12:36	1		
	out			12:39		3	
Loading-67	in	46272.2	1,000	12:40		·	
	out	1	1	12:40		0	
Loading-68	in	46273.3	1,100	12:44	4		Ole Odume Rd
×	out		,,,,	12:46		2	
Loading-69	in	46274.1	800	12:49	3		Hendred Ave
	out	1	1	12:52		3	
Loading-70	in	46274.4	300	12:53	1		
	out	T	†	12:54			
Loading-71	in	46275.6	1.200	12:59			Kingara Rd
	out		1,	13:0		1	ANALGULU IN
Loading-72	in	46275.8	200	13:0			·
Louising 12	out	1.0270.0		13:2		2	
	Jui						

Time & Motion Stu Vehicle No. KAE 636 H No. of Crew: 4	Loading C	Organization:CITY BINS Trip-1 Date: 22th MAY 1997 Loading Capacity:4 TON Researcher's name:M. Mapenzi Estimated Volume:								
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)			
Dumping site	in			14 : 5	63					
Start dumping		46298.1	22,300	the second se	2					
Finish dumping				14:24		17				
Dumping site	out			14:26						
Reach to workshop	in	46312.1	14,000	15 : 50	84		· · · · · · · · · · · · · · · · · · ·			
Total			80,440		287	144	Total min.: 431 min.			
Collection			42,140		122	127				
Transportation			16,000		161					
Inside the dumping site			22,300		4	17	Dumping time			
Idling time				<u> </u>			······			

Time & Motion St	udy (Organizatio	on:CITY B	INS 📑	•		May 1997
ehicle No. KAD 554 J	1	Loading Ca	apacity:2.6	TON I	Researcher	's name:m.	M. S. Nyawira
o, of Crew: 3	1	Estimated	Volume:3.3	75m ³			
	Ī	Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
				8:44	<u>(min.)</u>	<u>(min.)</u>	
lart from workshop		74855.7	4,400	$\frac{8:44}{9:7}$	23		Dam Estate - Langata Road
oading-1		74860.1	4,400	$\frac{7}{9:7}$		0	
	out	74860.1	0	$\frac{9}{9}$; 7	0		Dam Estate - Langata Road
oading-2	in	14600.1		9:8		1	Dun Doute Dangen tong
No. 2	out in	74868.8	8,700		13	<u>_</u>	Karen off Langata road
oading-3	out	14000.0	0,700	9:25		4	
oading-4	in	74873.9	5,100		7		Karen
oaumg-4	out	14013.7		9:32		0	
oading-5	in	74878.9	5,000		9		Karen Ngong View Rise
wooding-9	out		<u> </u>	9:42		1	<u>_</u>
.oading-6	in	74889	10,100		14	[Karen Resurrection Gardens
ANDING V	out		1	10 : 4		8	
.oading-7	in	74896.6	7.600	10 16	12		Karen Nandi Road
	out		<u> </u>	10 : 19		1	}
.oading-8	in	74904.6	8,000	10:29	10		Ngong road
	out			10:34			5
.oading-9	in	74905.4	800	10:37	3		Naivasha road
0	out	· · · · · · · · · · · · · · · · · · ·	1	10:40			3
Loading-10	in	74906	600	0 10 : 51	11		Riara road off Naivasha Rd
	out			10:52			1
Loading-11	in	74906.3	300) 10 : 53			Riara road off Naivasha Rd
	out			10:53			0
Loading-12	in	74908.2	1,900	0 10 : 59	6		Gitanga Road
	out			11 : 1		'	2
Loading-13	in	74908.2	(0 11 : 2			Gitanga road
	out		ި	11:5			3
Loading-14	іл	74908.3	10	011:7		2	Laxmi Estate Gitanga Rd
	out			11:8		<u>_</u>	1
Loading-15	in	74908.3		011:10		2	Gitanga Hill court
	out			11:10			0
Loading-16	in	74908.3		011:1		<u> </u>	Gitanga Hill court
	out			11:1:			2
Loading-17	in	74908.4	10	0 11 : 14		<u> </u>	Gitanga road
	out			$11:1^{\circ}$			0
Loading-18	in	74908.8	40	0 11 : 1		4	Gitanga road
	out		_ 	11:1		- , 	Gitanga road
Loading-19	in	74908.9	<u>10</u>	011:1		<u>-</u>	Gitanga road
	oul			11:1		<u>_</u>	Jacaranda Avenue
Loading-20	in	74909.1	2	0 11 : 1		2	0
	out			11:1			Jacaranda Avenue
Loading-21	in	74909.2	N	011:2		4	
	out			11:2		0	Jacaranda Avenue
Loading-22	in	74909.7	<u> </u>	011:2			1
	out			11:2			Kollolh Road
Loading-23	in	74910.4		$\frac{0011:2}{11:2}$			1
	out			11:2			Iames Gichum road
Loading-24						-+	
Loading-24	in out	74910.7	30	00 11 : 2 11 : 2	5	1	James Gichuru road 0

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Vehicle No. KAD 554 J

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Time & Motion Study Organization:CITY BINS Loading Capacity:2.6 TON Estimated Volume:3 375m³

Trip-1 Date:22nd May 1997 Researcher's name:m. M. S. Nyawira

No. of Crew: 3	J	Estimated	Volume:3.3	575m			
		Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
					(min.)	<u>(min.)</u>	James Gichuru road
Loading-25		74911.2		11:26		3	
	out	24021.2	500	11:29		3	Lavington Owashika road
Loading-26		74911.7	500	11 : 30	1	0	
	out	74010.0	600	11:30	1		Lavington Convent Drive
Loading-27		74912.3	600	11:31			Lavington Convent Drive
	out	710100	(00	11:33		2	Lavington Chalbi Drive
Loading-28		74912.9	600	11:35	2		Lavingion Charles Dive
·	out	7/011	1 100	11:39		4	Lavington Njumbi road
Loading-29	in	74914	1,100	11:41	2		Lavington Njumoi roau
	out			11:44			t Niverbi good
Loading-30	in	74914.5	500	11:45	1		Lavington Njumbi road
	out		100	11:45			
Loading-31	in	74914.6	100	11:45	0		Lavington Njumbi road
	out			11:46			I
Loading-32	in	74914.9	300	11:48			Lavington Njumbi road
	out			11:48		····· ·)
Loading-33	in	74915.1	200	11:49		ļ	Isaac Gathanju Road
	out			11 : 50		<u> </u>	l L Outrain Dead
Loading-34	in	74915.5	400) 11 : 51			Isaac Gathanju Road
	out			11:51			
Loading-35	in	74916.7	1,200) 11 : 53		<u>'</u>	Isaac Gathanju Road
	out	ļ		11:54			1
Loading-36	in	74918.9	2,200) 12 : 0			Apple cross Rd
	out	ļ		12 : 3		<u> </u>	3
Loading-37	in	74919.5	600) 12 : 4		ų	Muhaya road (Avenue)
	out			12 : 5			1
Loading-38	in	74920	50	012: 6	<u>'</u>	<u> </u>	Ole nguruone Road
	out			12 : 7	<u> </u>		
Loading-39	in	74921	1,00	012: 9		2	Mageta road
	out			12:10			
Loading-40	in	74921.7	70	0 12 : 1		<u>i </u>	Mageta road
	out			12:1			0
Loading-41	in	74922	30	0 12 : 12		<u>1</u>	Mageta road
	out			12:12			0
Loading-42	in	74922		012:1		3	Mageta road
	out			12:1		<u>_</u>	0
Loading-43	in	74923.9	1,90	012:1		2	Kaputei Gardens
	out			12:1			4
Loading-44	in	74926.3	2,40	012:2		5	Elgeyo Marakwet road
	out		_ _	12:2			0 Marakwet road
Loading-45	in	74926.4	10	012:2		<u> </u>	Kilimani Elegeyo
	out			12:2		<u>.</u>	
Loading-46	in	74927	60	012:2		<u>1</u>	Kilimani
	out			12:2			1
Loading-47	่เก	74927.4	40	012:2		2	Kilimani
	out			12:3			2
Loading-48	in	74927.6	20	0 12 : 3		0	Kilimani
	out		1	12:3	21	3	2

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Time & Motion Study Organization:CITY BINS Vehicle No. KAD 554 J No. of Crew: 3

Loading Capacity:2.6 TON Estimated Volume: 3.375m³

Trip-1 Date:22nd May 1997 Researcher's name:m. M. S. Nyawira

No. of Crew: 3		Estimated	Volume:3.	375m ³	· · · · · · · · · · · · · · · · · · ·		
		Mileage	Distance		Moving	Loading	
Location		-		Time	time	time	Remarks (route)
		(km)	(m)		(min.)	(min.)	
Loading-49	in	74928.9	1,300	12:38	5		Kirichwa Gardens
	out			12:39		1	
Loading-50	in	74929.8	900	12:41	2		Kilimani
	out		·····	12:41		0	
Loading-51	in	74930.1	300	12:44	3		Kilimani
	out			12:45		1	
Loading-52	in	74930.1	0	12.45	0		Kilimani
	out			12:49		4	
Loading-53	in	74930.2	100	12:51	2		Kilimani
Loading-55	out	14750.2	100	12:51		0	
Loading-54	in	74930.4	200	12:51 12:56	5		Kilimani Kindaruma Rd
Loading-34		74730.4	200		ر ب	<u>_</u>	Kininani Kingaruma Ku
	out	74020 6	100	12:57		1	
Loading-55	in	74930.5	100	12:59	2		Kilimani Kindaruma Rd
	out			12:59		0	
Loading-56	in	74930.6	100	13:0	1		Kilimani Kindaruma Rd
	out			13 : 0		0	
Loading-57	in	74930.7	100	13 : 3	3		Kilimani Kindaruma Rd
	out			13:5		2	
Loading-58	in	74931	300	13:6	1		Kindaruma Road
	out			13:7		1	
Loading-59	in	74931.1	100	13:8	1		Kindaruma Road
······································	out			13:8		0	
Loading-60	in	74931.2	100	13:10	• 2		Wood Avenue
	out		1	13:10		0	
Loading-61	in	74931.7	500	13:11	1	`	Chania Avenue
Louding of	out			13 : 12		1	
Loading-62	in	74931.7		13 : 13	1	·	Chania Avenue
inducing of	out	1.0000	<u>├</u>	13 : 13 13 : 13		0	
Loading-63	in	74932	300	13 : 15 13 : 15	2		Chania Avenue
Loaung-05		14332		13:13	2	4	+
Loading-64	out in	74932.4	400	13:19		4	1
Loading-04		14932.4	400		3		Chania Avenue
	<u> </u>	2/022.0		13:22		0	
Loading-65	in	74932.9	500	13:25	3		Komo Lane
	out			13:27		2	
Loading-66	in	74933.5	600	13:29	2		Wood Avenue
	out	<u> </u>	ļ <u> </u>	13:30		1	
Loading-67	in	74933.7	200	13:31	1		Argwings Khodek road
	out			13:34		3	
Loading-68	in	74934.4	700	13:39	5		Kilimani spanish Villas
	out			13:40		1	
Loading-69	in	74934.8	400	13:42			Lenana road
<u> </u>	out	1	1	13:44		2	
Loading-70	in	74935.4	600	13:48		<u>-</u>	Likoni Lane
	out	1	†	13:50		2	
Loading-71	in	74936.4	1.000	13:50 13:51		<u>_</u>	Chaka road
			+;,vv	13:54	[/]		
Looding 72	out	24026 4	+			3	
Loading-72	in	74936.4	<u></u>	13:54			Chaka road (Hirlingham)
	out		l	13 : 58	ļ	4	
		<u> </u>	<u> </u>	L	L		

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Time & Motion Study Organization:CITY BINS Vehicle No. KAD 554 J

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Loading Capacity:2.6 TON Estimated Volume:3.375m³

Trip- 1 Date:22nd May 1997 Researcher's name:m. M. S. Nyawira

No. of Crew: 3		Estimated	Volume:3.	875m ³			
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Dumping site	in	74953.6	17,200	14:43	45		DANDORA
Start dumping				14:49	6		
Finish dumping				15:8		19	
Dumping site	out	74954.5	900	15:10	2		
Reach to workshop	in	74969.2	14,700	15:48	38		
Total			113,500		306	118	Total min.: 424 min.
Collection			76,300		192	99	
Transportation			36,300		106	0	
Inside the dumping site			900		8	19	Dumping time
Idling time							[

Time & Motion Study	Organization:CITY BINS	Trip- 1	Date:22nd May 1997
Vehicle No.KAH 850S	Loading Capacity: 3.29 TON	Research	er's name: A. Wanjohi
No. of Crew 3	Estimated Volume 7 875m ³		

No. of Crew:3		Estimated	Volume:7.8	375m ³			
		Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
Charles Construction Incharge				0 . 44	<u>(min.)</u>	<u>(min)</u>	
Start from workshop	out	6572.8	0	8:44			
Loading-1	in	6579	6,200		22		Argwings Khodek - Hurlingham
	out	6570.2	200	9:10 9:12	2	4	
Loading-2	in	6579.3	300	9:12	Z		Argwings Khodek -Hurlingham
Landing 2	out	6579.5	200		3	6	A
Loading-3	in	0379.5	200	9:21		3	Argwings Khodek -Hurlingham
Loading-4	out in	6580.1	600		4	3	Jabavu court-Huringham
Loadnig-4		0300.1	000	9:20		1	Jabavu court-Huringham
Loading-5	<u>out</u> in	6580.5	400		2		Jabavu road
Loading-5	out	0300.3	400	9:31		1	Jabava Toau
Loading-6	in	6580.7	200		1	<u>.</u>	Mtito Andei road-Hurlingham
Loading-0	out	0000.7	200	9:39		6	
Loading-7	in	6580.9	200		1		Mtito Andei road-Hurlingham
150aunig-7	out	0500.5		9:40		1	Mino Anoci Toso Mornisguan
Loading-8	in	6581.1	200		1	· · *	Cathy Flats-Kims Court
Louding 0	out	0001.1	200	9:43		1	Cauly Hats Kins Court
Loading-9	in	6581.4	300		1		Theta Lane-Hurlingham
Ecology 5	out	0.01.1	500	9:47	*	3	
Loading-10	in	6581.7	300		1		Makuyu Lane-Hurlingham
	out			9:49		1	
Loading-11	in	6582.2	500		3	<u>_</u>	Lenana road-Lenana Chambers
	out			9:53		1	
Loading-12	้เก	6582.3	100		0		Lenana road-Lenana Chambers
X	out			9:55		2	
Loading-13	in	6582.7	400		2		Kasuku road-Hurlingham
	out			9:58]	
Loading-14	in	6582.8	100		1		Jabavu Villas-Hurlingham
	out			10:0		1	······································
Loading-15	in	6583.3	500	10:3	3		Apartments-Hurlingham
	out			10:6		3	
Loading-16	in	6583.4	100	10:6	0		Apartments-Hurlingham
	out			10:12		6	
Loading-17	in	6583.4	0	10:13	1		Deep Apartments-Hurlingham
	out			10:16		3	
Loading-18	in	6583.6	200	10:18			Apartments-Hurlingham
	out			10:19	-	1	
Loading-19	in	6583.8	200	10:20	1		Marcus-Garvey Road
	out			10:21		1	
Loading-20	in	6584.2	400	10:23			Marcus-Garvey Road
	out	ļ	ļ	10:24		1	
Loading-21	in	6584.5	300	10:26			Afya Masonettes
	out	ļ		10:34		8	-Kamburu Drive
Loading-22	in	6584.7	200	10:35		L	Afya Masonettes
	out		· ·	10:35		0	-Kamburu Drive
Loading-23	in	6584.9	200	10:36			Afya Masonettes
	out	<u> </u>	ļ	10:37		1	-Kamburu Drive
Loading-24	in	6585.3	400	10:39			Kindaruma Lane
L	out			10:41	Į	2	

No. of Crew:3		Loading C Estimated	Volume:7.	875m ³			
Location		Mileage (km)	Distance (m)	Time	Moving time	Loading time	Remarks (route)
Loading-25	in	6585.3	0	10:42	<u>(min.)</u>	<u>(min.)</u>	Kindaruma Lane
	out	0000,0	· · · · ·	10:42 10:46	1	4	Nikoarustia Lane
Loading-26	in	6585.7	400	10 : 48	2	·	
	out	000001	100	10:49	L	1	
Loading-27	in	6585.9	200	10:50	1		
	out	<u> </u>		10:51	·····		
Loading-28	in	6586.4	500	10:55	4	· <u>- · · · · · ·</u>	Melton Court-Holy Cross Brothers
	out		<u> </u>	10:57		2	Prenou court froij citoss broincis
Loading-29	in	6586.7	300	10:58	1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Kindaruma Road
	out			11:2		4	
Loading-30	in	6587.5	800	11:5	3		Ngong Lane
	out			11:9		4	
Loading-31	in	6587.8	300	11:12	3		···· · · · · · · · · · · · · · · · · ·
	out			11:13		1	
Loading-32	in	6587.9	100	11:14	ł		Ngong road
······	out			11:17		3	
Loading-33	<u>in</u>	6588	100	11:19	2		Ngong road
	out			11:20		1	
Loading-34	in	6588.5	500	11:21	1		Ngong road
	out			11:23		2	
Loading-35	in	6588.8	300	<u>11 : 24</u>	1		Ngong road
	out	· · · · ·		11 : 27		3	
Loading-36	in	6589.5	700	11:29	2		OLE
	out			11:31		2	
Loading-37	in	6589.6	100	11:32	1		Sato Flats-Ngong road
L l' 20	out	6600.0		11:34		2	
Loading-38	in	6589.8	200	11:35	1		
Loodina 20	out	(600.0	100	11:35		0	
Loading-39	in	6589.9	100	11:36	1		Masai Court-Ngong Rd
Loading-40	out	6589.9		11:37		1	
Loaumg-40	in	0389.9	0	11:37	0		Masai Court-Ngong Rd
Loading-41	out in	6590	100	11:38 11:38	0	l	M 10 M PA
Loading-41	out	0.570	100	11:38	0		Masai Court-Ngong Rd
Loading-42	in	6590.2	200	$\frac{11}{11}$: 49		10	Riara Lanc
Dodding 12	out	0370.2	200	$\frac{11}{11}:51$	1	2	Kiara Lanc
Loading-43	in	6590.3	100	11 . 52	1	Z	Riara Lane
	out		100	$\frac{11}{11}:52$		1	ivara Lant
Loading-44	in	6591.1	800	$\frac{11}{11}:54$	1	<u>I</u>	Riara Villas-Ngong road
	out		000	11:58			istara i mas-ingung (030
Loading-45	in	6591.2	100	11:59	1		Riara Villas-Ngong road
<u> </u>	out			12 : 1	1	2	ixiana i ninas titgong toau
Loading-46	in	6591.4	200	12:6	5	2	Embassy of Egypt
	out			12:7		1	Schoused of DElly
Loading-47	in	6591.8	400	12:8		1	Bamboo Lane
	out			12:8		0	
Loading-48	in	6594	2,200	12:13	5	<u> </u>	Woodley - Joseph
	out			12:14		1	Kongethe Rd
Loading-49	in	6594.1	100	12:15			Woodley - Joseph

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No. of Crew:3		Estimated	Volume:7.	875m ³		::	·
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (oun.)	Remarks (route)
	out			12:17		2	Kongethe Rd
Loading-50	in	6594.4	300	12:18	1		Woodley - Joseph
	out			12:21		3	Kongethe Rd
Loading-51	in	6595.7	1,300	12:25	4		Woodley - Joseph
	out			12:27		2	Kongethe Rd
Loading-52	in	6597.2	1,500	12:31	4		Friends in the West
	out			12:35		4	
Loading-53	in	6599.4	2,200	12:45	10		Hurlingham-Argwings
	out			12:45		0	Khodek road
Dumping site	in	6610.3		13:20	35		
Start dumping		6618.3	8,000	13:26	6		
Finish dumping				13:45		19	
Dumping site	out	6625.3	and the second se	13:51	6		
Reach to workshop	in	6632.5	6,200	14 : 20	29		
Total			59,700		195	141	Total min.: 336 min.
Collection			26,600		119	122	
Transportation			17,100		64		
Inside the dumping site			16,000		12	19	Dumping time
Idling time							

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Time & Motion S /ehicle No. KAE 636 1	*	Organizati Loading C	apacity:4 T		Researcher	's name:M	. Mapenzi
to. of Crew: 4		Estimated		~			
			Distance		Moving	Loading	
Location	5	Mileage ¹ (km)	(m)	Time	time	time	Remarks (route)
			()	8:24	<u>(min.)</u>	(min.)	
Start from workshop	out in	46312.1 46317.4	5,300		10		1st Ave Eastleigh
Loading-1	Out	40317.4	0,000	8:39		5	
Loading-2	in	46318.3	900		0		Seventh St. Eastleigh
	out			8:46		7	l
Loading-3	in	46320.8	2,500	8:51	5		Kariokor
	out		[8:54		3	
Loading-4	in	46321	200		1		
	out			8:55		0	
Loading-5	in	46322.6	1,600		4	5	Kariokor
	out	4(222.9	200	9:4 9:5	1	J	Park road
Loading-6	in	46322.8	200	9:9			
Loading-7	out in	46323.9	100		2		Nyambene Drive
Loading-7	out	40343.5		9:12		1	
Loading-8	in	46324.7	800	9:16	4		Garissa Road
induning e	out			9:18		1	
Loading-9	in	46325.1	400]		Mgweni Rd
	out			9:19)
Loading-10	in	46325.1	10		1		Mgweni Rd
	out			9:21		ļ	Manuari D2
Loading-11	in	46325.2	100) <u>9:21</u> 9:21			Mgweni Rd
	out	46325.3	100	9:21) 9:22			J
Loading-12	in	40323.3	1	9:22			0
Loading-13	in	46325.8	500				Juja road
Loading 15	out	1		9:27			2
Loading-14	in	46325.9	10	9:28			
	out			9:28			0
Loading-15	in	46326.1	20	010:17			North view Rd
	out			10:19			2
Loading-16	in	46327.1	1,00	010:19	<u>+</u>)	
	out	16227 4	- 20	10:20 010:20		D	Norht view road
Loading-17	in out	46327.4		10:2			1
Loading-18	in	46327.5	10	010:22		1	(Muranga road)
	out	1	1	10:24			2
Loading-19	in	46327.9	40	010:20		2	
<u> </u>	out			10:3			5
Loading-20	in	46328.6	70	0 10 : 50		9	Fairview Rd
	out			10:52			2 No
Loading-21	in	46328.9	30	0 10 : <u>5</u>		0	Mbono Rd
	out			10:5		1	0 Chai Rd
Loading-22	in	46329.1	2	0 10 : 5		4	3
1	out	46329.2		$10 \div 50$ $010 \div 50$		0	Chai Rd
Loading-23	in			11:		Ť	5
Loading-24	out	46330.7)0 11 :		3	<u></u>

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Time & Motion Study	Organization: CITY BINS
Vehicle No. KAE 636 H	Loading Capacity:4 TON
No. of Crew: 4	Estimated Volume:

Trip-1 Date:23rd MAY 1997 Researcher's name:M. Mapenzi

No. of Crew: 4		Estimated	Volume:			· · · · · · · · · · · · · · · · · · ·	
		Mileage	Distance		Moving	Loading	
Location	-	(km)	(m)	Time	time	time	Remarks (route)
	• • •				(min.)	(min.)	
Loading-25	in	46330.8	100	11:6	1		
	out			11:6		0	Muranga Rd
Loading-26	in	46330.8	10	11:6	0		· · · · · · · · · · · · · · · · · · ·
	out			11 : 9		3	Muranga Rd
Loading-27	in	46330.8	10	11:9	0		
	out			11:10		1	
Loading-28	in	46330.9	100	11:10	0		
	out			11:12		2	
Loading-29	in	46331.1	200	11 : 14	2		
	out			11:14		0	
Loading-30	in	46331.2	100	11:15]		Okoth Aura Rd
	out			11:15		0	
Loading-31	in	46331.3	100	11:15	0		Okoth Aura Rd
	out	1	1	11 : 17		2	
Loading-32	in	46332.3	1.000	11:21	4		Forest road
	out		<u> </u>	11:25		4	
Loading-33	in	46332.8	500	11:28	3		Forest road
<u>e</u>	out	1000-10		11:30	······	2	
Loading-34	in	46333.5	700	11:33	3		Desai Rd
Boulding to t	out	10000.0	1	11:33	ŭ	0	
Loading-35	in	46333.6	100	11:34	1		Desai Rd
Ecologing 55	out	10000.0	100	11:34 11:35	•	1	Besar Ko
Loading-36	in	46334.2	600		1		Muranga Rd
Loading-50	out	40334.2		11 : 30 11 : 43			Muranga Ku
Loading-37	in	46334.7	500	11:45	2	· · · · · · · · · · · · · · · · · · ·	Kolobot Rd
Loading-57	·······	40354.7	500	11 : 45	4	1	Kolobol Ku
Looding 20	<u>out</u>	46224.0	200	11:40 11:47		¹	
Loading-38	in	46334.9	200		1		Mushembi Rd
Landing 20	out	46225.4	500	11:48		I	N
Loading-39	in	46335.4	500	11:48	0		Ngara road
1	out		-	11 : 52		4	
Loading-40	in	46335.7	300	11 : 53	1		Ngara road
	out			11 : 55		2	
Loading-41	in	46336.1	400	11 : 58			
	out			11:58		<u> </u>	Kipkabus Rd
Loading-42	in	46336.5	400	11:59	1	· · · · · ·	
	out			11:59			Kipkabus Rd
Loading-43	in	46336.9	400	12:2		-	
	out			12:4		2	
Loading-44	in	46337.1	200	12:4			Munai Rd
	out			12:5		1	
Loading-45	in	46337.2	100	12:5			Munai Rd
	out			12:7		2	2
Loading-46	in	46337.4	200) 12 : 7	0		Kolobot Rd
	out			12:8			
Loading-47	іл	46337.5	100) 12 : 9			Kolobot Rd
	out	1	1	12:9		(
Loading-48	in	46337.6	100)12:10		†`	Forest road
	out	1.000110	1	12:10 12:11	<u>├</u> [*]	†	l olesi load

Jehicle No. KAE 636	11	Loading C	арасну:4 і	UN	itestatenet	a name.wi	. Mapenzi
lo. of Crew: 4		Estimated	Volume:				
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Leading time (min.)	Remarks (route)
.oading-49	in	46338.1	500	12:14	3	(unsuly	Parklands Rd
outing is	out	10000		12:14		0	
.oading-50	in	46338.5	400	12:15	1		Parklands Rd
	out			12:19		4	
.oading-51	in	46338.6	100	12:19	0		Parklands Rd
	out			12:20		1	
.oading-52	in	46338.9	300	12:21	1		Wambugu road
	out		<u> </u>	12:22		1	
.oading-53	in	46338.9	10	12:22	0		Wambugu road
-	out		<u> </u>	12:22		0	
.oading-54	in	46339.1	200	12:23	1		Wambugu road
	out	1.0000		12:23		0	
Loading-55	in	46339.2	100	12:24	 		Wambugu road
	out	46020 5	200	12:24	·	ļ	Wambugu road
Loading-56	in	46339.5		12:25 12:30	1		
(1 ['] 57	out	16220 6	+	12:30 12:30			Wambugu road
Loading-57	<u>in</u>	46339.6		12:30 12:30		(
Loading 58	<u>out</u> in	46339.7	100	12:30) 12:31		<u>├`</u>	Wambugu road
Loading-58	out	40337.1	+	12:31 12:32		 	
Loading-59	in	46339.8	100	$\frac{12}{12}:32$		¦	Wambugu road
1.0a010g-39	out		+	12:32			
Loading-60	in	46339.9	100	$\frac{12}{12}:34$			Wambugu road
Louoing ou	out	100000	1	12:34			
Loading-61	in	46340.4	50	0 12 : 36			Wambugu road
	out		1	12:38			2
Loading-62	in	46340.6	20	0 12 : 40			Wambugu road
	out			12:40))
Loading-63	in	46340.9	30	0 12 : 41			First Parkland Ave
	out			12:42			1
Loading-64	in	46341	10	0 12 : 43		<u> </u>	First Parkland Ave
	out			12:43			
Loading-65	in	46341.1	10	0 12 : 44		l 	First Parklands Avenue
	out			12:44			
Loading-66	in	46341.4		0 12 : 40		2	First Parklands Avenue
	out	-		12:5		<u>.</u>	5
Loading-67	in	46341.4		012:5		1	3 First Parklands Avenue
	out	100110		12:5		2	ITA Road
Loading-68	in	46341.9		0 12:5 12:5			0
	out	46341.9		12:5		1	ITA Road
Loading-69	in			13 : (<u>+</u>	2
Lording 70	out in	46342.1	20	013:		0	ITA Road
Loading-70	in		-+ ²⁰	13 :			0
Loading-71	in	46342.2	10)0 13 :		1	II Parkland Ave
Loading-71	out		-	13 :		-	1
Loading-72	in	46342.4	20	0 13 :		0	II Parkland Ave
Loaung-12	out	· · · · · · · · · · · · · · · · · · ·		13 :		t	2

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Time & Motion StudyOrganization:CITY BINSVehicle No. KAE 636 11Loading Capacity:4 TONNo. of Crew: 4Bstimated Volume:

Trip-1 Date:23rd MAY 1997 Researcher's name:M. Mapenzi

No. of Crew: 4		Estimated	Volume:				
		Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
				10	<u>(min.)</u>	(min.)	U.S. 11 14
Loading-73	in	46342.5	100	13 : 5	l		II Parkland Ave
	out			13:5		0	
Loading-74	in	46342.7	200	13:6	1		II Parkland Ave
	out			13:8		2	
Loading-75	in	46342.8	100	13:9	<u> </u>		II Parkland Ave
	out			13:9		0	
Loading-76	in	46342.9	100	13:10	<u>l</u>		II Parkland Ave
	out			13:11]	Masari road
Loading-77	in	46343.1	200	13:12	<u>l</u>	· · · · · · · · · · · · · · · · · · ·	·
	out			13:17		5	
Loading-78	in	46343.3	200	13:18	1		Ave Parklands
	out			13:19		1	
Loading-79	in	46343.4	100	13:20	1		
	out			13 : 22		2	
Loading-80	in	46343.4	10	13:23	1		
	out			13:23		0	
Loading-81	in	46343.5	100	13:24	1		2nd Ave. Parklands
	out			13:25		1	
Loading-82	in	46343.5	10	13:26	1		Msanaka rd
	out	L	ļ	13:28		2	
Loading-83	in	46344	500	13:30	2		Msanaka rd
	out			13:33		3	2nd Ave. Parklands
Loading-84	in	46344	10	13:33	0		
<u></u>	out	ļ	L	13:35	·	2	
Loading-85	in	46344.6	600	13:38	3		
	out			13:41		3	
Loading-86	in	46344.9	300	13:43	2		
	out		L	13:49		6	
Loading-87	in	46345.3	400	13 : 51	2		Moi Forces lane
	out	ļ		13:51		0	· · · · · · · · · · · · · · · · · · ·
Loading-88	in	46345.4	100	13:53	2		
	out			13:54		1	
Loading-89	in	46345.6	200	13:55	1		
	out			13:56		1	
Loading-90	in	46346.5	900	13 : 59			
	out			14 : 2		3	5
Loading-91	in	46346.9	400	14:9			
	out	<u> </u>		14 : 10	·	ļ!	Bhanderi rd.
Loading-92	in	46347.2	300	14 : 11		ļ	
	out	1	<u> </u>	14:11			
Loading-93	in	46347.2	10) 14 : 13			Bhanderi rd.
	out		_	14:14		1	
Loading-94	in	46347.3	100) 14 : 14			Bhanderi rd.
	out			14 : 17			3
Loading-95	in	46347.5	200	0 14 : 17			
	out			14 : 19			2
Loading-96	in	46348	50() 14 : 21			1st Ave, Parklands
	out			14:24			3

/ehicle No. KAE 636 11		Loading C	apacity:4 T	ON	Researcher	'e name M	Manenzi
Vehicle No. NAC 030 11		Estimated		UN	Noscalenti	s name.m	марска
10. 01 Crew; 4					Moving	Loading	
Location		Mileage	Distance	Time	time	time	Remarks (route)
Excution		(km)	(m)		(min.)	(min.)	,
.oading-97	in	46348.1	100	14:24	0		1st Ave. Parklands
	out			14:25		1	
.oading-98	in	46348.3	200	14:25	0		1st Ave. Parklands
<u> </u>	out			14:27		2	
.oading-99	in	46348.5	200	14:28	1		Bato Bato rd.
	out			14:29		1	
.oading-100	in	46349.1	600	14:31	2		2nd Ave. Parklands
	out			14:33		2	
.oading-101	in	46350.1	1,100	14:36	3		City Park
	out	<u> </u>	1	14:38		2	
.oading-102	in	46350.4	300	14:40	2		
	out	1		14:40		0	
Loading-103	in	46351.1	700	14:44	4		City Park shopping centre
	out			14:45		1	
Loading-104	in	46351.2	100	14:49	• · · · · · · · · · · · · · · · · · · ·		City Park shopping centre
	out	1		14:51		2	
Loading-105	in	46351.5	300	14:52	1		City Park shopping centre
	out			14:54		2	
Loading-106	in	46351.6	100	14:55	1		City Park shopping centre
<u> </u>	out			14:56		1	
Loading-107	in	46352.5	900	14:58	2		Limurur rd.
	out	1	1	15:0	1	2	
Loading-108	in	46353.6	1,100	15 : 2	2		Mwambao rd.
	out			15 : 5	1	3	
Loading-109	in	46354	400	15 : 8	3		6th Ave Parklands
V	out			15:9		1	
Loading-110	in	46354.2	200	15:11	2		6th Ave Parklands
V	out	1	1	15 : 12	!	1	
Loading-111	in	46354.9	700	15 : 15	3		6th Ave Parklands
	out			15 : 17		2	
Loading-112	in	46355	100	15:18	1		6th Ave Parklands
	out	-		15:19		1	
Loading-113	in	46355.2	200) 15 : 19			
··	out		1	15:19		0	
Loading-114	in	46355.4	200) 15 : 20) 1		
				T			
Dumping site	in	46367.4	12,000) 15 : 44	1 24		
Start dumping		—		:			
Finish dumping		46369.4	2,000) :			
Dumping site	out	1		16 : :			
Reach to workshop	in	46383.5	14,100) 16 : 30) 25		
Total		1	70,610)	301	185	Total min.: 486 min.
Collection			37,210		22	18.	
Transportation		+	31,400		59)
Inside the dumping site	2	<u>†</u>	2,000		2		Dumping time
Idling time		1		1		1	

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Time & Motion StudyOrganization:CITY BINSVehicle No. KAD 551 JLoading Capacity:2.6 TONNo. of Crew: 3Estimated Volume:6.75m³

Trip-1 Date:23rd May 1997 Researcher's name: M. S. Nyawira

venicie no. MD 551	J	Loading C	apacny:z.o	IUN	Researcher	's name: N	i. S. Nyawira
No. of Crew: 3		Estimated	Volume:6.	75m³ 👘		· .	
		Miloaga	Distance	· · · ·	Moving	Loading	
Location		Mileage		Time	time	time	Remarks (route)
		(km)	(m)		(min.)	(min.)	
Start from workshop	out	74969.2		8:36			From 8:36-9:41 Mechanical problem
Loading-1	in	74990.5	21,300	10:16	100		Karen K.C.B Banking & finance
	out			13:52		216	Institution
Loading-2	in	75009	18,500	14:55	63		Aga Khan Estate off Waiyaki way
	out			14:56		1	· · · · · · · · · · · · · · · · · · ·
Loading-3	in	75013.6	4,600	15:3	7		Waiyaki way
	out			15 : 6		3	
Loading-4	in	75016.5	2,900	15:11	5		Mountain view off Waiyaki way
	out		İ	15:15		- 4	
Loading-5	in	75016.8	300	15:15	0		Mountain view off Waiyaki way
	out			15:16		1	
Loading-6	in	75016.9	100	15 : 17			Mountain view off Waiyaki way
<u> </u>	out			15:20		3	
Loading-7	in	75017	100	15:20	1		Mountain view off Waiyaki way
Louising ,	out	13017		15 : 21 15 : 25	· - · · · · · · · · · · · · · · · · · ·	4	
Loading-8	in	75017	1 0	15:26 15:26			Mountain view off Waiyaki way
Loading-0	out	13017		15 : 20 15 : 26		0	
Loading-9	in	75017.6	600	15:20		V	
Loading-9		13017.0		15:29			Mountain view off Waiyaki way
Looding 10	out	75017.7	100	15:30		1	<u>_</u>
Loading-10	in	13011.1	100	15:30 15:31			Mountain view off Waiyaki way
Looding 11	out	75019.2				1	
Loading-11	in	75018.3		15:33			Mountain view off Waiyaki way
[X 10	out	76010 6		15:34			
Loading-12	in	75018.5	200	15:35			Mountain view off Waiyaki way
	out	175010 0		15:37		2	
Loading-13	in	75018.7	200	15:38			Mountain view off Waiyaki way
	out	-	1	15:38		0	
Loading-14	in	75018.8	100	15:39			Mountain view off Waiyaki way
	out			15:41		2	
Loading-15	in	75023.1	4,300	15:51			Loresho Shinyalu Road
	out			15:54		3	
Loading-16	in	75023.5	400	15:55	<u> </u>		Loresho Shinyalu Close
	out			15:59		4	
Loading-17	in	75024.1	600	16:0			Loresho road-Thego road
	out			16:0		0	
Loading-18	in	75024.6	500	16:0	0		Loresho Kaptagot Grove
	out			16:1		1	
Loading-19	in	75025.5	900	16:3			Loresho Kaumoni Lane
	out			16:3		C	
Loading-20	in	75026.7	1,200	16:6	3		Loresho Mweiga Rd
	out			16:6		0	
Loading-21	in	75028.7	2,000	16:9	3		Loresho kyuna Rd
	out	1	T	16:10			
Loading-22	in	75029.5	800	0 16 : 11			Loresho Mugumo Crescent
⊢ ⊻	out	1	+	16:11		0	
Loading-23	in	75030.5	1 1.000	16:14			Loresho Kyuna Lane
······································	out		1	16:19		i	
h		<u> </u>	<u> </u>	10.10	1	L.,	·I

Time & Motion S	•	+			Trip- 1		•	
ehicle No. KAD 554		Loading C			Researcher's name: M. S. Nyawira			
No. of Crew: 3		Estimated	Volume:6.	75m ³				
Location		Mileage	Distance	Time	Moving time	Loading time	Remarks (route)	
Execution		(km)	(m)		(min.)	(min.)		
.oading-24	in	75032.5	2,000	16:20	5		Loresho Gituamba Lane	
· · · · · · · · · · · · · · · · · · ·	out			16:21		1		
.oading-25	in	75032.8	300	16:23	2		Westlands - Grevillia Groove	
	out			16:23		0		
Loading-26	in	75033.5	700	16:25	2		Westlands - Grevillia Groove	
	out			16:26		1		
Loading-27	in	75033.8	300	16:27	1		Westlands - Grevillia Groove	
	out			16:28		1		
Loading-28	in	75034	200	16:30	2		Westlands - Grevillia Groove	
	out			16:31		1		
Loading-29	in	75034.3	300	16:34	3		Westlands - Grevillia Groove	
	out			16:34		0		
Loading-30	in	75034.4	100	16:35			Westlands - Grevillia Groove	
	out			16:35		0		
Loading-31	in	75034.6	200	16:36			Westlands - Grevillia Groove	
	out			16:37		1		
Loading-32	in	75035	400) 16 : 39			Westlands -Grevillia Groov	
	out			16:39		(
Loading-33	in	75035.4	400	0 16 : 40			Westlands off Muguga Garden	
	out			16:41		1		
Loading-34	in	75035.8	400) 16 : 43	the second second second second second second second second second second second second second second second s	·	Westlands off Muguga Garden	
	out			16:44			l	
Loading-35	in	75036	200) 16 : 45			Brookside Gardens	
	out			16:45		(-	
Loading-36	in	75037.5	1,50	0 16 : 49			School Lane Westlands	
	out			16:49		4	0]	
Loading-37	in	75037.6	10	0 16 : 50			School Lane Westlands	
	out	1		16 : 51		<u> </u>	1	
Loading-38	in	75038.7	1,10	0 16 : 55		<u>الے ال</u>	School Lane Westlands	
	out	<u> </u>		16 : 50				
Loading-39	in	75039.1	40	0 16 : 50		<u>n</u>	Brookside Grove	
	out			16 : 5'		<u> </u>	1	
Loading-40	in	75039.2	10	0 16 : 59		2	Brookside Grove	
	out			17 :			2	
Loading-41	in	75039.5	30	017:		3	Brookside Grove	
	out			17 : 9			0	
Loading-42	in	75040	50	0 17 : 1		2	Brookside Grove	
ļ	out			17 : 1	<u> </u>			
Dumping site	in			<u> </u>			To workshop (No Domping	
Start dumping				:	1	D		
Finish dumping				<u> </u> ::			0	
Dumping site	out		+	:		0		
Reach to workshop	in	75053.1	<u> </u>	0 17 : 5	0 3	8		

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Time & Motion StudyOrganization:CITY BINSVehicle No. KAD 554 JLoading Capacity:2.6 TONNo. of Crew: 3Estimated Volume:6.75m³

Trip-1 Date:23rd May 1997 Researcher's name: M. S. Nyawira

	connere	vorume.o.	i dan		Estimated Volume.0.75m									
Location	Mileage (km)	Distance (m)	Time	Moving time (nilo.)	Leading time (min.)	Remarks (route)								
Total		83,900		292	262	Total min.: 554 min.								
Collection		49,500		154	262									
Transportation		34,400		73										
Inside the dumping site		0	·	0	0	Dumping time								
Idling time				65		Mechanical problem								

Vehicle No.KAH 850S			apacity:3.2		Researcher	's name:A.	Wanjohi
No. of Crew:3		Estimated	Volume:7.	375m	<u></u>		
1		Mileage	Distance	Time	Moving	Loading time	Remarks (route)
Location		(km)	(m)	Time	time (min.)	(mia.)	Keimarks (loute)
Start from workshop	out	6632.5		8:32	<u></u>	<u>Unau.</u>	
Loading-1	in	6638.5	6.000	8:45	13	<u> </u>	Chiromo Rd. Petrol Station
	out	000.0.0	0,000	8:46		1	-Chiromo Rd
.oading-2	in	6639.1	600		3		Ring road
	out			8:50		1	
_oading-3	in	6639.5	400		2		Ring road
	out			8:57		5	
Loading-4	in	6639.8	300	8:59	2		Lantana road
	out			9:0		1	
Loading-5	in	6640	200	9:1	1		Lantana road
	out			9:4		3	
Loading-6	in	6640.5	500	9:8	4		Sports road
	out			9:10		2	
Loading-7	in	6640.8	300	9:12	2		westlands avenue
	out			9:13		1	
Loading-8	in	6641	200	9:14			westlands avenue
	out			9:17		3	
Loading-9	in	6641.3	300				Sports road
	out			9:22		3	l
Loading-10	in	6641.4	100	9:23			Sports road
	out	<u> </u>		9:23			
Loading-11	in	6641.4	(9:25		·	Sports road
	out			9:27		2	2
Loading-12	in	6641.5	100			l	Bitha Homes-Sports Road
	out			9:33		<u> </u>	
Loading-13	in	6641.7	200) 9:34		ļ	Bitha Homes-Sports Road
	out			9:35		· · · · · · · · · · · · · · · · · · ·	
Loading-14	in	6641.8	100	9:36			Sports road
	out	1		9:39		`	
Loading-15	in	6642	200				Sports road
	out	((1))		9:45			2 Sports road
Loading-16	in	6642.4	40	<u>) 9:46</u> 9:47		l T	1
1 17	out	6643	60			5	Waiyaki way
Loading-17	in	0043		9:43		<u> </u>	Malyaki Way
Loading-18	out in	6643.1	10	9:5		2	Hillcrest Hotel-Waiyaki wa
Loauing-16	out	0045.1	10	9:59			7
Loading-19	in	6643.9	80	010:		1	Hillcrest Hotel-Waiyaki wa
Loading-17	out	10015.7		10 : 4		· · · · · · · · · · · · · · · · · · ·	1
Loading-20	in	6644.2	30	0 10 : :		1	Hillcrest Hotel-Waiyaki wa
Logong Lo	out		1	10 : 10			5
Loading-21	in	6644.7	50	0 10 : 1		1	David Osieli road
Loaomg-21	out	1		10 : 1		1	1
Loading-22	in	6645.1	40	0 10 : 1		1	East Church Road
Loaung-22	out			10 : 10			3
Loading-23	in	6645.2	10	010:10		0	East Church Road
Example 25	out		*	10:1			0
Loading-24	in	6645.4	20	010:1		2	East Church Road
Frendring PT	out			10 : 1			0

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Vehicle No.KAH 850S No. of Crew:3			apacity:3.2 Volume:7.		Researcher	's name:A	Wanjohi
NO. OF CICW.5				67511	Moving	Loading	
Location		Mileage	Distance	Time	time	time	Remarks (route)
LACATION		(km)	(m)		(min.)	(min.)	Kemarks (route)
Loading-25	in	6645.8	400	10:20	2	<u>. (tanit)</u>	terrace close
radung-20		0043.0	+00	10 : 20 10 : 21	L		
Landing 26	out	6646.6	000	10:21 10:24	2	1	Manau Candana
Loading-26	in	0040.0			3		Mangu Gardens
1 11 07	out	77171	500	10:26		Z	
Loading-27	in	6647.1	500	10:29	3	4	Body Wise Fitness Centre
r 1' 00	out	((10.0	0.000	10:33		4	
Loading-28	in	6649.7	2,500	10:38	5		Kabarsiran Avenue
	out			10:38		0	
Loading-29	in	6650.7	1,000	10:40	2		Manyani Road West
	out		ļ	10:41		1	
Loading-30	in	6651.7	1,000	10:43	2		Musa Gitau Road
	<u>out</u>			10:44		1	
Loading-31	in	6658.7	7,000	10:53	9		Museum Hill
	oul			10:54		1	
Loading-32	in	6658.8	100	10:55	1		Muthithi road
<u>_</u>	out			10 : 56		j	
Loading-33	in	6659	200	10:57	1		Muthithi road
Louis of the	out		1	10:58		1	
Loading-34	in	6659.2	200	10:59	1		Muthithi road
Loading 54	out	0037.2	200	11 : 0			
Loading-35	in	6659.4	200	11:0		1	Choiromo lane
Luauing-55		00.57.4	200	11:2	I		
I 1' 26	out	6660	600	4		1	
Loading-36	in	0000	000				westlands road
2 . 1	out	(((0.0		11:6			
Loading-37	in	6660.2	200	11:9	3		westlands road
	out	10000		11:11		2	· · · · · · · · · · · · · · · · · · ·
Loading-38	in	6660.7	500	11:17			muthithi road
	out		ļ	11:18		1	
Loading-39	in	6661.3	600	11:20	2	İ	muthithi road
	out	<u> </u>	ļ	11:21		1	
Loading-40	in	6661.4	100	11:21			Mogotio road
	out			11 : 23		2	2
Loading-41	in	6661.5	100	<u>) 11 : 23</u>	0		Mogotio road
	out			11:24			
Loading-42	in	6661.6	100) 11 : 26	2		Mogotio road
· · · · · · · · · · · · · · · · · · ·	out	1	1	11:28			2
Loading-43	in	6661.8	200) 11 : 29			Mogotio road
<u>_</u>	out	1	1	11:30		1	
Loading-44	in	6662	200	$\frac{11}{11}:31$		† '	Mogetio road
	out			11:36			inogono road
Loading-45	in	6662.2	200	$\frac{11}{11:37}$, muthithi road
Louding to	out	10002.2	+	$\frac{11}{11}:37$		1	
Loading-46	in	6662.3	100	(11:41)		<u> </u>	
		0002.3	· ······			<u> </u>	muthithi road
1 42	out	((()))		11 : 43		<u> </u>	L <u></u>
Loading-47	in	6662.7	400	$\frac{111:44}{11:44}$		<u> </u>	Parklands road
	out	1		11:45	· · · · · · · · · · · · · · · · · · ·	Į	
Loading-48	in	6662.9	200	<u>) : 46</u>		<u> </u>	May Fair Court Hotel-
	out			11:48	<u> </u>	<u> </u>	Msapo close

Time & Motion Study Organization:CITY BINS Trip-1 Date:23rd May 1997

(**†**)

time & Motion			on:CITY B		Trip-1		•
/chicle No.KAH 8	50S				Researcher	's name:A.	Wanjohi
to. of Crew:3		Estimated	Volume:7.	375m ³		<u></u>	
		Mileage	Distance		Moving	Loading	
Location		(km)	(m)	Time	time	time	Remarks (route)
<u></u>					(min.)	(min.)	ml
.oading-49	in	6663.4	500	11:52	4		The crescent
	out			11:54		2	
.oading-50	in	6663.5	100	11:54	0		The crescent
	out			11:55		I	
_oading-51	in	6664.6	1,100	12:0	5		Maua close
	out			12:2		2	
.oading-52	<u>in</u>	6664.7	100	12:3	I		La Papa Loca-Maua
	out			12:20		17	
Loading-53	in	6665.1	400	12:23	3		Ring road
	out			12:34		11	
Loading-54	in	6666	900	12:38	4	3	General Mathenge Drive
	out			12:41		3	
Loading-55	in	6666.3	300	12:42	I		General Mathenge Drive
	out			12:43		1	Eldene Device Daine
Loading-56	in	6666.9	600	12:44		3	Eldama Ravine Drive
	out			12:47			Eldama Ravine Drive
Loading-57	in	6667.1	200	12:49		,	Eldama Ravine Drive
	out			12:50	<u> </u>	1	Eldama Ravine Gardens
Loading-58	in	6667.3	200	12:51	l	2	
	out		700	12:53		<u> </u>	Eldama Ravine Drive
Loading-59	in	6668	///	12:54			Eluana Kavine Drive
	out	6669.0		12:55		<u> </u>	Eldama Ravine Drive
Loading-60	in	6668.2	200	12:56		(
	out			12:56			3rd Parklands
Loading-61	<u>in</u>	6668.7		13:0			
	out	((()))	400	(13 : 1) (13 : 3)		<u> </u>	3rd Parklands
Loading-62	in	6669.1	40	13:3			
1 II ()	out	1440.2		13:3		<u>}</u>	3rd Parklands
Loading-63	in	6669.3	200	13:4			
1 1' / 4	out	4405		13:0			L
Loading-64	in	6669.5	200	13:8		· · · · · · · · · · · · · · · · · · ·	2
x 5° (E	out	10007		$\frac{13}{13}$; 8			4t Parklands road
Loading-65	in	6669.7	20	13:10			2
1 11	out	6669.8	10	$13 \cdot 13$ $013 \cdot 11$			4t Parklands road
Loading-66	in	0009.6		13 : 13		· · · · · · · · · · · · · · · · · · ·	
Lasting 67	out	6669.9		013:14			4t Parklands road
Loading-67	in	0009.9	10	13:18		<u> </u>	4.1 arkiands road
Lasdian (9	out	6670.6		13:10 0 13:2			4t Parklands road
Loading-68	in	6670.6		13:2		' 	1
Landir - 60	out	6671.1				2	4t Parklands road
Loading-69	in	6671.1	<u> </u>	013:2 13:2		<u></u>	1
1	out	6671.4	20	13:2 0 13:2		1	4t Parklands road
Loading-70	in	6671.4				*	1
T	out	((7) 5		13:30			4t Parklands road
Loading-71	in	6671.5		013:30		' -	1
	out	COLC.		13:3			Mutati road
Loading-72	in	6671.6	10	013:3		<u>}</u>	In Indu
	out		_ _	13:3	기	.L	1

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Vehicle No.KAH 850S	,	Loading Capacity:3.29 TON Researcher's name: A. Wanjohi						
No. of Crew:3			Volume:7.8		;			
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)	
Loading-73	in	6671.7	100	13:33	0		Mutati road	
	out			13:35		2		
Loading-74	in	6671.7	0	13:36	1		Masari Road	
	out			13:39		3		
Loading-75	in	6671.8	100	13:40	1		Masari Road	
	out			13:44		4		
Loading-76	in	6672.2	400	13:45	1		3rd parklands road	
	out			13:46		1		
Loading-77	in	6672.8	600	13:49	3		4th Parklands Avenue	
	out			13:52		3		
Loading-78	in	6673.1	300	13:54	2		4th Parklands Avenue	
	out			13:55		1		
Loading-79	in	6673.4	300	13:57	2		5th Parklands Avenue	
	out		·-·	13:58		1		
Loading-80	in	6673.9	500	14:0	2		Githuri road	
	out			14:3		3		
Loading-81	<u>in</u>	6674.1	200	14 : 4]		Githuri road	
	out			14 : 7		3		
Loading-82	in	6674.3	200	14 : 10			Iregi road	
	out			14:14		4		
Loading-83	in	6674.6	300	14:15			parklands avenue	
	out			14:16		1		
Dumping site	 in	6678.1	3,500	14:37	21			
Start dumping		6686.1	8,000	14:43	6			
Finish dumping				15 : 7		24		
Dumping site	out	6694.1	8,000	15:13				
Reach to workshop	in	6700.8		16:10				
Total			68,300		257	201	Total min.: 458 min.	
Collection		1	36,100		154	177		
Transportation		1	16,200		91	0		
Inside the dumping site			16,000		12	24	Dumping time	
Idling time								

Time & Motion Study Organization:CITY BINS Trip-1 Date:23rd May 1997

Time	&	Motion	Study
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P

Organization:CITY BINS Loading Capacity:2.6 TON Estimated Volume:3.375m³

Date:24th May 1997 Trip- I Researcher's name: M. S. Nyawira

Vehicle No. KAD 551 J No. of Crew: 3	- 1	Loading Ca Estimated	apacity:2.67 Volume:3.3	FON I 75m ³	Researcher	's name: M	. S. Nyawira
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (mio.)	Remarks (route)
Start from workshop o	ut	75053.1		8:31			To Dumping site
Loading-1 i				:			
· · · · · · · · · · · · · · · · · · ·		<u></u>					
			1				
			1				
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			1 1				
			<u> </u>				
			1-1				
· · · · · · · · · · · · · · · · · · ·			<u>†</u> †				
			1				
			1				
			1				
			11				
······································							
		1					
	•	1					
- <u>-</u>							
Dumping site	in	75067.6	14,500		31		Dandora
Start dumping				9:6			
Finish dumping		1		9:32		20	5
Dumping site	out	75068.9	1,300	9:40	8	3	
Reach to workshop	in			:			
						_	
Total			15,800		4		6 Total min.: 69 min.
Collection			0				0
Transportation			14,500		3		0
Inside the dumping site			1,300		1	2 2	6 Dumping time
Idling time							

Vehicle No. KAD 551 J No. of Crew: 3		Loading C Estimated		TON	Researchei	's name: N	I. S. Nyawira
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	75068.9		9:40			From Dumping site
Loading-1	in	75081.8	12,900	10:30	50		Ridge ways Ridge way Road
	out			10:35		5	
Loading-2	in	75081.8	0	10:35	0		Ridge ways Ridge way Road
	out			10:40		5	
Loading-3	in	75082	200	10:41	1		Ridge ways Ridge way Road
	out			10:42		1	:
Loading-4	in	75083	1,000	10:44	2		Ridge ways Ridge way Road
	out			10:44		0	
Loading-5	in	75083.6	600	10:45	1		Ridge ways Ridge way Road
	out			10:49		4	
Loading-6	in	75085.7	2,100	10 : 55	6		Runda (new)
	out			10:56		1	
Loading-7	in	75089.4	3,700	11:0	4	_	Runda (Old)
	out			11 : 5		5	
Loading-8	in	75090.7	1,300	11 : 7	2		Runda (Old)
	out			11:9		2	
Loading-9	in	75092.1	1,400	11:11	2		Runda (Old)
	out			11:12		1	
Loading-10	in	75092.1	0	11:13	1		Runda (Old)
	out			11:15		2	2
Loading-11	in	75094.3	2,200	11 : 20	5		Limuru road (German School)
	out			11 : 26		6	
Loading-12	in	75098.2	3,900	11:31	5		wispers Avenue
	out			11:32	the second second second second second second second second second second second second second second second s	1	
Loading-13	in	75098.6	400	11:35		l	wispers Avenue
	out			11:36		1	
Loading-14	in	75100.2	1,600	011:40	4		Fuchsia Close
	out			11:41		1	
Loading-15	in	75100.5	300	11:42			Gardenia Road
	out			11:43			
Loading-16	in	75100.8) 11 : 44	1		Magnolia close
	out			11:45			
Loading-17	in	75101.3	500) 11 : 46			Bombax close
	out			11:46)
Loading-18	in	75101.4	100) 11 : 48			Camelia close
	out			11:48)
Loading-19	in	75101.8	400)11:50			Ansellia Close
	out			i1 : 54		4	·
Loading-20	in	75105	3,200) 11 : 59		·	Red Hill road
	out			12 : 0			1
Loading-21	in	75106.4	1,400	012:1			Red Hill road
	out			12 : 2			
Loading-22	in	75107.9	1,50	0 12 : 7		i	Nyari Estate Red Hill Drive
	out	. 		12 : 8			1
Loading-23	in	75109.8	1,90	0 12 : 12			Nyari Estate Red Hill Drive
	out			12:12	·	<u> </u>	D

Time & Motion Study Organization: CITY BINS Trip-2 Date: 24th May 1997

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ehicle No. KAD 554	-	· · · ·	pacity:2.6				. S. Nyawira
lo. of Crew: 3	r	Estimated	volume:	<u> </u>	Moving	Loading	······································
Location		Mileage	Distance	Time	time	time	Remarks (route)
Location		(km)	(m)	1,	(min.)	(min.)	
.oading-24	in	75110.3	500	12:14	2		Nyari Estate Red Hill Drive
	out			12:14		0	
.oading-25	in	75110.8	500	12:15	1		Nyari Estate (Red Hill Drive)
	out			12:15		0	
.oading-26	in	75115.3	4,500	12:22	7	0	Thigiri Grove
	out			12:22		0	Thigiri Grove
.oading-27		75115.4	100	12:23		0	
	out	76117	1.000	12 : 23 12 : 27	4		Thigiri Ridge
.oading-28		75117	1,000	12:27 12:28		1	Taight Ridge
r 00	out	75120.8	3.800	12 : 20 12 : 33	5	<u>_</u>	Kitisuru road
Loading-29	in out	13120.8	3,000	12:33		0	
Loading-30		75122.2	1.400	12:36	3		Kitisuru road
Loading-50	out	10120.0	1,100	12:39		3	
Loading-31	in	75124.9	2,700	12:43	4		peponi close
	out			12:43		(
Loading-32	in	75126.7	1,800) 12:45	2		Spring valley road
Louing	out			12:45		(
Loading-33	in	75128.2	1,500) 12 : 50			Hill view crescent
	out			12 : 50)
Loading-34	in	75128.4	200	012:52			Hill view crescent
	out			12:52		(· · · · · · · · · · · · · · · · · · ·
Loading-35	in	75129.2	80	0 12 : 55			Hill view rise
	out			12:57		<u> </u>	2 Lake view magadi close
Loading-36	in	75129.8	60	013:0		3	Lake view magaor crose
	<u>out</u>	75100.0		13 : (0 13 : 1			Lake view Elemantaita Driv
Loading-37	in	75129.8		13:13	·	· · ·	Lake their Exemandant offi
. 1: 20	outin	75134	4 20	013:10		8	Pine Wood Grove Shanzu R
Loading-38	in	13134	4,20	13 : 10			0
Loading-39	in	75134.3	30	013:1		1	Pine Wood Grove Shanzu R
Loaoing-39	out	75154.5		13 : 1			1
Loading-40	in	75134.6	30	013:1		3	Pine Wood Grove Shanzu R
Loading to	out		<u> </u>	13:1	and the second se	1	1
Loading-41	in	75134.7	10	0 13 : 1	6	0	Shanzu Rd General Mathenge
Loading-41	out			13:1	9		3
Loading-42	in	75134.8	10	0 13 : 2		1	Shanzu Rd General Mathenge
20101016 12	out			13:2			0
Loading-43	in	75134.9	10	0 13 : 2		<u> </u>	General Mathenge Shazu road
	out			13:2			
Loading-44	in	75135.2	30	1013:2		2	General Mathenge Shazu road
	out			13:2		4	2 General Mathenge
Loading-45	in	75135.6		13:3		4	2
	out	-		13:3		4	General Mathenge
Loading-46	in	75136.1		00 <u>13 : 3</u> 13 : 3	the second second second second second second second second second second second second second second second se	4	0
	out			13:3 00 13:3		3	General Mathenge
Loading-47	in	75136.2	_ "	$\frac{13}{13}$: 4			1
Loading-48	out in	75136.5		$13 \cdot 4$ 00 13 : 4		3	General Mathenge

Time & motion St	auy	Organizati	OR.CITI D	1183	нiр- 2	Date. 24th.	iviay 1997
Vehicle No. KAD 554 J		Loading C	apacity:2.6	TON	Researcher	's name: M	I. S. Nyawira
No. of Crew: 3		Estimated	Volume:				
Location		Mileage (km)	Distance (m)	Time	Moving time	Loading time	Remarks (route)
· · · · · · · · · · · · · · · · · · ·	out	´	· · ·	13:45	(mio.)	(min.) 2	
Loading-49	in	75136.7	200	$\frac{13}{13}$: 45	0	£	Donyo sabuk lane
8	out			13:49	· · · · · · · · · · · · · · · · · · ·	4	
Loading-50	in	75137.1	400	13:53	4		peponi road
	out			13:54		1	· ·
Loading-51	in	75138.1	1,000	13:54	0		Donyo sabuk Avenue
	out			13:55		1	· · · · · · · · · · · · · · · · · · ·
Loading-52	in	75138.3	200	13:56	1		Donyo sabuk Avenue
·	out			13:56		0	
Loading-53	in	75138.3	0	13:57	1		Donyo sabuk Avenue
	out	ļ		13:58		1	
Loading-54	in	75139.4	1,100	14:0	2		Lower Kabete road
	out			14:3		3	
Loading-55	in	75139.4	0	14:4	<u> </u>		Lower Kabete road
	out	76100.5	100	14:6		2	
Loading-56	in	75139.5	100	14 : 8 14 : 10	2	2	
Dumping site	out in	75152.9	12 (00	14 : 10 14 : 35		2	Dandora
Start dumping	111	13132.9	13,400	14 : 33 14 : 40			
Finish dumping			<u> </u>	14 : 40 14 : 49		9	
Dumping site	out	75154.8	1.900	14:54	5		······································
Reach to workshop	in			15:30	36		
Total			85,900		263		Total min.: 350 min.
Collection		ļ	57,700		142	78	
Transportation			26,300		111	0	
Inside the dumping site			1,900		10	9	Dumping time
Idling time			<u> </u>				

Time & Motion Study Organization:CITY BINS Trip-2 Date:24th May 1997

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Vehicle No.KAH 850S No. of Crew:3	·		apacity:3.29 Volume:7.8		Researcher	's name:A.	Wanjohi
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	6700.8		8:37			
Loading-1	in	6702.1	1,300	8:43	6		mukundu read-South B
	out			8:44		1	•
Loading-2	in	6702.6	500	8:46	2		Melili road
	out			8:49		3	
Loading-3	in	6704.2	1,600	8:54	5		Golden Gate
	out			8:57		3	
Loading-4	in	6704.6	400	8:59	2		Sadi road
	out			9:2		3	
Loading-5	in	6704.7	100		1		Sadi road
	out			9:7		4	and the second second second second second second second second second second second second second second second
Loading-6	in	6704.8	100		0		Sadi road
	out			9:10		3	
Loading-7	in	6704.9	100		0		Sadi road
	out			9:12		2	
Loading-8	in	6707.3	2,400	9:18	6		Mombasa road
	out			9:19		1	
Loading-9	in	6711.3	4,000	9:37	18		Muhoho road-South C
	out			9:41		4	
Loading-10	in	6711.4	100	9:41	0		Pundamilia Crescent
	out			9:43		2	
Loading-11	in	6711.5	100	9:44	1		Pundamilia Crescent
	out			9:46		2	
Loading-12	in	6711.6	100	9:46	0		Mukangi road
	out			9:47			· · · · · · · · · · · · · · · · · · ·
Loading-13	in	6711.6	0	9:50	3		Mukangi road
	out			9:51	and the second s		
Loading-14	in	6711.7	100		÷		Ndekwa Avenue
	out			9:57			5
Loading-15	in	6712.1	400	10 : 0	3		Dluvimu Road
	out		ļ	10:1			l
Loading-16	in	6712.3	200	10 : 2			Sungura road
	out			10:3]
Loading-17	in	6712.4	100	10:4			Sungura Estate-Sungura road
	out			10 : 5		<u> </u>	1
Loading-18	in	6712.5	100	10 : 5		<u>)</u>	Sungura Estate-Sungura road
	out			10 : 6			1
Loading-19	in	6712.5	(10:9		<u> </u>	Sungra road
	out			10 : 10			1
Loading-20	in	6712.6	100) 10 : 18			Sungra road
	out	1		10 : 20			2
Loading-21	in	6712.7	100) 10 : 21		l 	
	out		<u>_</u>	10:24			3
Loading-22	in	6713.1	400) 10 : 27			
	out			10:30			3
Loading-23	in	6713.7	600	$0 10 : 3^2$		<u>ال</u>	Mugoya Estate
1	out	1		10:36	5	1	2

Time & Motion StudyOrganization:CITY BINSTrip-1Date:24th May 1997Vehicle No.KAH 850SLoading Capacity:3.29 TONResearcher's name:A. WanjohiNo. 600Patiented Values 2.875m³

(**†**)

Vehicle No.KAH 850S			apacity:3.2		Researchei	's name:A.	Wanjohi
No. of Crew:3		Estimated	Volume:7.	<u>375m³</u>			
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24	in	6713.8	100	10:37	1		Mugoya Estate
	out			10:37		0	
Loading-25	in	6714.4	600	10:40	3		Mugoya Estate
	out			10:42		2	
Loading-26	in	6714.5	100	10:43	1		Mugoya Estate
	out			10:45		2	
Loading-27	in	6715.1	600	10:47	2		K.M.A.
	out	10100		10:48		<u> </u>	(Kenya Medical Association
Loading-28	in	6715.8	700	10:50	2		Rumi Road
Landing 20	out	6716	200	10:51 10:52	1	1	Rumi Road
Loading-29	in out	0/10	200	10:52 10:54	I	2	
Loading-30		6716.1	100	10:54 10:54	0	2	Ole shapara Avenue
roading-50	out	0/10.1	100	10:54 10:57	0	3	ore snapara Avence
Loading-31	in	6716.2	100	11:2	5		
	out			11:4		2	
Loading-32	in	6716.3	100	11: 5	1		
	out			11:5		0	
Loading-33	in	6716.4	100	11:6	1		Ole shapara Avenue
	out			11:6		0	
Loading-34	in	6716.6	200	11 : 7	1		Mufulu Avenue
	out			11:8		}	
Loading-35	in	6716.8	200	11:11	3	·····	Uchumi road
} ►■~	out			11:11		0	
Loading-36	in	6716.9	100	11:12	1		Uchumi road
	out			11 : 13		<u> </u>	
Loading-37	in	6717	100	11:13	0		Uchumi road
Lasting 10	out	6717.1	100	11 : 15 11 : 16		2	
Loading-38	in out		100	11 : 10 11 : 17	¹	1	Ole shapara Avenue
Loading-39	out in	6717.2	100	11:18	1		Ole shapara Avenue
Loading-59	out	0/11.2	100	11 : 18		0	
Loading-40	in	6717.3	100	11 : 10			Ole shapara Avenue
	out			11:22		2	
Loading-41	in	6717.4	100	11:23			Ole shapara Avenue
	out			11:25		2	
Loading-42	in	6717.5	100)11:25	0		Ole shapara Avenue
¥	out			11:27		2	
Loading-43	in	6717.5	(11:28	1	1	
	out		ļ	11:31		3	
Loading-44	in	6717.6	100) 11 : 32	1	<u> </u>	Mtelo road
	out		_	11:41	ļ	9	
Loading-45	<u>in</u>	6717.7	100) 11 : 42			Mufuti road
	out	(012.0		11:45		3	
Loading-46	in	6717.8	100)11:48		l	Mufuti Crescent
1	out	(212.0		11:49		¹	
Loading-47	in	6717.9	1 100)11:50	1	1	Mufuti Crescent

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Vehicle No.KAH 850S		Loading C	apacity:3.2	9 TON	Researcher	's name:A.	Wanjohi
No. of Crew:3		Estimated	Volume:7.8	175m°	<u></u>		······································
Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-48	in	6718.2	300	11:54	4	· · · · ·	Mufuti Crescent
	out	T		11:57		3	
Loading-49	in	6719.1	900	12:0	3		South C
	out			12:2		2	
Loading-50	in	6719.2	100	12:5	3		South C
	out			12:9		4	
Loading-51	in_	6719.3	100	12:10	1		South C
	out			12:11		1	
Loading-52	in	6719.7	400	12:12			South C
	out			12:16		4	
Loading-53	in	6719.9	200	12:17			South C
	out			12:17		0	
Loading-54	in	6720	100	12:18	1		South C
	out			12:22		4	······
Dumping site	in	6737	17.000	13 : 3	41		
Start dumping		6737.8		13:9			
Finish dumping			1	13:24		15	
Dumping site	out	6738.6	800	13:30			
Reach to workshop	in	6745.3		14:0			
Total			44,500		200	123	Total min : 323 min.
Collection			17,900		111	108	
Transportation			25,000		77	0	
Inside the dumping site			1,600		12	15	Dumping time
Idling time							

Time & Motion Study Organization:CITY BINS Trip-1 Date:24th May 1997

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